SKANSKA WALSH
DESIGN-BUILD JOINT VENTURE

Environmental, Health and Safety Manual

LGA CTB REPLACEMENT - SKB

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SKANSKA WALSH
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Introduction

Environmental, health and safety (EHS) are core values for Skanska, and are the foundations for all policies, procedures, training programs, reporting requirements and incident response plans. These are designed to ensure the health and safety of all site personnel and minimize impacts on the surrounding community. Contractor's senior management fully supports all EHS initiatives and the enforcement of the policies set forth in this EHS Manual.

Skanska's Safety, Health and Environmental Management System (SHEMS)) provides the format to conduct work on projects managed by Contractor in the context of increasingly stringent legislation, the development of economic policies and other measures that foster both safety and environmental protection. The program has been developed and is based on continual improvement associated with increased concern expressed by interested stakeholders regarding environmental matters and sustainable development.

The scope of Skanska's Safety Health and Environmental Management System applies to all sizes and types of projects where SkanskaMaintains operational and financial control.

The basis of Skanska's approach depends on the commitment from all levels and functions of the organization. A system of this kind enables an organization to:

- Develop a safety, health and environmental policy that establishes objectives, targets and processes to achieve the policy commitments
- Take action as needed to improve its performance and demonstrate the conformity of the system to the requirements of OHSAS 18001 and ISO 14001

The overall aim of this program is to promote safety, health and environmental protection, the prevention of pollution and to address the socio-economic needs of the affected community.

Skanska's EHS Manual will reflect all applicable legal and client requirements. The project management will ensure that all members of the project team adhere to our SHEMS and all EHS Manual requirements. Project management will have full access to Skanska's national and regional corporate environmental, health and safety staff in support of this program.

Our EHS professionals are trained in their field and will guide the project team in establishing Skanska's SHEMS, which is inclusive of measuring our environmental, health and safety performance. Similar to production planning, the entire Skanska team will be involved in the

planning and implementation of Skanska's SHEMS to ensure the project's overall environmental, health and safety success.

The entire Skanska team has extensive experience establishing and implementing Skanska's program on complex building and infrastructure projects in diverse geographical areas ranging from urban areas to extremely rural areas. Adherence to Skanska's standards for all employees throughout all projects is integral to our success.

EHS POLICIES

These EHS policies address Skanska's expectations to protect the environment and the health and safety of everyone at or nearby Contractor project sites. To the extent these EHS policies relate to Skanska employees, Skanska has direct responsibility for enforcing these policies.[1] To the extent the policies relate to subcontractors and their employees, workers or other personnel on a site at the behest of a subcontractor, the subcontractors are responsible for ensuring that their workers comply with these expectations.[2]

Skanska further reserves the right to supplement, modify or alter these policies at any time.

EHS Manual Definitions

The term "employee is defined as a person employed by Skanska, and, in the case of a joint venture includes all individuals employed by the joint venture or working at a project on behalf of the joint venture while remaining in the employ of a joint venture partner.

The term "subcontractor" is defined as a business or person of any tier below Skanska that performs any part of the labor or material requirements of a contract for construction, alteration or repair on the project.

[1] As to Skanska employees, as stated in the applicable Employee Handbook, employment with Skanska is employment at will. This means that employment may be terminated for any or no reason, with or without cause or notice, at any time by an employee or by the Company. Nothing in this EHS Manual or in any other document or oral statement shall limit the right to terminate at will. This employment at will policy is the sole and entire agreement between any Skanska employee and Skanska, as to the duration of employment and the circumstances under which employment may be terminated.

[2] Nothing in the EHS Manual is intended to or should be deemed to give Skanska the right to control any site personnel that are not Skanska employees. This EHS Manual does not create any joint employment relationship, either direct or implied, between Skanska and any subcontractor worker.

The term “subcontractor employee” is defined as a person employed by a subcontractor. The definition of project “subcontractor employee” shall apply to every tier of subcontractor, its employees, independent contractors, agents, suppliers, and all workers who enter the project and perform a portion of the contract involving labor.

The terms “site personnel” and “worker” are defined to include employees of Skanska as well as subcontractor employees performing work at the project site. Subcontractors maintain all responsibility for managing, controlling and setting the terms and conditions of work for subcontractor personnel. To the extent that a subcontractor of any tier performs any part of the contract scope of work, it assumes responsibility for complying with the applicable provisions of this EHS Manual.

Injury-Free Environment®

In 2003, Skanska implemented an Injury-Free Environment (IFE®) initiative on all our projects. IFE is the shared corporate and individual belief that safety is a value, not compromised by cost or schedule. The program is designed to create for all workers a mindset intolerant of any frequency or severity of injury or incident.

In our IFE, everyone involved on projects, from craft workers to our client partners, has ownership of the safety program and is held accountable for its implementation. The core principles of our IFE philosophies include:

- All incidents and injuries are preventable
- Injury-free operations are possible in construction
- Safety awareness is personalized every day
- Each worker is empowered and accountable to stop any unsafe act or condition on the jobsite

We manage our IFE through training and participation. All subcontractors and workers entering our jobsites are encouraged to attend IFE training, which focuses on workers’ personal relationship to safety and three skills:

- Assigning injury-free work
- Recognizing and reinforcing safe work
- Constructively correcting at-risk work

Prior to any work activity starting, a Construction Work Plan (CWP) will be completed to identify specific hazards and controls related to the task.

Daily jobsite IFE activities begin with Stretch & Flex, a 10-minute stretching and calisthenics program for all workers. Begun in 2004, Stretch & Flex is an energetic way for the entire team to start the day and is followed by announcements or relevant toolbox talks. Crews then gather for a Daily Hazard Analysis (DHA), a 10-15 minute documented conversation about the day's activities, associated hazards and plans to abate the hazards. Skanska superintendents and EHS professionals perform daily worksite inspections to confirm DHAs and CWPs are completed and implemented appropriately.

The effectiveness of our IFE program is measured through both leading and lagging indicators. Lagging indicators, such as incident rates and lost time accident rates, capture industry-standard safety statistics. Leading indicators, however, are more consistent with our IFE culture and include measuring participation in Stretch & Flex, the number of people who have been trained in IFE and the number of Executive Site Visits performed by Skanska leadership.

Environmental, Health and Safety Policy Statement

Skanska is attuned to the potential safety, health and environmental impacts of its operations and activities. In keeping with Skanska AB policies, which are incorporated here by reference, Skanska's management has established, implemented and maintains a safety, health and environmental management system to address these potential impacts and to carry out operations and activities in a manner that is protective of human health and the environment. This management system is designed to make safety, health and environmental care an integral part of all projects and a responsibility of all employees and any persons working for, or on behalf of, Skanska. It allocates appropriate resources and provides the training necessary to ensure the attainment of safety, health and environmental objectives and targets.

Senior Skanska management is committed to keeping this system effective for its intended purpose and to continually improving it as a framework to achieve the following results:

Regulatory Compliance
We will evaluate and comply with all applicable federal, state and local laws and regulations and any other requirements at each location where we conduct business.

Prevention of Accidents
We will strive to identify and assess risk in all our activities and take actions to mitigate any high-risk conditions.

Prevention of Pollution
We will seek first to cost-effectively avoid the creation of pollution and waste from our projects and operations, and second, to manage remaining waste through safe and responsible methods.

Conservation
We will strive to reduce our consumption of natural resources through cost-effective use of recycled and reused materials and conservation of energy and water.

Emissions and Effluents

We will work to diminish our emissions and effluents by employing cost-effective operational controls, by diligently monitoring operational indicators and by implementing corrective and preventive actions where necessary.

Ecology and Habitat
We will protect habitats, wetlands and other sensitive ecological resources in accordance with applicable regulations and local ordinances.

Hazardous and Toxic Substances
We will exercise caution when using hazardous materials and not use toxic substances if we cannot assess their human, ecological or environmental risks.

Communication
We will communicate this policy to all employees, make it available to the public and establish procedures to receive and respond to inquiries from external interested parties. We will also alert potentially affected individuals and authorities of any safety, health or environmental incidents in a timely and effective manner. Thorough investigations will be conducted and corrective and preventive actions implemented and monitored. Senior management at Skanska believes that how we care for people and the environment today affects both current and future generations. We accept our responsibility for doing our best to maintain awareness and to minimize adverse safety, health and environmental impacts from our operations.

Sincerely,

Richard Cavallaro

EVP Skanska AB / President & CEO Skanska USA

January 1, 2015

SHEMS

SHEMS Program

Corporate Organization Structure

The overall structure for Skanska USA Inc. SHEMS management is shown below. The organizational structure for each region will be carried out to the individual project level and maintained throughout the life of the project.

Prior to the commencement of work on every project, a project-specific organization structure/chart will be created. This document will be updated by the project team throughout the life of the project.

Corporate Organization Chart

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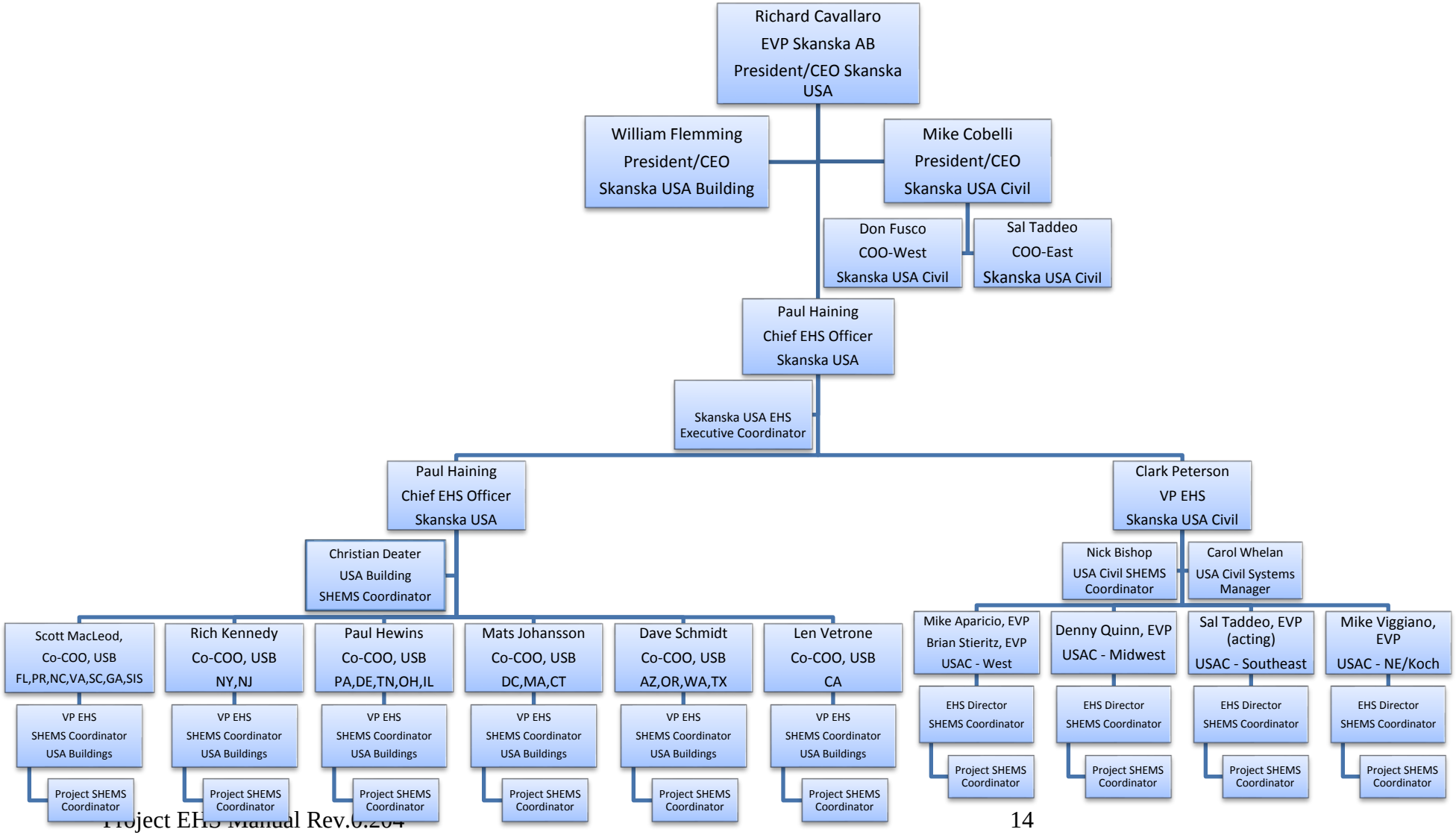

Identification and Management of EHS Impacts

Objective

The objective is to identify the EHS impacts of Skanska's activities, products and services and to develop operational controls, indicators, measureable objectives and targets as defined in the EHS Manual. This assessment will take into account our operations, subcontractor operations, visitors and vendor activities. EHS impacts will be identified before the start of work and updated as needed.

ISO/OHSAS References

- ISO 4.3.1 Environmental aspects
- ISO 4.3.3 Objectives, targets and programs
- ISO 4.4.1 Resources, roles, responsibility and authority
- ISO 4.4.6 Operational controls
- OHSAS 4.3.1 Hazard identification, risk assessment and determining controls
- OHSAS 4.3.3 Objectives and programs
- OHSAS 4.4.1 Resources, roles, responsibility, accountability and authority
- OHSAS 4.4.6 Operational controls

Procedure

<u>Identifying EHS Impacts and Determining Significance</u>

Prior to beginning work, project teams will identify and assess all potential EHS aspects and impacts utilizing the PlanIt Tool. The following criteria establish the EHS aspects and impacts as significant:

- Any EHS impact with a regulatory requirement
- An impact deemed significant by a client
- Potential human exposure to a hazard

- A solid waste stream that can be profitably recycled or reused related to a Skanska green strategic indicator or initiative
- Any situation that could result in adverse publicity or negative public opinion

The EHS Manual identifies the minimum requirements for all significant environmental aspects and Health and Safety Hazards. For each EHS aspect and hazard identified, the project team will customize the project EHS Manual and ensure the following items are included:

- Significant Environmental Aspects Objectives
- Quantifiable Environmental Targets (where practical)
- Health and Safety Objectives
- Operational controls
- Performance indicators
- Legal and other requirements
- Roles and responsibilities
- Documents and records
- Training
- Emergency response

Each project uses an integrated approach to manage the environmental, health and safety risks associated with the project and the individuals below have been assigned specific responsibilities associated with the management of the program.

Tasks	Person Responsible	Documents/Records/Performance Indicators
Manage risk and mitigate impacts associated with this program	Project Manager, Superintendent, Project Engineer, EHS Professional	Management review results
Identify legal and other requirements	Project Manager, Superintendent, Project Engineer, EHS Professional	Management review results
Identify and develop applicable plans	Project Manager, Superintendent, Project Engineer, EHS Professional	Management review results
Identify employee training needs	Project Manager, Superintendent, Project	Training records

Tasks	Person Responsible	Documents/Records/Performance Indicators
	Engineer, EHS Professional	
Facilitate training	Project Manager, Superintendent, Project Engineer, EHS Professional	Training attendance records
Implementation of programs	Project Manager, Superintendent, Project Engineer, EHS Professional	Management review results
Prepare Construction Work Plan	Project Manager, Superintendent, Project Engineer, EHS Professional	Construction Work Plans
Review and approve Construction Work Plan	Project Manager, Superintendent, Project Engineer, EHS Professional	Construction Work Plan sign-offs
Conduct crew reviews	Project Manager, Superintendent, Project Engineer, EHS Professional	Crew review results
Required inspections	Project Manager, Superintendent, Project Engineer, EHS Professional	Inspection findings
Compliance audits	Project Manager, Superintendent, Project Engineer, EHS Professional	Audit findings
Subcontractor EHS Kick-off Meeting	Project Manager, Superintendent, Project Engineer, EHS Professional	Meeting minutes and attendance records

For each individual construction activity (e.g., framing doors, installing fixtures, etc.), each contractor will be provided Skanska's electronic tool to develop a Construction Work Plan (CWP) to mitigate EHS risks and impacts.

The Construction Work Plan will include:

- A narrative description of each activity that details all elements of the task in a sequential order inclusive of means and methods
- Initial and residual risk
- Triggers which include the task environment, equipment, materials and tools associated a with the activity and controls to be implemented for risk mitigation

- Identification of competent person(s)
- Training requirements (documentation to be provided prior to work commencing)
- All equipment, materials, small tools and safety equipment
- Emergency action plan, including, but not limited to, fall protection rescue, confined space rescue, SCBA standby, HazMat team, etc.
- Additional information as required (drawings, SDS sheets, cut sheets, etc.)

The following hierarchy should be followed, in the prescribed order, when determining controls for each trigger:

- Elimination
- Substitution (i.e., substitution of a product that is less hazardous, or using the same product but in a different form)
- Engineering Controls (i.e., fitting mufflers to equipment to reduce noise at source, use of local exhaust ventilation systems, etc.)
- Administrative Controls (e.g., utilizing enclosures, shift rotation, signage, barriers, etc.)
- Personal Protective Equipment (PPE)

The CWP will determine the highest remaining risk level for each task, which will be documented on the acknowledgement sheet that is attached to the Risk Assessment and Control Worksheet. The risk levels will be classified as extremely high risk, high risk, moderate risk or low risk.

Upon completion of the CWP, the risk assessment must be approved by an appropriate member of the management team. Subcontractor management will approve their CWPs and submit to Skanska project management for review prior to starting work. As the risk associated with the task increases the authorization for the activity advances through the organizational structure:

- Extremely high risk operation – never authorized
- High risk operation – company officer (President or VP)
- Moderate risk operation– Project Manager, Superintendent, and EHS
- Low risk operation – Superintendent

Following the sign-off of the CWP, and before any activity begins, all crew members must be given training on the plan requirements, and are to sign the acknowledgement sheet. A change in conditions requires the plan to be updated and all crew members to be retrained.

<u>Ongoing Risk Assessment</u>

A Daily Hazard Analysis will:

- Begin with a pre-shift meeting in the area where work is to be performed
- Include communications from project management to crew from the morning's/pre-shift meeting
- Should include a 360 degree look around
- Be conducted by the foreman at the activity's location to communicate the risks, hazards and environmental aspects associated with the CWP
- Discuss the required controls to ensure safe performance and mitigate any negative impact to the environment
- Address changing conditions including simultaneous operations or adjacent work activities
- Provide an opportunity for craft employees to provide feedback or concerns to project management
- Be turned in to the project superintendent, or their designee, at the end of each shift

Project management team will review the DHA, provide feedback at the next pre-shift meeting, and address all EHS concerns.

Crew Reviews

Every two weeks the project team members are required to evaluate all foremen/crews as a means to engage the whole team in EHS planning activities. The reviews should occur at the beginning of the shift and should include the foremen and all of their crew members. Each project shall create a rotating schedule to ensure that all project team members are involved in assessing all crews. The crew review shall be documented and ensure that the CWPs are:

- Current to the ongoing task
- Taking into account any changing conditions (i.e., the triggers noted on the original plan are still applicable)
- Reviewed in the field and revisions provided prior to the next shift
- Maintained in the project's EHS files

Project management will address all EHS concerns, discuss findings, and provide revised CWPs to crews as necessary.

Determining Legal and Other Requirements

Objective

The objective of this procedure is to provide projects with appropriate and relevant knowledge of federal, state and local safety, health and environmental regulations that are applicable to the hazards and environmental aspects of the activities and operations at their respective worksites.

ISO/OHSAS References

- ISO 4.3.2 Legal and other requirements
- OHSAS 4.3.2 Legal and other requirements

Procedure

Authority and Responsibility

In this project EHS Manual the project manager will assign roles and responsibilities to Skanska personnel to ensure legal compliance on the project.

The project manager and designated SHEMS coordinator are responsible for maintaining operations in compliance with all applicable legal requirements with the assistance of the EHS Director.

The project manager/superintendent will ensure all personnel who perform work on our behalf are adequately trained in the risks they are exposed. Likewise, subcontractors shall ensure that their employees are adequately trained in the risks to which they are exposed.

During the management review process, if a change of activities or operations creates a new EHS aspect or impact, the project manager will be responsible for identifying and enforcing all applicable legal requirements.

Information on legal requirements can be obtained from multiple sources, including but not limited to:

Construction Industry Compliance Assistance Center	www.cicacenter.org
Environmental Law Net	www.lawvianet.com
Environmental Protection Agency	www.epa.gov

BLR Solutions for Skanska Safety and Environmental	www.blr.com
American National Standards Institute	www.ansi.org
Occupational Safety and Health Administration	www.osha.gov

Skanska can also receive input on local ordinances and other requirements through legal publications, bulletins, notices and person-to-person contact with local government agencies and municipal officials. Skanska is responsible for identifying, processing and responding appropriately to applicable municipal requirements.

If regulatory requirements change Skanska's EHS programs will be updated accordingly. The EHS Department transmits all new programs and requirements to the project manager, or his/her alternate, who will initiate appropriate responses to ensure program implementation and compliance. A log must be maintained to document all applicable legal requirement updates/changes.

The EHS Department may prepare management instructions, handbooks, interpretive statements and maintenance manuals to assist with legal compliance.

Training

Objective

EHS training will be conducted to ensure that employees understand how to execute their tasks safely while also protecting the environment.

ISO/OHSAS References

- ISO 4.4.2 Competence, training, and awareness
- OHSAS 4.4.2 Competence, training, and awareness

Procedure

These are minimum training requirements and are not intended to be all-encompassing. Training requirements are also referenced in the individual EHS aspects, CWPs and other EHS documents.

Prior to engaging in work, all employees will be trained on the EHS impacts of the tasks being performed. Likewise, all Subcontractors shall cause all workers to be trained on applicable EHS impacts of the tasks performed by those workers.

Project Orientation Training

All site personnel will receive project-specific orientation upon arrival at the project site.

IFE Trainings

- IFE training is required for all individuals working on Skanska projects
- Consult the regional EHS Director for current IFE training requirements

Awareness Training

The objective of awareness training is to enable employees to recognize potential EHS impacts and to understand Skanska's policies as defined in this EHS Manual. Workers roles and responsibilities will be communicated during awareness training conducted by Skanska or the subcontractor, as applicable.

A baseline training matrix has been developed (see below) to determine minimum training requirements within the organization. The training identified in the matrix is not intended to be all-inclusive. Specific awareness training will be identified at the operating unit level.

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Training Matrix

Topic	Who Needs Training	What Training is Needed
Project Specific EHS Orientation	All project management, supervision, and workers entering the project	At a minimum the training must cover following Skanska's Corporate Policies: • IFE • SHEMS Awareness • Accountability • Anti-harassment • Environmental aspects • Expectations for Stretch and Flex and • Code of conduct • Ethics Site specific information may include: • Site Emergency Action Plan, • Site Specific and Owner Requirements, • OSHA 10/30hr Construction Outreach Training requirements • Fall Protection General Awareness Training
Hazard Communication	All workers entering the project	• Hazard Communication Basic Training
Hazardous Chemical or Substance	Workers exposed to hazardous chemicals or substances such as paints, solvents, lead, silica and asbestos.	• Specific Hazard Training

Topic	Who Needs Training	What Training is Needed
Respiratory Protection	Workers required to wear respiratory protection	• OSHA 29 CFR 1910.134 and 139
Fall Protection	Any worker who might be exposed to a fall hazard	• The nature of fall hazards • Procedures for erecting, disassembling, maintaining and inspecting fall protection systems • Use and operation of: guardrail systems, personal fall arrest systems, safety net systems, warding line systems, controlled access zones and other fall protection • Fall protection standards
Personal Protective Equipment (PPE)	All employees	• Refer to PPE policy or regulatory standards
Powered Industrial Trucks (Forklifts)	Operators of powered industrial trucks	• Types of trucks operated • Hazards of the workplace • Hands-on performance evaluation
Confined Spaces	Any worker attending to, supervising, entering or working within a confined space	• Hazards of the space • Duties of entrants, attendants, supervisors • Air monitoring
Permit-Required Confined Spaces	Any worker attending to, supervising, entering or working within a permit-required confined space	• Hazards of the space • Duties of entrants, attendants, supervisors • Measures used to eliminate or control hazards

Topic	Who Needs Training	What Training is Needed
		• Air monitoring requirements • Emergency procedures/rescue equipment • Communications • Permitting procedure • PPE
Excavations/Trenches	Workers entering or working within an excavation/trench	• Hazards of the space (slides, cave-ins, water accumulation, etc.) • Safe means of access/egress • Proper support system procedures (erection, maintenance, disassembly and inspection)
Lockout/Tagout	Workers affected by hazardous energy sources	• Nature of known hazardous energy sources • Project-specific Lockout/Tagout procedures
Gas/Arc Welding & Cutting	Workers conducting welding and/or cutting	• Procedures for unattended machines and electrode holders • Operations around water • Shielding arc welding • The safe use of fuel gas • Respiratory training • Occupational exposure training (i.e. lead, welding fumes, hexavalent chromium)
Hot Work	Workers conducting hot work	• Hazards of the area

Topic	Who Needs Training	What Training is Needed
	activities	• Permits • Duties of fire watch • How to use a fire extinguisher
Scaffolding	Workers working from scaffolding	• The nature of any known hazards • Proper erection, maintenance and disassembly of fall protection systems • Falling object protection • Material/equipment handling from scaffold • Maximum load-carrying capacity • Scaffold tagging system • Access and egress
Crane Suspended Personnel Baskets	Workers working from crane baskets	• Safety work rules • 100% fall protection • Lift plans contents • Emergency procedures
Shipyards and Vessel maintenance	Workers performing maintenance of vessel, to include floating cranes, whether at our site or at a shipyard	• Requirements of OSHA 29 CFR 1915 and 1926
Marine Operations	Employee working on or in the immediate vicinity of barges and other marine equipment	• Marine operations • Man-overboard procedures • Vessel access • Safety equipment (life buoy, PFD, safety skiff)

Topic	Who Needs Training	What Training is Needed
Flagger Training	Any worker directing traffic or heavy equipment	• Proper PPE • Knowledge of traffic control devices • Purpose of traffic control devices • Principles of traffic control devices • Placement and operation of traffic control devices • Maintenance of traffic control devices • Authority for placement of traffic control devices
Aerial Work Platform (AWP) Certified Operator Training	Any worker required to operate an Aerial Work Platform	• Safe operations • Knowledge of safety devices • Equipment inspection • Hazard awareness • Pre-start operational check • Safe shutdown procedures
Silica Awareness	Any worker that is occupationally exposed to silica containing dusts generated as a result of concrete demolition, drilling , chipping or mixing operations	• What crystalline silica is • Common exposures to crystalline silica • The hazards of crystalline silica • What to expect in your workplace
Small Spills and Leaks	Any worker that may potentially be involved with responding to a small spill or leak	• Spill prevention • Spill response • Proper storage • Proper handling

Topic	Who Needs Training	What Training is Needed
		• Hazard identification
Rigging	Any worker involved with standard, major or critical lifts	• Rigging plans • Load characteristics • Equipment requirements • Environmental factors • Inspections • Lift preparation • Role of the rigger • Types of slings, shackles • Communication systems
Hand/Voice Signaling	Any worker involved with communicating with heavy equipment operators to facilitate the movement of materials or equipment	• Rigging awareness • Equipment capabilities/limitations • Hand signals • Voice commands
Accident Investigations	Anyone participating in accident/incident investigations	• How to respond to different types of accidents • Conducting an investigation • Techniques to get accurate results when interviewing witnesses • Documenting findings and corrective actions • Assessing accuracy of findings and effectiveness of corrective actions • Implementing improvements

Competency Training

Competency training is not the same as an OSHA competent person. Competency training is the minimum training that each employee must complete before beginning an assigned task or function.

CWPs will be used as the basis for competency training. Any further training will be identified as part of the CWP process. Skanska and Subcontractors will ensure employees have received training prior to commencing an activity, and likewise subcontractor training will be subject to verification by Skanska at its discretion.

All site personnel will be trained on:

- The scope of work for the activity
- Associated hazards
- Environmental aspects
- Engineering and/or administrative controls
- Specific PPE requirements
- Emergency action plan

Additional Training Requirements

All Skanska salaried personnel with field operation responsibilities must complete one web-based safety training module each month. Each module is valid for five years.

All Skanska employees identified as competent persons on the Construction Work Plan are required to complete all associated web-based training modules or an equivalent program, approved by the local EHS Director. All training must be renewed every five years.

All Skanska salaried personnel with field operation responsibilities must complete OSHA 30 training. After initial OSHA 30 training, OSHA 10 training must be completed every five years.

Enter project-specific training requirements

Documentation

- All training will be documented
- Training records will be maintained for the length of the job and thereafter will be stored with the project files and/or at regional EHS office
- Subcontractor employee training records will be subject to verification by Skanska at its discretion throughout the duration of the project

Communication

Objective

The objective of this procedure is to communicate our concern for the safety of all personnel, the environment, and our desire to conduct business operations in a safe and environmentally sound manner to all employees, owners, suppliers and contractors.

An additional objective is to communicate specific procedures and requirements to those owners, suppliers and subcontractors that provide goods and services associated with significant environmental aspects or known hazards.

All written, external input regarding safety, health and environmental performance will be considered as being from an interested party. All such input will be processed in accordance with this procedure.

ISO/OHSAS References

- ISO 4.4.3 Communication
- ISO 4.5.2 Evaluation of Compliance
- OHSAS 4.4.3 Communication, Participation and Consultation
- OHSAS 4.5.2 Evaluation of Compliance

Procedure

Internal Communication

Skanska will communicate the following to employees:

- Skanska's Environmental, Health and Safety (EHS) policy and relevant sections of the SHEMS will initially be communicated through SHEMS awareness training
- Any changes to the SHEMS will be communicated to employees as needed by senior management

Each Skanska region will create a Corporate EHS Leadership Team that meets on a monthly basis to set goals, policies, and programs. Meetings may be held via teleconference; however the team must meet in person at least once a quarter.

Meetings shall be led by a member of the senior executive management team responsible for the region (e.g., Executive Vice President, Chief Operating Officer or General Manager) and shall include Contractor EHS Directors, Project Executives, Account Managers and Superintendents, as applicable.

All projects will also establish a Project EHS Leadership Team, inclusive of all levels of project management and craft for both Skanska and subcontractors. The team shall meet monthly and will:

- Review all incidents
- Discuss job environmental, health, and safety performance
- Conduct a site inspection - all potential hazards/risk identified must be addressed at the time of the inspection and document closure if possible
- Assess committee's site inspection to the EHS Monthly Compliance Audit to evaluate potential trends and repetitive items.
- Hold special meetings when warranted and after all lost-time incidents
- Utilize Project SHEMS Leadership Team agenda and maintain meeting minutes
- Report program status to the regional office management team

External Communication

Skanska will communicate the following information to external parties:

- Our concerns about EHS issues and desires to conduct business operations in a safe and environmentally sound manner
- That we have an EHS Management System that is based on ISO-14001/OHSAS-18001 and that has been registered with an accredited ISO-14001/OHSAS-18001 Registrar
- That we encourage our owners, suppliers and contractors to provide, at the same quality and price, products and services that have safe working conditions and the least environmental consequence of all available options

Relevant sections of the SHEMS will be communicated to subcontractors during the contract award process, orientation training and SHEMS Awareness Training.

Skanska will communicate the following to suppliers:

- Where a supplier's product is creating a significant EHS hazard, Skanska will communicate to that supplier that, where possible, they should select the available option that minimizes the potential environmental impact or safety hazard of that product
- Where an owner, supplier or contractor is supplying goods or services associated with EHS aspects, the project will work with procurement to inform that supplier or contractor of applicable requirements to mitigate, minimize, or otherwise control the potential EHS impacts

Communications with owners, suppliers, and contractors form part of the subcontract agreement.

All written, external inquiries concerning EHS performance will be directed to the corporate EHS Department and, when appropriate, to the Communications Department, which will:

- Coordinate with the Operating Unit/Region's most senior EHS representative to evaluate the substance of the external communication
- The Operating Unit/Region's most senior EHS representative will make a determination of whether the communication pertains to an existing significant aspect or hazard, or to one that may need to be added into the SHEMS
- Following this evaluation, the EHS department, or designee, will respond appropriately to the external interested party
- The response will be timely
- All external communications will be kept for consideration when establishing and reviewing safety and environmental objectives and targets for the SHEMS and will initiate any necessary changes to the SHEMS

Documentation

Corporate EHS Leadership Team meeting documentation will be maintained at the regional office.

Project EHS Leadership Team meeting documentation will be maintained with the project records.

The EHS Department will document the contents of the external communication, the evaluation of its content, the decision taken on any changes to the SHEMS and the contents of the reply to the external interested party. Records pertaining to these communications will be kept in the EHS Department.

Incident Investigation

Objective

Skanska will conduct an incident investigation following all EHS incidents that occur on a project in order to identify root causes, develop corrective and preventive actions and communicate lessons learned to prevent future occurrences.

ISO/OHSAS References

- ISO 4.5.3 Nonconformity, Corrective Action and Preventive Action
- OHSAS 4.5.3 Nonconformity, Corrective Action and Preventive Action

Procedure

Following an incident of any severity level, including near miss, project management and/or a Skanska EHS representative will investigate the incident. The investigation will:

- Provide a specific description of the incident, including any underlying deficiencies, root causes and other factors that may have caused or contributed to the incident
- Identify the need for corrective action and preventative action
- Identify opportunities for continual improvement
- Communicate preventative actions and lessons learned
- All serious accidents, near misses, lost time accidents, potential fatalities, and serious environmental breaches must be followed by a Flash Report

EHS Directors will review preventative actions to determine effectiveness and initiate policy changes when necessary.

If the incident investigation identifies a process or procedural failure, it will be addressed in accordance with the nonconformance, corrective action and preventive action section.

Documentation

All incident investigation documentation will be maintained in Skanska's web-based reporting database.

Audits

Objective

The objective of this procedure is to provide guidance for conducting SHEMS audits at our jobsites, which determine proper implementation and maintenance of both the ISO 14001 & OHSAS 18001 standards as well Skanska policies and procedures.

ISO/OHSAS References

- ISO 4.5.5 Internal Audit
- OHSAS 4.5.5 Internal Audit

Procedure

Internal audits will be conducted annually on all projects that are three months or greater in duration. An audit checklist will be utilized to assess conformance to the standards. Findings identified during the assessment will be documented in accordance with the Non-Conformance, Corrective Action and Preventative Action process.

Auditors will rely on records for information related to the functioning of the SHEMS and its objectives and targets. Auditors will also rely on employee interviews, observations of operating conditions to gauge EHS status and conditions on a site.

Responsibilities

EHS

- Maintain a list of projects that qualify for audits
- Maintain a schedule of audits
- Select the auditor/audit team to ensure objectivity
- Maintain documentation of auditor training
- Be the point of contact for all communications with the registrar inclusive of scheduling the external audits
- Coordinate external audit closing meeting (in person or via teleconference) with the respective Business Unit (BU) Senior Management Team and the project teams

- Communicate all external audit reports to respective BU's inclusive of any potential non-conformances and corrective actions required to be taken by the affected BU
- Ensure all findings are documented and closed out
- Maintain audits

Auditor/Audit Team

Auditors will receive auditor training and will have relevant work experience of at least five years in EHS management. The audit may be conducted by a sole auditor or by a team. If conducted by a team, a lead auditor will be designated. The auditor/audit team is responsible for issuing/distributing a formal audit report within five working days to the following:

- The project team (inclusive of all who attended either the opening or closing meeting, Vice President/Project Executive, Project Manager, General Superintendent)
- Regional EHS leads
- Corporate EHS

Documentation

All audit records will be maintained in Skanska's web-based reporting database.

Nonconformance, Corrective Actions and Preventative Action

Objective

Following any deviations from established procedures and programs related to the SHEMS or whenever a non-conformance in the SHEMS is detected, a corrective and preventive action report will be completed.

ISO/OHSAS References

- ISO 4.5.3 Nonconformity, Corrective Action and Preventive Action
- OHSAS 4.5.3 Nonconformity, Corrective Action and Preventive Action

Classifications for Nonconformance

Major Nonconformance Classification

Report any systemic failure in the implementation of the SHEMS. For example:

- Environmental aspects and hazard identification is not taking place
- Required documents not maintained
- Construction planning, monitoring and measuring are not being implemented or partially being implemented at site
- Training/management review/EHS meetings not being conducted as per procedure
- Several similar minor nonconformance in documentation and/or implementation in a specific procedure or element of the ISO/OHSAS Standards

Minor Nonconformance Classification

A single observed nonconformance to the SHEMS that is not considered to be a breakdown. For example:

- Obsolete versions of policy are observed at the site
- Gaps in documented evidence of conformance
- Obsolete versions of SHEMS and its controlled documents are being utilized
- Orientation not being conducted timely and consistently
- Roles and responsibilities have not been defined/communicated

Opportunity for Improvement (OFI) Classification

A finding not determined to be a nonconformance but that could be an enhancement of EHS programs.

Event

This is an unanticipated occurrence onsite that has the potential to become a nonconformity if not addressed.

Procedure

- The project team is responsible for responding to a nonconformance
- Nonconformance will be addressed at monthly SHEMS management review meetings
- The auditor/audit team is responsible for issuing/distributing a formal audit report within five working days to the following:
  - The project team (inclusive of all who attended either the opening or closing meeting, Vice President/Project Executive, Project Manager, General Superintendent)
  - Regional EHS leads
  - Corporate EHS
- Within five days of the auditor's findings being reported, the project team will complete and submit for approval a corrective action report (CAR), which includes a root cause analysis and corrective and preventive actions required to mitigate the nonconformance
- The project team is responsible to ensure that the correction is completed
- Any corrective action taken to eliminate the cause of nonconformance will be appropriate to the magnitude of the finding
- When additional time is required to complete the investigation and to identify corrective and preventive actions, the project team will notify their EHS Director who will determine the timeline for completion of the CAR
- Preventative and corrective actions will be reviewed at the management review meetings to assess implementation and effectiveness with revisions made as needed

Emergency Preparedness

Objective

Skanska will implement procedures to identify and respond to an EHS emergency in order to minimize the potential negative impact. Each project will be responsible for coordinating its emergency response procedures.

ISO/OHSAS References

- ISO 4.4.7 Emergency Preparedness and Response
- OHSAS 4.4.7 Emergency Preparedness and Response

Procedure

Each project team will:

- Consider all activities and hazards when developing the project-specific Emergency Action Plans (EAP) and Environmental Compliance Plans (ECP)
- Identify a local environmental response contractor
- Provide the necessary resources and equipment available to manage minor EHS incidents (first aid kits, spills kits, properly trained personnel, etc.)
- Post emergency phone numbers in visible locations on site
- Communicate the plan to all site personnel

The EAP will include:

- Emergency escape routes
- Emergency signals
- Assembly points
- Spill kit locations
- Designated lines of authority

The plan will be tested at least every six months. Following any emergency response or drill, a debrief will be conducted to determine if EAP is effective.

Documentation

All EAP training, the critique of all emergency drills, and incident reports will be recorded and maintained with the project records.

Management Review

Objective

This procedure specifies senior management review of the Safety, Health and Environmental Management System (SHEMS) at planned intervals to ensure its continuing effectiveness, suitability and adequacy, and provides for its continual improvement at the corporate and project level.

ISO/OHSAS References

- ISO 4.5.1 Monitoring and Measurement
- ISO 4.5.2 Evaluation of Compliance
- ISO 4.6 Management Review
- OHSAS 4.5.1 Monitoring and Measurement
- OHSAS 4.5.2 Evaluation of Compliance
- OHSAS 4.6 Management Review

Procedure

- Skanska USA Senior Leadership Team, together with members of the USA EHS Leadership Team, will conduct a Business Unit Annual Management Review at internals not to exceed twelve months.
- The EHS Leadership Team will conduct a Regional/Operating Unit Management Review at internals not to exceed twelve months.
- Each Project Team will conduct a Monthly Management Review
- Skanska will establish annual engagement targets will generally be set at this meeting

All non-project based executives and above will attend a minimum of four project Monthly Management Review Meetings per year

Project based executives are required to attend their own project's Monthly Management Review Meeting in addition the executives are required to attend to 4 peer project's Monthly Management Review Meeting's

Records will be kept of each management review utilizing designated agendas. The respective EHS Director or designee will prepare the necessary content to be considered in the regional review and will give recommendations for improvement.

The following items will be addressed at each SHEMS Management Review Meeting:

- Review of monthly or annual goals
  - This is to include discussion as to whether monthly or annual objectives and targets are being met. Where issues are detected, alternative solutions should be discussed with a goal of improving performance
- Open items from previous management review
  - Previous minutes are to be reviewed. All outstanding action items are to be discussed and documented with status updates
- SHEMS audit results
  - Discussion shall include results of previous internal/external audits, review and update of any corrective and preventive actions that were implemented as a result of previous audits and date for next audits
- Review of SHEMS procedures
  - Ensure all aspects of the management system are in place and effective. EHS risks/aspects identified in the project specific EHS Manual are to be reviewed to ensure that they are current and up-to-date. Where changes are needed, these documents are to be updated in the PlanIt tool.
- Monitoring and measurement of EHS indicators
  - A minimum of 4 aspects/hazards identified in the project's EH&S Manual specific to existing or upcoming work are to be reviewed.
  - The project team will review the leading and lagging indicators to determine if controls are effective and objectives and targets are being met.. Where indicators are found to be ineffective, a plan will be implemented to improve performance. Action items, responsibilities and dates should be noted in the review minutes
  - The project team will review the previous months EHS compliance audit to ensure legal compliance
  - The project team will review and ensure that all monitoring equipment used at the project site is calibrated per manufacturer's requirements. Records are to be maintained at the project site
- Correction and prevention of nonconformance

  - Management will review corrective and preventive actions and address CARs with open items
  - Management will review corrective and preventive actions to determine effectiveness and noted in the meeting minutes. Where corrective and preventive actions are found to be ineffective, a plan will be implemented to improve performance. Action items, responsibilities and dates should be noted in the review minutes
  - Confirm project review of other locations' Flash Reports and determine if applicable to project; if so, develop a plan to implement, monitor and measure.
- Consider and recommend opportunities for improvement, changes to policies and any other relevant information regarding the SHEMS
    - Ensure recommendations are communicated to the Operating Unit/Region EHS Leads for consideration for changes to the Skanska SHEMS.
- Discuss any relevant communication from external interested parties, including complaints for the previous month
    - This includes inquiries from owners, clients, unions or surrounding community.

Document / Record Control

Objective

The purpose of this procedure is to ensure that only authorized and current documents are used to implement the requirements and that records are properly prepared, maintained, retained and disposed.

ISO/OHSAS References

- ISO 4.4.5 Control of documents
- ISO 4.5.4 Control of records
- OHSAS 4.4.5 Control of documents
- OHSAS 4.5.4 Control of records

Procedure

The following is to outline protocols that apply to potential changes that may be needed to effectively implement the EHS Manual at all levels.

- The EHS Manual and all associated documents will be controlled at the corporate level
- All projects will implement the most current version of the EHS Manual
- Skanska will maintain a national library for all current documents that are applicable to the implementation of the EHS Manual. The library will be managed by the EHS Leadership team.
- EHS related documents will be reviewed periodically and revised as needed by the EHS Leadership team
- Updated documents will be communicated by the EHS Leadership Team to project teams
- Regional specific addenda to the EHS Manual will be identified as such and maintained at the regional level by the EHS Director
- Project-specific documents will be identified and maintained at the project level

Documentation

- All documents and records will be legible, identifiable and easily retrieved for review

- Documents and records will be maintained at all projects through a combination of hard copies and electronic copies

All documents and records will be retained through the life of the project or otherwise as required by law or by contract.

ISO 14001/OSHAS 18001 Standards SHEMS Procedures Correlation Table

ISO 14001-2004 Elements	*BS OHSAS 18001-2007 Elements*	*SHEMS Section*
4.1 General requirements		**Stated**
4.2 Environmental Health & Safety Policy Statement		**Stated**
4.3 Planning		
4.3.1 Environmental aspects	4.3.1 Hazard identification, risk assessment and determining controls	**Identification and Management of EHS Impacts**
4.3.2 Legal and other requirements	4.3.2 Legal and other requirements	**Determining Legal and Other Requirements**
4.3.3 Objectives, targets and programs	4.3.3 Objectives and programs	**Identification and Management of EHS Impacts**
4.4 Implementation and operation		
4.4.1 Resources, roles, responsibility and authority	4.4.1 Resources, roles, responsibility, accountability and authority	**Identification and Management of EHS Impacts**
4.4.2 Competence, training and awareness	4.4.2 Competence, training and awareness	**Training**
4.4.3 Communication	4.4.3 Communication, participation and consultation	**Communication**
4.4.4 Documentation	4.4.4 Documentation	**Applicable documentation defined in specific procedure**
4.4.5 Control of documents	4.4.5 Control of documents	**Document/Record Control**
4.4.6 Operational control	4.4.6 Operational control	**Identification and Management of EHS Impacts**
4.4.7 Emergency preparedness and response	4.4.7 Emergency preparedness and response	**Emergency Preparedness**
4.5 Checking		

4.5.1 Monitoring and measurement	4.5.1 Monitoring and measurement	**Management Review**
4.5.2 Evaluation of compliance	4.5.2 Evaluation of compliance	**Communication,** **Management Review**
4.5.3 Nonconformity, corrective action and preventive action	4.5.3 Incident investigation, nonconformity, corrective action and preventive action	**Incident Investigation,** **Nonconformance, Corrective Actions and Preventative Action**
4.5.4 Control of records	4.5.4 Control of records	**Document/Record Control**
4.5.5 Internal audit	4.5.5 Internal audit	**Audits**
4.6 Management review		**Management Review**

Policies

Accountability Policy

Objective

This Accountability Policy details the minimum standards all personnel (located at the site or otherwise) are required to observe regarding EHS issues. Regional policies may exceed the minimum requirements as the region deems necessary.

Adherence to EHS Policies Regarding Dangers
*That **ARE** Immediately Dangerous to Life and Health*

All personnel shall adhere to all EHS policies that protect against immediate dangers to life and health. Examples of such policies include, but are not limited to, those regarding fall protection, exposure to electricity, caught in-between hazards, struck by hazards, lockout/tag out hazards, exposure to unsafe trench excavation, failure to locate utilities pre-excavation, use of ear buds and confined space hazards. While Contractor does not generally follow a progressive disciplinary practice, Contractor employees are, except as otherwise agreed in an applicable Collective Bargaining Agreement (CBA) or Project Labor Agreement (PLA), subject to the following disciplinary actions for violations of any EHS policy designed to protect against immediate dangers to life and health

- 1st Offense: Three (3) -day suspension without pay
- 2nd Offense: Twenty (20) day suspension without pay
- 3rd Offense: Termination

Contractor may impose more serious penalties upon its offending employees if it deems such action to be appropriate for violations covered by this provision.

Subcontractors are likewise responsible for disciplining subcontractor workers who fail to adhere to applicable EHS policies and rules set forth in this EHS Manual, provided that Contractor may take actions necessary to address imminent threats to life and health and, if a subcontractor fails to take timely or appropriate corrective action, Contractor may, consistent with the terms of the

applicable subcontract, bar from the project site any such subcontractor worker who poses a safety risk to the project.

Adherence to EHS Policies Regarding Activity
***NOT** Immediately Dangerous to Life and Health*

AllSite personnel shall adhere to all EHS policies, including, but not limited to PPE requirements, equipment/tool inspections, use of tools, rebar caps, and housekeeping.

While Contractor does not generally follow a progressive disciplinary practice, Contractor employees are, except as otherwise agreed in an applicable CBA or PLA, subject to the following disciplinary actions for violations of any EHS policy that is not designed to protect against immediate dangers to life and health:

- 1st Offense: Written reprimand
- 2nd Offense: One (1) day suspension without pay
- 3rd Offense: Three (3) day suspension without pay

Contractor may impose more serious penalties upon its offending employees if it deems such action to be appropriate for violations covered by this provision.

Subcontractors are likewise responsible for disciplining subcontractor workers who fail to adhere to applicable EHS policies and rules set forth in this EHS Manual, provided that Contractor may take actions necessary to address imminent threats to life and health and, if a subcontractor fails to take timely or appropriate corrective action, Contractor may, consistent with the terms of the applicable subcontract, bar from the project site any such subcontractor worker who poses a safety risk to the project.

Imposition of Discipline on Contractor Employees

The level of offense will be considered over a rolling one (1) year period looking back from the date of each offense.

- The foregoing discipline policy shall be applicable to all supervisory personnel in relation to their respective obligation to properly and adequately manage their workforce so that it conducts itself in a safe manner and in accordance with this EHS policy. Accordingly, should employees under the management of supervisory personnel commit multiple (i.e. more than one (1)) IDLH or non-IDLH offense as stated above during a

given one (1) year period, said multiple offenses may be construed as a violation of the workplace rule requiring supervisors to properly manage and maintain a safe working environment in accordance with this EHS policy and may result in the supervisor being subject to discipline as set forth herein.

- With respect to supervisory personnel being indirectly associated with any single EHS policy violation constituting a danger that is either an IDLH or non-IDLH by employees under his or her direct or indirect supervision and management, the supervisor may be disciplined by way of no less than a five (5) day suspension without pay. However, shorter suspension periods without pay for the supervisor may be considered in such situations after consultation with the Human Resources and Legal Departments.

    - The above is the minimum guideline. All offenses will be reviewed and more severe discipline may be implemented when conditions warrant.

    - Prior to any discipline being implemented, the proposed disciplinary action should be discussed with Human Resources and approved at or above the Project Executive level. The level of discipline imposed should then be documented for the employee file.

    - All disciplinary actions resulting in a suspension are to be reviewed and approved by the Senior Leadership Team (SLT) and the local HR representative (in consultation with the Legal Department).

    - Contractor employees that are terminated for EHS non-compliance will not be deemed eligible for rehire for a minimum of six (6) months. The rehire of employees terminated for failure to comply with EHS policies requires Contractor approval at the senior management level and such decision shall be made in consultation with HR.

If in the judgment of the Contractor's project team, the extenuating circumstances of an individual incident warrant not adhering to the guidelines above, the team can petition an appropriate member of Contractor's senior management for relief from the guidelines. Only a

member of Contractor's senior management, in consultation with Contractor's Legal Department and HR, can authorize deviations from these guidelines, except as expressly provided above.

Cell Phone/Tablets/Smart Device User Policy

Objective

When site personnel use communication technology on project sites, they are expected to utilize it in a safe, prudent manner that in no way jeopardizes the safety of themselves or others or puts equipment, facilities or other materials at risk.[3]

Legal and Other Requirements

All site personnel shall comply with all applicable federal, state and local laws and regulations regarding the use of cell phones/smart device usage while driving.

[3] In the event this Policy is inconsistent with any information in any Skanska Employee Handbook and/or any applicable joint venture employee handbooks (together, the "Handbooks"), the more stringent safety requirement shall govern as to Skanska employees to the extent necessary to remove the conflict or inconsistency.

Skanska Management

- Members of Skanska's project management team may purchase appropriate hands-free smart devices for use by Skanska employees with the approval of the project executive for that site
- Members of Skanska management shall ensure Skanska employee awareness of, and enforce compliance with this Policy and the related policy contained in any Handbooks
- Project Management shall ensure that cell phone/tablets/smart devices are being used in a safe manner when they must be utilized as part of the work. Project Management shall ensure that signage shall be posted where cell phones/smart device use is prohibited, and identify tasks that are not to be performed while using those devices, such as texting or emailing while driving, to the extent those activities are not already address by this Policy or in Handbooks.
- In no event shall the use of wired or wireless earpieces (earbuds, Bluetooth, etc.) in connection with cell phones, smart devices or music players be permitted.
- Only where specifically permitted in writing as part of a CWP, cell phones/tablets/smart devices maybe used in connection with work operations where such usage is required to carry out the work but then only in strict accordance with the guidelines set forth for such usage in the CWP.
- Enter project-specific responsibilities

EHS

- Members of Skanska's EHS staff may provide additional recommendations to site personnel for safe usage of cell phones, tablets and smart devices.
- Enter project-specific responsibilities
-

Sub-Contractor

- Sub-Contractor shall ensure that sub-Contractor employees are aware of this Policy, and shall ensure compliance with the Policy

Procedure

- All site personnel, while operating a company fleet vehicle, whether company owned or rented, shall utilize a cell phone "Hands Free" product, whether portable or permanently installed in a vehicle or piece of equipment.

- Use of cell phones/smart devices in vehicles while on site is only permitted when the vehicle is parked (e.g., a cell phone/smart device may not be used when temporarily stopped at a traffic light)
- Any person requiring the use of a cell phone/tablet/smart device as a tool for their work can only use them in a stationary position at a location in which the use of the device would not create a hazard to themselves or other employees.
- Cell phones/tablets/smart devices may never be used when operating heavy machinery.
- The use of personal cell phones/tablets/smart devices and/or personal audio devices is subject to the same restrictions as Skanska- issued cell phones/tablets/smart devices
- Personal cell phones/tablets/smart devices and/or personal audio devices may never be used when operating any equipment or machinery on an active project site
- The use of personal cell phones/tablets/smart devices and/or personal audio devices may be entirely prohibited, in Skanska management's discretion, while on a project worksite if such use creates a safety risk
- The use of personal cell phones by Skanska employees shall be limited to designated breaks and lunch periods
- Regardless of whether personal cell use is permitted on break or in designated areas, in no event shall the use of earbuds or headphones of any type be permitted on the project worksite. The use of earbuds or headphones shall be considered an IDLH condition and the requirements of the accountability policy shall apply.

In the event of an emergency requiring the use of communication equipment, comply with the project's emergency response plan and communication protocol.

Vehicle Policy

Objective

The purpose of this policy is to establish rules and regulations for safe operation of motor vehicles when used on a project site.

Legal and Other Requirements

Federal, State, Local Regulations

- All site personnel shall comply with all applicable federal, state and local laws and

regulations regarding the safe operation of equipment and motor vehicles
- Enter project-specific regulations

Rights and Responsibilities

Project management will identify who will fulfill the responsibilities of monitoring and measuring the operational controls listed below. Site personnel will be responsible for complying with any imposed project- specific requirements by the Client or Skanska.

Project Management

- Members of management shall enforce the policies and rules set forth in this EHS Manual
- Ensure that proper access, egress and safe parking areas are available at the project site
- Verify that daily walk-around inspections are being performed

EHS Staff

Members of the EHS Staff shall:

- Audit the inspection and maintenance records of company-owned vehicles
- Recommend the appropriate safety accessories for company-owned vehicles when required (e.g., flashing beacons, whip flags, fire extinguisher size, etc.)
- Enforce the rules set forth in this EHS Manual

Subcontractors

Subcontractors shall:

- Ensure that their subcontractor employees operating a motor vehicle on an active project site are properly licensed and qualified to drive a motor vehicle
- Ensure that vehicles utilized on an active project site meet the project safety requirements
- Ensure that all subcontractor employees operating a vehicle on an active project site comply with the applicable policies and rules set forth in this EHS Manual
- Coordinate with project vehicle routes, conflicts in parking, and access and egress

logistics

In the event this Policy conflicts with or is inconsistent with any information in any Contractor Handbook, the more stringent requirement shall apply.

Operational Controls/Documents

The following documents should be maintained as part of the project files. To the extent these documents are within the control of subcontractors, subcontractors shall maintain them and make them available for inspection by Contractor's EHS staff at the project site:

- Manufacturer's operating manual
- Driver's License
- Construction Work Plan
- Maintenance of Traffic (MOT)
- Traffic Control Program(TCP)
- Maintenance and Protection of Traffic(MPT)
- Vehicle equipment and maintenance records
- Enter project-specific operational controls/documents

Performance Indicators/Records

Performance indicators are the means by which projects monitor and measure their compliance with operational controls and the status of achieving objectives and targets. . Accordingly, the following records should be maintained as part of the project files:

- Daily vehicle inspections (when applicable)
- Maintenance records
- Incident reports involving vehicles
- Enter project-specific indicators/records

Procedure and Rules

The following procedures and rules apply to all vehicles, whether owned by the company or covered by a company auto allowance, used during the construction process, (e.g., material delivery and transport, hauling of debris, service and maintenance vehicles) or for related business purposes:

<u>Rules for Safe Operation of Vehicles</u>

- Every vehicle shall have a seatbelt for every occupant being transported
- Every vehicle over one ton in hauling capacity shall have a fire extinguisher and first aid kit
- Parked equipment 1 ton or greater in capacity shall have a wheel chocked and parking brake set
- Every vehicle entering an active work zone must be equipped with an audible reverse signal alarm, and in urban areas, a "white noise" alarm is recommended.
- A spotter shall be used whenever a heavy duty vehicle is put in reverse.
- A spotter shall be used whenever a light duty vehicle (e.g., pickup truck) is put in reverse and conditions surrounding such use present a significant risk to person or property.
- If a vehicle has an obstructed view to the rear, a trained spotter shall be used to direct the backing operations.
- The spotter can only be removed if a Construction Work Plan detailing the controls for safely backing without a spotter has been reviewed and approved by project management.
- A worker shall not serve as a spotter unless properly trained and qualified to do so.
- It is the responsibility of each vehicle operator to perform a daily walk-around and vehicle inspection. Drivers are responsible for checking the mechanical condition of the vehicle, fire extinguishers or any other mandated equipment and keeping company-owned vehicles clean
- All tools and equipment must be secured prior to being transported
- All site personnel are required to know and comply with local, state and federal traffic laws for the locations in which they will operate their vehicles
- Any Contractor employee must notify his/her supervisor immediately if he/she is issued a citation while operating a vehicle during the construction process or for project-related purposes, whether the vehicle is Contractor-owned or covered by an auto allowance.
- Continued violations of these rules by Contractor employees could result in the loss of a Contractor vehicle or auto allowance or potential further disciplinary action up to and including termination
- Neither Contractor vehicles nor private vehicles used for Contractor purposes under auto allowances may be operated when the Contractor employee is under the influence of alcohol or drugs
- Contractor employees are subject to disciplinary action if they are involved in an accident for which they are charged with a traffic violation or crime, or found liable for in a civil lawsuit, including but not limited to drug or alcohol use, unacceptable driving record or evidence of any unsafe conditions or circumstances. All charges of traffic violations

involving Contractor vehicles or private vehicles while used for Contractor purposes under auto allowances are to be immediately reported to a member of the project management team. Accidents must be reported in accordance with established Contractor's corporate policies and procedures

- Except in an emergency, only authorized drivers may operate a vehicle
- Decals and unit-assigned numbers are not to be removed from Contractor-owned vehicles under any circumstance without written authorization of a Contractor equipment manager
- All Contractor employee drivers are expected to conduct themselves appropriately, professionally and in a safe manner when operating a Contractor vehicle or private vehicle used for Contractor's purposes. Contractor employees found in violation of any of these rules will be subject to disciplinary action, up to and including dismissal. Subcontractors are likewise responsible for disciplining subcontractor workers who fail to adhere to applicable EHS policies and rules set forth in this EHS Manual, provided that Contractor may take actions necessary to address imminent threats to life and health and, if a subcontractor fails to take timely or appropriate corrective action, Contractor may, consistent with the terms of the applicable subcontract, bar from the project site any such subcontractor worker who poses a safety risk to the project

Job Vehicles/Trucks

- All company vehicle assignments will be made to the jobs as required. As with any other equipment, the project manager will request vehicle job assignments when the job is mobilized. The equipment manager will assign vehicles to the jobs. Job vehicles will be used on the job by qualified drivers and will remain on the job overnight

Applicable Training

Enter project-specific training

Fit For Duty Policy

Objective

Skanska employees and subcontractor employees are expected to report to work fit for duty, which means able to perform their job duties safely, appropriately and effectively, free from the adverse effects of physical, mental, emotional and personal problems.

Procedure

Skanska will implement our fit for duty process for all projects. Project management will be responsible for ensuring that employees are fit for duty. Anyone on a Skanska project must be capable of carrying out the assigned task(s).

Foremen will be responsible for the following:

- Foremen will assign each worker tasks for which they are physically fit and mentally capable
- Foremen will ensure that each employee reporting to work is not under the influence of drugs or alcohol

During Stretch and Flex and the Daily Hazard Analysis (DHA), all foremen will observe their crew members to assure they are capable of performing each stretch and are not in distress. Employees are responsible for maintaining their own individual level of fitness required to conduct his/her daily work.

Personal Protection Equipment (PPE) Policy

Objective

All site personnel shall, at a minimum, wear the following personal protective equipment while on the project site (except inside the jobsite office and designated safe zones).

Requirements

Head Protection

Hardhats will be worn at all times on this project, in accordance with the following:

- Hardhats will be worn according to manufacturer requirements
- Company name and personal name (first and last) will be displayed on the hardhat
- Hardhats more than five years old, as determined by manufacture date, will not be worn
- Hardhat meets ANSI Z89.1 requirements

Eye and Face Protection

- Eye and face protection safety glasses with side-shields that meet ANSI Z87 criteria are to be worn at all times. Prescription glasses must meet ANSI Z87 requirements, or employees will be required to wear over the glasses (OTG) safety eyewear.
- In addition, the following eye/face protective equipment, at a minimum, must be used when performing the following work activities:

Activity	Safety Equipment
Welding	Welding hood and safety glasses
Burning	Burning goggles with face shield
Abrasive grinding or cutting	Safety glasses and face shield
Drilling	Goggles or safety glasses and face shield

Reaming	Face shield and safety glasses
Chemical handling	Goggles and face shield
Concrete pouring	Safety glasses and face shield

Foot Protection

- Safety-toed work boots with a minimum of six inch ankle support must be worn on all jobsites. Shoes must be puncture resistant. Sturdy work boots that are in good condition must be worn (heel and sole will not show excessive wear). Tennis shoes or other street shoes are not allowed, even if they have safety toes

High-Visibility Attire

- All persons on the project site must wear a high visibility orange or high visibility green vest or shirt that has reflective striping consistent with Class II requirements
- ANSI Class III reflectivity requirements must be met when working in traffic and/or at night

Work Attire

- Shirts will have a minimum sleeve length of three (3) inches. Tank tops and cut-off shirts are not permitted. Long pants that fit properly around the waist and ankles and that are not excessively worn are required. Pants that are worn low on the hips or thigh are not allowed. The length of the pants will be such as to not present a tripping hazard. Shorts are not permitted

Hand Protection

- All personnel on the project shall wear gloves at all times. All gloves shall be a minimum of ANSI cut level III. Each task shall be analyzed to determine the appropriate cut level of glove that is required. Specialty gloves may be required ANSI cut level III for handling sharp materials, chemicals, electrical work, etc.
- Specific tasks requiring high dexterity are not exempt from this requirement.
- This requirement applies to all craft workers, supervisors, managers, visitors, vendors or any other individual onsite

Additional Protections

- Respiratory protection and hearing protection are covered in this manual

Contractor may, taking into consideration the hazards associated with a particular project or task, require site personnel to wear additional personal protective equipment to reduce the likelihood of a work-related injury or illness.

Stop Work Authority

Employees have been given the authority, without fear of reprimand or retaliation, to immediately:

- Stop any work activity that presents a danger to any employees, the public, or the environment
- Get involved, question and rectify any situation that is identified as not being in compliance with our environmental, health, and safety policies
- Report any unsafe conditions or potential negative environmental impacts
- Question any work activity that involves violation of established environmental, health, and safety policies

EHS Policies Specific to Subcontractors

Rights and Responsibilities

.Each subcontractor shall participate in and enforce the project-specific environmental, health, and safety programs that shall cover all work performed by it and its sub-subcontractors. Subcontractors shall comply with all applicable federal, state and local EHS requirements

Project Management

- Inform subcontractors of the policies and rules contained in this EHS Manual
- Ensure subcontractors have met Business Unit prequalification criteria prior to being allowed to work on a project
- Review the subcontractor's written CWP, with the understanding that Contractor may reject any CWP that does not comply with the requirements of this EHS Manual
- Provide subcontractors with Contractor's CWP
- Conduct a preconstruction EHS meeting utilizing the Subcontractor Kick-Off Meeting Agenda Form with all tier subcontractors to inform them of the project-specific program. Owners and union business agents, may also need to be invited, pending approval of site management and the EHS Director.
- Conduct subcontractor EHS meetings as they deem necessary
- Conduct inspections of subcontractor operations to encourage compliance with applicable regulations and policies
- Request that subcontractors attend Project SHEMS Leadership Team meetings

Enter project-specific information

Subcontractor shall

- Attend the preconstruction EHS meeting held by Skanska project management
- Provide a copy of their Construction Work Plans (CWPs) utilizing the template furnished by Skanska, to include task-specific activities and associated competent persons
- Submit all CWPs to Skanska project management for review one week prior to the commencement of each activity

- Warrant that subcontractor employees and workers have all necessary training for the assigned tasks.
- Submit applicable employee training records to Skanska prior to work commencing
- All subcontractor employees and tier subcontractor employees will attend a Skanska jobsite orientation at the commencement of employment
- Prepare Daily Hazard Analysis (DHA) prior to the commencement of each activity
- Provide all required PPE to their employees, instruct employees on proper use, and ensure use/implementation at all times
- Provide adequate safety measures against occupational exposures such as gases, fumes, vapors, dusts, chemicals and noise levels, including potential exposures to individuals in the vicinity of the work being performed
- Provide all applicable occupational monitoring documentation, including but not restricted to, exposure assessments, employee blood levels, and proof of respirator fit tests (including tier subcontractors)
- Maintain documentation that verifies that its EHS program is in compliance with applicable federal, state, local and project safety requirements. Documentation shall be made available upon request by Skanska
- Conduct periodic safety observations and take corrective actions for recognized hazards. Report unsafe conditions outside their scope of work to Skanska personnel
- Implement immediate corrective action to eliminate unsafe practices and conditions when they are observed or reported, in accordance with Skanska's Accountability Policy
- Subcontractors are required to utilize Skanska's Employee Reprimand Notice Forms for each employee violation and submit copies to Skanska's on-site management immediately
- Comply with project emergency action plan
- Investigate all incidents resulting in a near miss, personal injury, general liability, negative environmental impact, and third-party claims
- Submit in writing to Contractor within 24 hours of any incident all findings, including root cause, corrective action, and preventative action, shall be submitted to Contractor in writing within 24 hours of the event, and such written report shall be on the form designated by Skanska
- Job foremen will conduct weekly toolbox safety meetings for all site employees under their supervision with sign off and submit to Skanska project team

- Attend contractor's Project SHEMS Leadership Team meeting on monthly basis with the representatives of the various trades employed to ensure that all employees understand and comply with the safety programs.

Subcontractors will submit:

  - Monthly safety performance report by the 5th of every month, to include hours worked and all incidents, or
  - Day Facts Online Reporting or paper copies of Contractors Daily Report (where available)
- Designate an EHS representative prior to mobilization
- Provide a full-time onsite EHS professional upon mobilization of the subcontractor's first worker if the subcontractor plans to have thirty (30) or more workers (including workers of lower tier subcontractors) on the project, provided that if the subcontractor's staffing exceeds 150 workers or the subcontractor will perform activities deemed high risk by Contractor, additional EHS personnel may be required. In the event this policy conflicts with or is inconsistent with the applicable subcontract, the more stringent requirement shall govern to the extent necessary to remove the conflict or inconsistency.
- Submit the resume of their proposed EHS professional or representative to be reviewed by Contractor. Contractor will have the right to object to the use of the proposed EHS professional or representative if he/she does not have the training and experience required for this project. The subcontractor's designated EHS professional or representative will have the authority and responsibility to ensure the proper implementation of this policies and rules in this EHS Manual.
- Subcontractor full time onsite EHS professionals shall have the following minimum qualifications:
  - Three years construction safety experience
  - Onsite full time and have no other responsibilities other than environmental, health and safety
  - Specialized training relevant to scope of work
  - Minimum of OSHA 30-hour construction safety awareness course
  - Working knowledge of EHS regulations and hazard control methods
  - Demonstrated ability to conduct EHS training
- Each subcontractor expected to have less than 30 workers onsite will designate an EHS representative prior to mobilization. This onsite EHS representative will be a competent worker who has completed at least 10 hours of OSHA awareness training and who may have other onsite duties.

Enter project-specific information

Designated Subcontractor EHS Professional or Representative

Designated EHS professionals and representatives will have the authority to stop any work they deem unsafe.

- Skanska reserves the right to object to designated subcontractor safety professionals and representatives if they do not strictly adhere to and enforce the requirements of this EHS Manual, including, without limitation, if they fail to:
  - Investigate any incident or near miss and report the findings to Skanska
  - Attend EHS meetings as required by Skanska
  - Conduct regular EHS meetings with workers to instruct them on project EHS practices and requirements
  - Conduct written daily EHS inspections of their work activities and make available to Skanska for review to ensure compliance with safe work practices and this EHS Management Program

Subcontractor EHS Submittals

Prior to beginning work, each subcontractor shall submit to Contractor the following (in the event this policy conflicts with or is inconsistent with the applicable subcontract, the most stringent requirement shall govern to the extent necessary to remove the conflict or inconsistency):

- Subcontractor-prepared Construction Work (CWP), at least one week prior to mobilization
- Name(s) of designated EHS representative or professional and a statement of his/her qualifications
- Emergency contacts and telephone numbers for their senior operations person and company EHS representative who are available at all times
- Verification of training completed by designated competent persons as required by the scope of work
- Verification of training completed by qualified equipment operators as required by the scope of work for cranes, forklifts, aerial lifts, heavy equipment, etc.

- Verification that subcontractor workers designated as first responders have completed first aid and CPR training
- Verification of required training completed by subcontractor workers responding to environmental incidents
- Verification that current annual crane inspections by a third-party crane inspection firm have been completed for all cranes brought onto the project
- Project-specific Master Chemical and Substance Inventory Sheet and Safety Data Sheets for all hazardous chemicals and materials to be used or stored on the project
- Verification that OSHA or other project required training, as applicable, has been completed. Examples of OSHA or project required training may include:
  - Fall Protection
  - Confined Space
  - Respiratory Protection
  - Excavations and Trenches
  - Scaffolding
  - Crane Signals
  - Annual Hazard Communication Training
  - Ladders

Permits or Plans as Required

Prior to commencing work on the project, each Subcontractor will submit to Contractor for review all work permits or plans pertinent to its scope of work, including, as applicable, the following:

- Confined Space Entry
- Hot Work
- Excavation and Trenching
- Crane Lift Permit
- Fall Protection Plan
- Lockout/Tagout Checklist
- Other work plans and permits as deemed necessary

Maintain While Working on the Project

Throughout the course of the project, each subcontractor will maintain the following records or documents on-site and submit electronically to Skanska weekly:

- OSHA documentation related to injuries
- Subcontractor Work Site Safety Inspection
- Scaffold, Trench, Crane and Forklift Inspections
- Skanska permits or forms, or their approved equivalent, such as:
  - Confined space entry
  - Hot work
  - Excavation and trenching
  - Crane lift permit
  - Fall protection plan
  - Lockout/tagout checklist
  - Other work plans and permits as deemed necessary

Subcontractor Pre-Mobilization Meeting

Prior to mobilization, each subcontractor shall attend a pre-mobilization meeting to discuss site specific environmental, health and safety concerns. The meeting will address the following:

- Review subcontractor contract responsibilities
- Skanska policy includes that personal protective equipment (PPE) shall be provided, at no expense to the employee, by the subcontractor. The subcontractor shall enforce the use of PPE
- Review Subcontractor Data Compliance Log, (Includes a written EHS Program, written Hazard Communication Program, lockout/tagout program as required, SDS sheets, OSHA 300A Summary Form, project-specific fall plan if required, competent person sign off, and written verification of fall protection training)
- Review of subcontractor's method of weekly jobsite inspection
- Review required OSHA trainings with respect to scope of work, paying special attention to Fall Protection training
- Other trainings as required by the scope of work may include ladders, scaffolding, confined space, excavations, respiratory protection, rigging and hand signals, tools, etc.
- Task-specific preplanning meetings required for all high risk activities
- Review competent and qualified person sign off
- PPE Review: hard hats, safety glasses, hearing protection, face shields for grinding operations, welding and cutting shields, goggles, dust masks for nuisance dust, or a full respiratory protection program for respirator use for protection from hazard atmospheric conditions, gloves, etc. Other items may be required depending on the task.

- Review project-specific fall protection requirements, which may exceed the Skanska six-foot rule
- Review the use of the Guardrail Disruption Permit and its appropriate application. If guardrails are removed without permission, Skanska will assume that your firm is responsible for reinstalling the guardrails, and will charge your account accordingly.
- Review Skanska Fire Protection/ Prevention requirements: subcontractor must provide a fire extinguisher and fire watch in accordance with Skanska's Hot Work permit requirements.
- Review Skanska project-specific emergency plan and site evacuation plan
- All medical emergencies and accidents must be reported to Skanska immediately
- Skanska will coordinate 911 responses. Subcontractors are required to submit injury report, insurance accident report forms and hospital release forms in a timely manner.
- All property damage incidents must be reported to Skanska immediately
- Skanska's three-strike rule for environmental, health and safety violations Subcontractors shall take corrective action to abate unsafe conditions immediately.
- Weekly Tool Box Talks must be submitted with employee sign-off
- Each subcontractor is responsible to provide drinking water for its own employees
- Each subcontractor is responsible to provide its own first aid kit, as well as current trained First Aid/ CPR designated person(s)
- Subcontractors are responsible to protect their own workers
- All workers must attend project orientation, sign in and receive a Skanska hardhat sticker
- Enter project-specific EHS policies and procedures

Substance Abuse Policy

Objective

Skanska has a drug-free workplace program to ensure that our business is functioning safely, efficiently and cost-effectively. Skanska will require all employees and job applicants to participate in, consent to and comply with the dictates of this program as a condition of employment and continued employment. For those who refuse to cooperate fully with the terms and conditions of this program, Skanska will take appropriate measures to address the situation promptly and will not tolerate substance abuse. This policy applies to all Skanska, subcontractors at any tier, vendor and other third-party employees, including management working on or visiting the project.

Responsibilities

Project Management

- Address employee questions or requests for information relative to Skanska's substance abuse policy
- Document any reasonable suspicion of prohibited drug and/or alcohol use by employees or subcontractors that requires a drug/alcohol test
- Provide copy of positive/negative result to employee
- Enter project-specific information here

Subcontractor

- Comply with this policy. Each subcontractor will promote a Drug Free Workplace with their employees and will communicate what constitutes prohibited activities
- Ensure all workers involved in an incident have a post incident drug/alcohol test within three hours of the incident and report the results to Skanska. At a minimum, the drug test will follow current Substance Abuse Mental Health Services Administration (SAMHSA) five panel guidelines; the alcohol test will follow Department of Transportation (DOT) guidelines
- Enter project-specific information here

Procedure

Jobsite Requirements

- Whenever employees are working, operating Skanska vehicles or equipment, present on Skanska premises or present in any other location performing services for Skanska, they are prohibited from:
  - Using, possessing, buying, selling, manufacturing, distributing, dispensing or transferring illegal drugs or controlled substances
  - Being under the influence of controlled substances
- Workers are expected to follow the medical advice given with prescribed medication
- Violation of this requirement will result in termination

Testing

- Skanska reserves the right to request drug and alcohol screenings from job applicants and employees
- Skanska will conduct drug and alcohol testing within the parameters of any applicable state and federal laws and will use scientifically valid methods and procedures
- Skanska reserves the right to use onsite testing procedures per direction of the project for both employees and subcontractors
- Applicants for all positions will be notified that they may be required, once offered a position, to successfully pass a drug test as a condition of being hired.
- Applicants will be required to sign a consent form and present a valid photo identification card (driver's license)
- A positive drug test or refusal to participate in a drug test, or any effort to tamper with a sample or to alter a test result, will disqualify an applicant from employment
- This provision will apply to all former employees who are eligible to reapply for employment with Skanska after six months

Reasonable Suspicion Testing

- Employees and subcontractors will be required to submit to a drug and/or alcohol test when a supervisor and/or manager have reasonable suspicion of prohibited drug and/or alcohol use. Reasonable suspicion will be documented and will not be based on rumor, speculation or unsubstantiated information.

Post-Accident Testing

- All employees and subcontractors who may have caused or contributed to an incident or injury during work time or while on Skanska business or on Skanska property will be subject to drug and alcohol testing
- A post-accident drug and alcohol test must take place within three (3) hours of the time of the accident. Any worker who fails to report a work-related accident is in violation of this program and is subject to disciplinary action, up to and including termination.

Organizational Response to Policy Violation

- An employee or job applicant who receives a confirmed positive test result may contest or explain the result to the medical review officer within five working days after receiving written notification of the test result. If an employee's or job applicant's explanation or challenge is unsatisfactory to the medical review officer, the medical review officer shall report a positive test result back to Skanska.
- In the event of a positive test result, after appeal, the employee shall be removed from the project and subject to termination, pending review by Human Resources.

Right to Search

- Employees and their property, including but not limited to lunch boxes and toolboxes, are subject to search while on Skanska premises. Searches may be conducted without prior warning and may include entire work groups or specific individuals, if management has reason to suspect the employee is in violation of this program. Trained narcotic dogs may be used in searches. Searches of employees and their clothing will be by a person of the same gender.
- Employees who refuse to cooperate will not be forcibly detained or searched, but failure to cooperate will result in disciplinary action up to and including termination

Confidentiality

- All information, interviews, reports, statements, memoranda, documentation, and drug and alcohol test results, written or otherwise, are confidential. Skanska and any of its agents associated with drug and alcohol testing who receive or have access to information concerning test results shall keep all information confidential. No such information shall be released without the written consent of the employee unless the release is on a need-to-know basis, is required by law, and is relevant to a legal claim asserted by the employee, or as otherwise provided by law.

- In the event of a positive drug test, the reason for termination shall be referred to as "employee failed to comply with company program"
- Skanska workers' compensation carrier may be notified of results of post-accident tests that may affect Skanska insurance program as provided for by state laws

Reservation of Rights

- Skanska reserves the rights to administer, interpret, change or rescind the program in whole or in part, with or without notice or consideration. In addition, changes to applicable state and federal laws or regulations may require Skanska to modify or supplement the program.
- The program does not create an employment contract and should not be interpreted or considered as such
- This program does not, in any way, change the nature of the at-will employment relationship on the part of the employee or Skanska

Safety

Aerial Work Platforms

Objective

The purpose of this program is to establish safe working practices for all employees working on or around aerial work platforms (AWPs).

Legal and Other Requirements

Federal, state, local regulations

- OSHA 29 CFR 1926.453
- OSHA 29 CFR 1926.502
- OSHA 29 CFR 1926.952
- ANSI A92
  Port Authority of NY/NJ

Skanska/Client requirements

- Enter project-specific requirements

Procedure

Aerial work platforms including telescoping boom platforms, articulating boom platforms, scissor lifts, and vertical towers/lifts are covered by this program.

Effective January 1, 2016, all boom lifts will be fitted with appropriate primary or secondary guarding devices in an effort to eliminate operator crushing incidents. A primary guarding device is a physical structure that prevents the operator from being crushed. A secondary guarding device is an alarm and/or sensor bar that alerts ground personnel when the operator is in a potential crush hazard.

During operation of the equipment, an individual trained on emergency ground control processes will be in reasonable proximity to ground controls to respond to an emergency.

- Only qualified operators will operate lifts
- Prior to use, employees will perform an inspection on the lift and fill out the inspection form
- Employees will wear a full body harness and be tied off with a self-retracting lifeline (SRL) to the manufacturer's designated anchorage point at all times while operating the lift
- Decelerating lanyards are not permitted
- Tying off to an adjacent structure or equipment (unless designed for purpose or appropriate engineering design checks have been conducted) while working from a lift will not be permitted
- Designated operators will be held accountable for the safe operation of the lift to which they are assigned. If the lift is operated in an unsafe manner, the operator will be subject to disciplinary action up to, and including, termination
- Employees will always stand firmly on the platform of the lift. An employee will never stand, sit or climb on the edge of the platform, or use any type of ladder, plank or other device as a work positioning system
- The gates of lifts will be properly engaged whenever the lift is in use
- Boom or basket load limits will not be exceeded for any reason.
- Lifts will not be used as material hoists unless the load is contained within the basket and meets the lift's rated capacity. The lift will not be modified for hoisting, lifting or positioning of material unless the manufacturer approves it in writing.
- A lift will not be moved when the boom is extended in a working position and employees are in the platform, unless the equipment has been specifically designed for this purpose
- The insulating components of a lift will not be altered or integrity compromised in any way to reduce its insulating value
- In the event that a lift is stuck, the operator must immediately shut down the lift and summon help. The employee will be rescued from the lift by other means and the lift will be operated from the ground controls to free it once initial operator has been extracted from basket
- Operational lifts must maintain a minimum of 10 feet clearance from power lines plus additional clearance from OHSA 1926 subpart K
- Enter project-specific procedure

Responsibilities

Tasks/Operational controls	Person responsible	Documents/Records/Performance indicators
Required inspections	Qualified Operators, assigned competent persons	Aerial Work Platform Inspections General Safety Hazard Inspections/safety observations
Enter project-specific roles and responsibilities	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance indicators

Applicable Training

- Operator training meeting ANSI standards
- All AWP training should include practical review of emergency retrieval process using ground controls
- Enter project-specific training

Potential Related Safety, Health and/or Environmental Aspects

Enter project-specific potential health and/or environmental impacts

Concrete and Masonry

Objective

The purpose of this program is to develop, implement, maintain and enforce safe work practices when working with concrete and masonry products.

Legal and Other Requirements

Federal, State, Local Regulations

- OSHA 29 CFR 1926.700

- OSHA 29 CFR 1926.701
- OSHA 29 CFR 1926.702
- OSHA 29 CFR 1926.703
- OSHA 29 CFR 1926.704
- OSHA 29 CFR 1926.705
- OSHA 29 CFR 1926.706

  Enter project-specific regulations

Skanska/Client Requirements

- Washout in approved concrete wash out areas/containers (Skip pans lined with poly)
- Have available onsite – barrier cream and Nuetralite to protect against concrete burns.

Procedure

General Requirements

- No construction load will be placed on a concrete structure until it has been determined that it can support the load
- All impalement hazards will be identified and guarded to eliminate the hazard
- No employee, other than those essential to the work, will be permitted behind the jack during post-tensioning operation; signs and barriers will be erected to limit employee access
- No employee will be allowed to ride on a concrete bucket
- Elevated concrete buckets will be routed so that no employees are exposed to hazards associated with falling concrete and/or buckets
- No employee will be permitted to work under concrete buckets while buckets are being elevated or lowered
- Walkways will be setup for safe access/egress
- Taglines will be used to control the bucket as well as to activate release of the bucket
- Air horns will signal when the bucket is being flown overhead
- Task-specific personal protective equipment (PPE) to be worn will be determined based on the level of risk of dermal contact associated with each activity
- For any mixing, chipping, grinding, or other dust-producing activities related to concrete or mortar, refer to the silica and/or respiratory protection sections of this manual
- Port Authority NY/NJ requirements

Equipment and Tools

- Concrete mixers with one cubic yard or larger loading skips will be equipped with a mechanical device to clear the skip of materials with guardrails installed on each side of the skip
- Powered and rotating concrete troweling machines that are manually guided will be equipped with a control switch (a.k.a. “dead man” switch) that will automatically shut off the power whenever the hands of the operator are removed from the equipment handles
- Slick line/distribution systems will be secured to prevent the release of stored energy
- Slick line/distribution systems will be cleared of any residual concrete upon completion of work or during extended periods of idle time
- Slick line/distribution systems shall utilize thrust blocks during vertical operations or operations that include changes in direction based on engineering calculations
- Concrete buggy handles will not extend beyond the wheels on either side of the buggy
- Concrete pumping systems using discharge pipes will be provided with pipe supports designed for 100 percent overload
- Concrete buckets equipped with hydraulic or pneumatic gates will have positive safety latches
- Concrete buckets will be designed to prevent concrete from hanging up on top and the sides
- Equip buckets with a discharge device that an employee can operate without being exposed to the load. and with safety devices to prevent premature or accidental dumping and ensure that the release is self-closing
- Follow safe rigging practices when handling concrete buckets
- Sections of tremies and similar concrete conveyances will be secured with wire rope (or equivalent materials) in addition to the regular couplings or connections
- Ensure that all concrete and masonry tools are inspected prior to use
- Bull float handles will be constructed of nonconductive material or insulated with a nonconductive sheath
- When using bull floats, inspect the area to ensure there is no energized equipment or power lines nearby that the handles could touch
- Finishers will wear kneepads and impervious gloves when hand-finishing concrete

- Masonry saws will be guarded with a semicircular enclosure over the blade. A method for retaining blade fragments will be incorporated in the design of the semicircular enclosure
- No employee will be permitted to perform maintenance or repair on equipment unless all potentially hazardous energy sources have been locked out and tagged in accordance with Skanska's lockout/tagout policy
- Employees, who operate vibrators, pump nozzles, and concrete buckets will wear appropriate eye and foot protection based on risk assessment. It is highly recommended that long sleeve shirts be worn to protect against exposure of concrete to the bare skin and the possibility of concrete burn and contact dermatitis

Cast-In-Place Concrete

General Requirements

- Drawings or plans, including all revisions for the jack layout, formwork (including shoring equipment), working decks and scaffolds will be available at the jobsite
- All shoring equipment (including equipment used in re-shoring operations) will be inspected prior to erection
- Erection shoring equipment will be inspected immediately prior to, during and after concrete placement. If it is found damaged, it will be immediately reinforced
- The decking under concrete placement area will be sectioned off with "Do Not Enter" signage
- The sills for shoring will be sound, rigid and capable of carrying the maximum intended load
- All base plates, shore heads, extension devices and adjustment screws will be in firm contact and secured when necessary with the foundation and the form
- Eccentric loads on shore heads and similar members will be prohibited unless these members have been designed for such loading
- Whenever single post shores are used on top of another (tiered):
  - A qualified designer will prepare the design of the shoring, and an engineer qualified in structural design will inspect the erected shoring

  - The single post shores will be vertically aligned, spliced to prevent misalignment and adequately braced in two mutually perpendicular directions at the splice level. Each tier will also be diagonally braced in the same two directions
- Adjustments of single post shores to raise formwork will not be made after the placement of concrete
- Re-shoring will be erected, as the original forms and shores are removed, whenever the concrete is required to support loads in excess of its capacity
- Walkways along form walls will be constructed in accordance with OSHA scaffold and fall protection standards

Vertical Slip Forms

- Formwork will be designed, fabricated, erected, supported, braced and maintained so that it will be capable of supporting, without failure, all vertical and lateral loads anticipated to be applied to the formwork
- The steel rods or pipes on which jacks climb, or by which the forms are lifted, will be specifically designed for that purpose and adequately braced where not encased in concrete
- Forms will be designed to prevent excessive distortion of the structure during the jacking operation
- All vertical slip forms will be provided with scaffolds or work platforms where employees are required to work or pass
- Jacks and vertical supports will be positioned in such a manner that the loads do not exceed the rated capacity of the jacks
- The jacks or other lifting devices will be provided with mechanical dogs or other automatic holding devices to support the slip forms whenever failure of the power supply or lifting mechanism occurs
- The form structure will be maintained with all design tolerances specified for plumb during the jacking operation
- The predetermined safe rate of lift will not be exceeded

Reinforcing Steel

- Reinforcing steel for walls, piers, columns and similar vertical structures will be adequately supported to prevent overturning and to prevent collapse
- Measures will be taken to prevent unrolled wire mesh from recoiling
- All vertical and horizontal rebar, form stakes, metal and/or plastic conduit and/or small pipe stub-ups will be protected with approved caps or other industry accepted and tested alternatives to protect against impalement and injury
- Ensure that reinforcing steel and forms for walls, piers, columns, stairs and similar vertical structures are adequately supported to prevent overturning and collapse and are designed and installed under the supervision of a qualified person

Removal of Formwork

- Forms and shores (except those used for slabs on grade and slip forms) will not be removed until it has been determined that the concrete has gained sufficient strength to support its weight and superimposed loads
- Re-shoring will not be removed until the concrete being supported has attained adequate strength to support its weight and all loads in place upon it

  Implement the red bolt policy to ensure the last bolt holding the form in place is not removed until it is positively rigged to a piece of equipment or crane.

<u>Precast Concrete Erection</u>

General Requirements

- Precast concrete wall units, structural framing and tilt-up wall panels will be adequately supported to prevent overturning and to prevent collapse until permanent connections are completed
- Lifting inserts that are embedded or otherwise attached to tilt-up precast concrete members will be capable of supporting at least two times the maximum intended load applied or transmitted to them
- Lifting inserts that are embedded or otherwise attached to precast concrete members, other than the tilt-up members, will be capable of supporting at least four times the maximum intended load applied or transmitted to them

- Lifting hardware will be capable of supporting at least five times the maximum intended load applied or transmitted to the lifting hardware
- Proper lifting devices, such as lifting lugs, will be used for precast. A lifting plan will be prepared and made part of the Construction Work Plan (CWP).
- No employee will be permitted under precast concrete members being lifted or tilted into position except those employees required for the erection of those members
- Enter project-specific procedure

Lift Slab

- All lift slab operations will be designed by a Registered Professional Engineer with experience in this field
- Enter project-specific procedure

Masonry Construction

- A limited access zone will be established whenever a masonry wall is being constructed
- The limited access zone will:
  - Be established prior to the start of construction of the wall
  - Be equal to the height of the wall to be constructed plus four feet and will run the entire length of the wall
  - Be established on the side of the wall that does not have a scaffold
  - Be restricted to entry by employees actively engaged in constructing the wall
  - Remain in place until the wall is adequately supported
- All masonry walls over eight (8) feet in height will be adequately braced to prevent overturning and to prevent collapse unless the wall is adequately supported so that it will not overturn or collapse. The bracing will remain in place until permanent supporting elements of the structure are in place
- Establish requirements for supporting masonry walls during construction. Limited access zone will encompass both the front and rear of the work area
- No material lean on or be stacked against the wall until fully supported

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Required inspections	Foreman/assigned competent person(s)	Inspection forms
Ensure formwork system is constructed as per the design	Project Managers, superintendents, engineers, QC	Inspection Records verifying built per the design documents.
Ensure fall protection program is followed	EHS and Assigned competent person(s)	Compliance audit/Inspection
Verify supplier equipment has been properly inspected prior to commencing work	Assigned competent person(s)	Equipment Inspection reports
Click here to enter text.	Enter project-specific roles and responsibilities	Enter project-specific operational controls/documents

Applicable Training

- Installation of Formwork
- Rigging
- Fall protection
- Housekeeping

Potential Related Safety, Health and/or Environmental Aspect

Potential and unforeseen Upset Conditions

Community Impacts Transportation

Confined and Enclosed Spaces

Objective

The purpose of this program is to protect workers from the hazards associated with permit-required and non-permit required confined spaces on our jobsites. Projects will take the necessary steps to correctly evaluate confined spaces in order to safely enter and perform our work.

All workers taking part in an entry will be trained in accordance with the requirements of this program.

Legal and Other Requirements

Federal, State, Local Regulations

- OSHA 29 CFR 1926.21
- OSHA 29 CFR 1926 Subpart AA
- Notification to Port Authority by 10 AM the day prior to entry. Send PA Confined Space Notification to REO's office and fill out PA and SWJV Confined Space Entry Permits.

Skanska/Client Requirements

- Notification to Port Authority by 10 AM the day prior to entry. Send PA Confined Space Notification to REO's office and fill out PA and SWJV Confined Space Entry Permits.
- Sign out atmospheric meters at the start of each shift/ Turn back in and sign out at the end of the shift.

Procedure

Entry Procedure

Pre-Entry Procedure

- Isolate the space and implement the measures necessary to prevent unauthorized entry
- Properly calibrate air monitoring equipment and maintain records of calibration

- Evaluate the space to determine if it fits the definition of a permit–required confined space. Regardless of type of confined space, an air-monitoring log is to be filled out and maintained at the jobsite for inspection
- Implement the means, procedures, and practices necessary for safe entry operations including, but not limited to the following:
  - Test the space for atmospheric hazards in this order: oxygen content, combustible gases, vapors and dusts and then for toxic gases and vapors.
  - Specify acceptable entry condition
  - Isolate the confined space
  - Purge, flush or ventilate the space as necessary to eliminate or control atmospheric hazard (purging to be done for at least 30 minutes prior to retesting air quality).
- No employee will be allowed to enter a confined space with an oxygen deficient or potentially toxic/explosive atmosphere until Construction Work Plan is approved by Skanska project management
- Identification of work tasks to be performed in the space and their potential hazards.
- Implement Lock-Out/Tag-Out as necessary
- Identification of appropriate controls if hot work is to be performed in the space
- Selection of rescue and retrieval methods (if these functions will be performed by site personnel) or notification of proper emergency services that may be required to respond
- Selection of communication method based on configuration of space and work task to be performed
- In an explosive environment, all mechanical equipment and lighting must be explosion-proof (Class 1 Div 1)
- Provide the following equipment to employees, maintain the equipment properly, and ensure that employees use the equipment properly:
  - Testing and monitoring equipment
  - Ventilation equipment needed to obtain acceptable entry conditions
  - Any necessary communications equipment
  - Personal protective equipment when feasible engineering and work practice controls do not adequately protect employees
  - Lighting equipment needed to enable employees to see well enough to work safely and to exit the space quickly in an emergency
  - Non-sparking hand tools
  - Barriers and shields as required

- Rescue and emergency equipment needed to comply with this program, except to the extent that the equipment is provided by rescue services
- Communication means or equipment
- Any other equipment necessary for safe entry into and rescue from space
- Fill out pre-entry checklist and entry permit
- Post entry permit at entrance to space (permit must be authorized by the supervisor before entry may begin)
- Ensure space attendant is at his/her post outside the space opening

Enter project-specific procedure

During Entry

- Ensure continuous communication between attendant(s) and entrant(s) to monitor entrant(s) status
- Attendant must remain outside the space for the duration of the entry unless relieved by another authorized attendant
- Test or monitor the space continuously to determine if acceptable entry conditions are being maintained. Document readings every 15 minutes.
- Ensure all rescue controls are in place
- Evacuate the space immediately when:
  - A prohibited condition is detected inside or outside the space
  - Entrant(s) exhibit signs of exposure to a hazard
  - When the order to evacuate is given
  - When work in the space is concluded and occupation of the space is no longer necessary
- Enter project-specific procedure

Post Entry

- Remove all entrants and equipment from space
- Cancel the permit and file it for program review
- Replace the cover, hatch, door, etc., in space to prevent unauthorized entry
- Enter project-specific procedure

Authorized Entrants

- Only authorized personnel shall enter confined spaces

- Follow all entry procedures including but not limited to:
  - Verification of acceptable entry conditions
  - Continuous air monitoring
  - Implementation of forced air ventilation if necessary
  - Proper use of equipment required
  - Communication with attendant and other entrants
  - Any other procedures deemed necessary for safe operations
- Alert attendant when:
  - You recognize any warning sign or symptom of exposure to a hazard
  - You detect a prohibited condition
- Exit the permit space immediately when:
  - An order to evacuate is given by the attendant or the entry supervisor
  - You recognize any warning sign or symptom of exposure to a hazard
  - You recognize a prohibited condition
  - An evacuation alarm is sounded
- Enter project-specific procedure

Authorized attendant(s) will follow all entry procedures including, but not limited to:

- Verification of acceptable entry conditions
- Continuous air monitoring
- Implementation of forced air ventilation if necessary
- Communication with entrants
- Any other procedures deemed necessary for safe operations
- Continuously maintaining an accurate count of authorized entrants in the confined space and noting time of entry and exit
- Taking the following actions when unauthorized persons approach or enter a confined space while entry is in progress:
  - Warn the unauthorized person(s) that they must stay away from the confined space
  - Advise the unauthorized persons that they must exit immediately if they have entered the confined space
  - Inform the authorized entrants and the entry supervisor if an unauthorized person(s) has entered the confined space
- Monitoring activities inside and outside the space to determine if it is safe for entrants to remain in the space and order the authorized entrants to evacuate the confined space immediately under any of the following conditions:

  - If the attendant detects a prohibited condition
  - If the attendant detects the behavioral effects of hazard exposure in an authorized entrant
  - If the attendant detects a situation outside the space that could endanger the authorized entrants
  - If the attendant cannot effectively and safely perform all the required duties
- Conducting air monitoring and enter the results on the air-monitoring log throughout the duration of the entry
- Remaining outside the confined space during entry operations until reviewed by another approved attendant
- Summoning rescue and other emergency services as soon as it is determined that authorized entrants may need assistance to escape from space hazards
- Performing non-entry rescues with retrieval equipment
- Enter project-specific procedure

The entry supervisor will coordinate the entry and establish entry procedure including, but not limited to:

- Evaluating the confined space to determine known and potential hazards
- Identifying acceptable entry conditions
- Selecting appropriate equipment (retrieval, personal protective equipment, air monitors, etc.) based on hazards in the confined space
- Verifying that rescue services are available and the means for summoning them are operable
- Assigning qualified and trained individuals as authorized entrants and attendants
- Verifying that the appropriate entries have been made on the permit, that all tests specified by the permit have been conducted and that all procedures and equipment specified by the permit are in place before endorsing the permit and allowing entry to begin
- Terminating the entry and canceling the permit when:
  - A prohibited condition is detected
  - A condition that is not allowed under the entry permit criteria arises inside or near the confined space
  - Operations covered by the entry permit have been completed

- Ensuring all Safety Data Sheets (SDS) for hazardous chemicals involved with entry are kept available for emergency personnel in the event an employee must receive treatment for overexposure to a substance
- Provide pedestrian, vehicle or other barriers as necessary to protect entrants from external hazards
- Provide lighting equipment needed to enable employees to see well enough to work safely and to exit the space quickly in an emergency
- Provide equipment, such as ladders, needed for safe ingress and egress by authorized entrants
- Remove unauthorized persons who enter or who attempt to enter the confined space during entry operations
- Determine when responsibility for a confined space entry operation is transferred, at intervals dictated by the hazards and operations performed within the space, when entry operations remain consistent with the terms of the entry permit and acceptable entry conditions are maintained

Enter project-specific procedure

Rescue Services

- Follow all procedures identified for safe entry according to this program
- Notify REO's office prior to entry

Permit System

- Before entry is authorized, the supervisor must complete the entry permit. The entry supervisor whose name appears on the permit must sign the entry permit to authorize entry.
- The completed permit must be posted at the entry portal or by any other equally effective means so that the entrants can confirm that pre-entry preparations have been completed
- The duration of the permit may not exceed the time required to complete the assigned task or job identified on the permit. Permits will be valid for a period of eight hours or less.
- The entry supervisor must terminate entry and cancel the entry permit when:
  - The entry operations covered by the entry permit have been completed
  - A condition that is not allowed under the entry permit arises in or near the confined space

- The supervisor must give the safety department each completed entry permit, which will be maintained for one year to facilitate a review of the confined space program. If any problems are encountered during an entry operation, they must be noted on the permit so appropriate revisions can be made to the confined space program.
- Enter project-specific procedure

Non Entry Rescue

Application

- To facilitate non-entry rescue, retrieval systems or methods must be used whenever an authorized entrant enters a confined space
- The only circumstance retrieval equipment is not required is when its use would increase the overall risk of entry or would not contribute to the rescue of the entrant such as with confined spaces with side openings. Side openings in a confined space are those within 3-½ feet of the bottom.
- Enter project-specific procedure

Retrieval systems must meet the following requirements:

- Each authorized entrant must use a chest or full body harness with the retrieval line attached at the center of the entrant's back near shoulder level, or above the entrant's head. Wristlets may be used in lieu of the chest or full body harness if the use of a full body harness is infeasible or creates a greater hazard. The wristlets must be the safest and most effective alternative in this case.
- The other end of the retrieval line must be attached to a mechanical device or fixed point outside the permit space in such a manner that rescue can begin as soon as the rescuer becomes aware that rescue is necessary. A mechanical device must be available to retrieve personnel from vertical-type permit spaces more than five feet deep.
- Enter project-specific procedure

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Establish and review written space-specific procedures including lockout/tagout, rescue plan, and on-site rescue team	Superintendent/EHS Manager	Construction Work Plans
Required inspections	EHS Manager	Daily/Weekly Compliance Reports
Evaluate jobsite for the presence of confined spaces	Superintendent/EHS Manager	Project drawings identifying confined spaces
Mark confined spaces with signs reading "Danger – Confined Space – Do Not Enter"	Superintendent/EHS Manager	Signs, barriers, and shields
Provide all equipment necessary for safe entry into and rescue from the space	Superintendent/EHS Manager	Daily/Weekly Compliance Reports
Designate the employees who have active roles in entry operations and atmospheric monitoring	Superintendent/EHS Manager	Training Records
Logistical coordination with local emergency response/rescue agency	Superintendent/EHS Manager	Periodic Walkthroughs with FDNY/PA Fire Marshall
Test emergency rescue procedures	Superintendent/EHS Manager	Drill sign-off sheet
Ensure the permit	Superintendent/EHS Manager	Completed confined space entry

process is being implemented		permits Entry logs
Atmospheric monitoring	Foreman/Superintendent/EHS Manager Enter project-specific roles and responsibilities	Atmospheric monitoring data Calibration records
Enter project-specific information here	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance Indicators

Applicable Training

- Emergency response
- Confined space entrant, attendant, supervisor, and rescuer training
- Atmospheric testing
- Lockout/tagout
- Enter project-specific training

Potential Health and/or Environmental Impacts

- Enter project-specific potential health and/or environmental impact

Cranes and Crane Rigging

11.1 General Policy

The following standards, definitions and procedures support the acquisition, erection, operation and maintenance of all cranes under Skanska control on Skanska projects. This document is designed to be included as part of the EHS Manual It includes basic requirements for the operation of cranes in all regions. Project and regional-specific requirements can be added at the end of each major section.

This document is intended to standardize the efforts and actions required by project teams to safely and properly plan and manage the crane operations on each site. Therefore, this document, together with applicable project or agency specifications and OSHA regulations, will guide all project teams on the safe operation of and the administrative requirements for cranes.

On joint-venture projects where Skanska is not the lead managing partner, the lead managing partner's crane policy will take precedence; however, when not the lead managing partner, Skanska employees will make every effort to comply with Skanska's practices.

11.1.1 Scope of Applicable Equipment

This standard applies to all cranes, defined as a piece of equipment designed to hoist, lower and horizontally move a suspended load. It is intended to assist in the use of mobile cranes, truck cranes, rough terrain cranes, crawler cranes, pile drivers, tower cranes and gantry cranes, but is not intended to provide guidelines for mobile equipment for which the hoisting of loads is a secondary purpose (e.g., an excavator equipped with a hook on the bucket).

11.1.2 Applicable Regulations

ASME B30.5.2011		OSHA 29 CFR 1926.1412		OSHA 29 CFR 1926.1426
OSHA 29 CFR 1910.179		OSHA 29 CFR 1926.1413		OSHA 29 CFR 1926.1427
OSHA 29 CFR 1926.106		OSHA 29 CFR 1926.1414		OSHA 29 CFR 1926.1430
OSHA 29 CFR 1926.1400		OSHA 29 CFR 1926.1415		OSHA 29 CFR 1926.1431
OSHA 29 CFR 1926.1401		OSHA 29 CFR 1926.1416		OSHA 29 CFR 1926.1434
OSHA 29 CFR 1926.1402		OSHA 29 CFR 1926.1417		OSHA 29 CFR 1926.1435
OSHA 29 CFR 1926.1403		OSHA 29 CFR 1926.1418		OSHA 29 CFR 1926.1436
OSHA 29 CFR 1926.1404		OSHA 29 CFR 1926.1419		OSHA 29 CFR 1926.1437
OSHA 29 CFR 1926.1406		OSHA 29 CFR 1926.1420		OSHA 29 CFR 1926.1441
OSHA 29 CFR 1926.1407		OSHA 29 CFR 1926.1421		OSHA 29 CFR 1926.1501
OSHA 29 CFR 1926.1408		OSHA 29 CFR 1926.1422		OSHA 29 CFR 1926.20

OSHA 29 CFR 1926.1409		OSHA 29 CFR 1926.1423		OSHA 29 CFR 1926.251
OSHA 29 CFR 1926.1410		OSHA 29 CFR 1926.1424		OSHA 29 CFR 1926.502
OSHA 29 CFR 1926.1411		OSHA 29 CFR 1926.1425		OSHA 29 CFR 1926.550

11.1.3 Definitions

A/D director (Assembly/disassembly director): Individual who meets this policy's requirements for an A/D director, irrespective of the person's formal job title or whether the person is non-management or management personnel

Anti-collision system: An electronic device used to help the operator avoid swing collisions with other cranes and set swing boundaries and zones for safe operation

Articulating crane: A crane whose boom consists of a series of folding, pin-connected structural members, typically manipulated to extend or retract using power from hydraulic cylinders

Assembly/disassembly: The assembly and/or disassembly of equipment covered under this policy. With regard to tower cranes, ''erecting and climbing'' replaces the term ''assembly'' and ''dismantling'' replaces the term ''disassembly". Regardless of whether the crane is initially erected to its full height or is climbed in stages, the process of increasing the height of the crane is an erection process.

Assist crane: A crane used to assist in assembling or disassembling a crane

Attachments: Any device(s) that expand(s) the range of tasks that can be done by the equipment. Examples include, but are not limited to, augers, drills, magnets, pile-drivers and boom-attached personnel platforms.

Audible signal: A signal made by a distinct sound or series of sounds. Examples include, but are not limited to, sounds made by bells, horns or whistles.

Blocking (also referred to as ''cribbing''): Wood or other material used to support equipment or a component and distribute loads to the ground. It is typically used to support lattice boom sections during assembly/disassembly and under outrigger and stabilizer floats.

Boatswain's chair: A single-point, adjustable suspension scaffold consisting of a seat or sling (which may be incorporated into a full body harness) designed to support one employee in a sitting position

Bogie: See ''travel bogie" below

Boom (equipment other than tower crane): An inclined spar, strut or other long structural member that supports the upper hoisting tackle on a crane or derrick. Typically, the length and vertical angle of the boom can be varied to achieve increased height, or height and reach, when lifting loads. Booms can usually be grouped into general categories of hydraulically extendible, cantilevered type, latticed section, cable-supported type or articulating type.

Boom (tower cranes): On tower cranes, if the ‘‘boom’’ (i.e., principal horizontal structure) is fixed, it is referred to as a jib; if it is moveable up and down, it is referred to as a boom

Boom angle indicator: Device that measures the angle of the boom relative to horizontal

Boom hoist limiting device: Includes boom hoist disengaging device, boom hoist shut-off, boom hoist disconnect, boom hoist hydraulic relief, boom hoist kick-outs, automatic boom stop device or derricking limiter. This type of device disengages boom hoist power when the boom reaches a predetermined operating angle. It also sets brakes or closes valves to prevent the boom from lowering after power is disengaged.

Boom length indicator: Indicates the length of the permanent part of the boom (such as ruled markings on the boom) or, as in some computerized systems, the length of the boom with extensions/attachments

Boom stop: Includes boom stops (belly straps with struts/standoff), telescoping boom stops, attachment boom stops and backstops. These devices restrict the boom from moving above a certain maximum angle and toppling over backward.

Boom suspension system: System of pendants, running ropes, sheaves and other hardware that supports the boom tip and controls the boom angle

Center of gravity: Point in an object around which its weight is evenly distributed. If you could put a support under that point, you could balance the object on the support.

Certified welder: Welder who meets nationally recognized certification requirements applicable to the task being performed

Climbing: Process in which a tower crane is raised to a new working height either by adding tower sections to the top of the crane (top climbing) or by a system in which the entire crane is raised inside the structure (inside climbing)

Come-a-long: A mechanical device typically consisting of a chain or cable attached at each end that is used to facilitate movement of materials through leverage

Competent person: One who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous or dangerous to employees and who has authorization to take prompt corrective measures to eliminate them. Training records are maintained and available.

Competent Rigging Person: Typically, the foreman of the crew performing the lift, but may be anyone who oversees the lift from rigging to landing the load. The individual must possess training and experience and meet the other competent person criteria to be considered competent in rigging.

Controlled load lowering: Lowering a hoisted load with maximum control using the gear train or hydraulic components of a hoist mechanism. Controlled load lowering requires the use of the hoist drive motor, rather than the load hoist brake, to lower the load.

Controlling entity: Prime contractor, general contractor, construction manager or any other legal entity that has the overall responsibility for the construction of the project, including its planning, quality and completion

Counterweight: A weight used to supplement the weight of equipment in providing stability for lifting loads by counterbalancing those loads

Crane location plan (CLP): A drawing specific to a jobsite that identifies known hazards for underground and overhead crane operations. It specifies an individual area's ability to support the ground pressure produced by operating a crane. The drawing provides a visual representation of where specific cranes are approved to and are not approved to operate. The drawing is adjusted routinely to account for changes in site conditions and other factors that affect the safe operation of a crane on the site. The CLP must be approved by a qualified person.

If Skanska is the controlling entity on a jobsite, Skanska must also make the location of underground hazards in the set-up area (e.g., voids, tanks, utilities) available to the user and the operator of all cranes on the jobsite. If hazards are identified in documents (e.g., site drawings, as-built drawings and soil analyses) that are in the possession of Skanska (whether at the site or offsite) or are hazards that are otherwise known to Skanska.

Note: this does not relieve each respective user and operator of cranes on the jobsite (e.g., subcontractors) from their responsibility to meet the requirements as stated above.

Crawler crane: Equipment with base mounting that incorporates a continuous belt of sprocket-driven track

Crossover points: Locations on a wire rope spooled on a drum where one layer of rope climbs up on and crosses over the previous layer. This takes place at each flange of the drum as the rope is spooled onto the drum, reaches the flange and begins to wrap back in the opposite direction.

Dedicated channel: Line of communication assigned by the employer who controls the communication system to only one signal person and crane/derrick or to a coordinated group of cranes/derricks/signal person(s)

Dedicated pile-driver: A machine designed to function exclusively as a pile-driver. These machines typically have the ability to both hoist and pile-drive the material.

Dedicated spotter (power lines): To be considered a dedicated spotter, the requirements of a signal person must be met. The dedicated spotter's sole responsibility is to watch the separation between the power line and the equipment, load line and load, including rigging and lifting accessories. They also ensure, through communication with the operator, that the applicable minimum approach distance is not breached

Directly under the load: When a part or all of an employee is directly beneath the load

Dismantling: Includes partial dismantling (i.e., dismantling to shorten a boom or substitute a different component)

Drum rotation indicator: A device on a crane or hoist that indicates in which direction and at what relative speed a particular hoist drum is turning.

Electrical contact: Occurs when a person, object or equipment makes contact or comes in close proximity with an energized conductor or equipment that allows the passage of current

Encroachment: Where any part of the crane, load line or load (including rigging and lifting accessories) breaches the minimum clearance distance required to be maintained from a power line

Fall protection equipment: Guardrail systems, safety net systems, personal fall arrest systems, positioning device systems or fall restraint systems

Fall restraint system: A fall protection system that prevents the user from falling any distance

Floating cranes/derricks: Equipment designed by the manufacturer (or employer) for marine use by and is permanently attachment to a barge, pontoons, vessel or other means of flotation

Free fall (of the load line): When only the brake is used to regulate the descent of the load line (i.e., the drive mechanism is not used to drive the load down faster or retard its lowering)

Free surface effect: The uncontrolled transverse movement of liquids in compartments which reduces a vessel's transverse stability

Hoist: A mechanical device for lifting and lowering loads by winding a line onto or off a drum

Hoisting: The act of raising, lowering or otherwise moving a load in the air with equipment. As used in this policy, ''hoisting'' can be done by means other than wire rope/hoist drum equipment.

Insulating link/device: An insulating device listed, labeled or accepted by a nationally recognized testing laboratory

Jib (tower cranes): On tower cranes, if the ''boom'' (i.e., principal horizontal structure) is fixed, it is referred to as a jib; if it is moveable up and down, it is referred to as a boom

Jib stop (also jib backstop): The same type of device as a boom stop but for a fixed or luffing jib

Lift director: Directly oversees the work being performed by a crane and the associated rigging crew. The lift director is someone appointed on the jobsite and can be in the capacity of a project manager, project superintendent, foreman or project crane coordinator (PCC).

Lift plan: A construction plan that outlines the step-by-step aspects of a particular lift in detail. It includes a rigging plan and a signal plan.

List: The angle of inclination about the longitudinal axis of a barge, pontoon, vessel or other means of floatation

Load: Object(s) being hoisted and/or the weight of the object(s); both uses refer to the object(s) and the load-attaching equipment (e.g., the load block, ropes, slings, shackles and any other ancillary attachment)

Load moment (or rated capacity) limiter: A system that aids the equipment operator by sensing (directly or indirectly) the overturning moment on the equipment (i.e., load multiplied by radius). It compares this lifting condition to the equipment's rated capacity and when the rated

capacity is reached, shuts off power to those equipment functions that can increase the severity of loading on the equipment (e.g., hoisting, telescoping out or luffing out). Typically, those functions that decrease the severity of loading on the equipment remain operational (e.g., lowering, telescoping in or luffing in).

Locomotive crane: A crane mounted on a base or car equipped for travel on a railroad track

Luffing jib limiting device: Similar to a boom hoist limiting device except that it limits the movement of the luffing jib

Marine hoisted personnel transfer device: A device, such as a ‘‘transfer net’’, that is designed to protect the employees being hoisted during a marine transfer and to facilitate rapid entry into and exit from the device. Such devices do not include boatswain’s chairs when hoisted by equipment covered in this document.

Marine worksite: A construction worksite located in, on or above the water

Mobile crane: A lifting device incorporating a cable-suspended latticed boom or hydraulic telescopic boom designed to be moved between operating locations by transport over the road

Multi-purpose machine: A machine designed to be configured in various ways, at least one of which allows it to hoist (by means of a winch or hook) and horizontally move a suspended load. For example, a machine that can rotate and can be configured with removable forks/tongs (for use as a forklift).

Nonconductive: An object that, because of the nature and condition of the materials used and the conditions of use (including environmental conditions and condition of the material), has the property of not becoming energized (i.e., it has high dielectric properties offering a high resistance to the passage of current under the conditions of use)

Operational controls: Levers, switches, pedals and other devices for controlling equipment

Operator: A person who is operating the equipment or a winch pack, jib (with a hook at the end) or jib used in conjunction with a winch

Operational aids: are devices that assist the operator in the safe operation of the crane by providing information or automatically taking control of a crane function

Overhead and Gantry cranes: includes overhead/bridge cranes, semi-gantry, cantilever gantry, wall cranes, storage bridge cranes, launching gantry cranes and similar equipment irrespective of whether it travels on tracks, wheels or other means

Pendants: Includes both wire and bar types. Wire type: A fixed length of wire rope with mechanical fittings at both ends for pinning segments of wire rope together. Bar type: Instead of wire rope, a bar is used. Pendants are typically used in a latticed boom crane system to easily change the length of the boom suspension system without completely changing the rope on the drum when the boom length is increased or decreased.

Personal fall arrest system: A system used to arrest an employee in a fall from a working level. It consists of an anchorage, connectors and a body harness and may include a lanyard, deceleration device, lifeline or suitable combination of these.

Portal crane: A type of crane consisting of a rotating upper structure, hoist machinery and boom mounted on top of a structural gantry which may be fixed in one location or have travel capability. The gantry legs or columns usually have portal openings in between to allow passage of traffic beneath the gantry.

Power lines: Electric transmission and distribution lines

Project crane coordinator (PCC): The PCC is typically not a full-time position, but rather a multipurpose member of the project staff who serves in the capacity of a field engineer tasked with crane management for the jobsite. Some of the PCC's duties include verification of completion of daily periodic inspections, verification of operator's licensing and qualification, and completion of routine tasks maintaining the project's compliance with this document.

Proximity alarm: Device that provides a warning of proximity to a power line

Qualified evaluator (not a third party): Person employed by the signal person's employer who has demonstrated that he/she is competent in accurately assessing whether individuals meet the qualification requirements in this policy for a signal person

Qualified evaluator (third party): An entity that, due to its independence and expertise, has demonstrated that it is competent in accurately assessing whether individuals meet the qualification requirements in this policy for a signal person

Qualified person: Person who, by possession of a recognized degree, certificate or professional standing, or who by extensive knowledge, training and experience, successfully demonstrates the ability to solve/resolve problems relating to the subject matter, the work or the project

Qualified rigger: Rigger who meets the criteria for a qualified person

Range control limit device: Device that can be set by an equipment operator to limit movement of the boom or jib tip to a plane or multiple planes

Range control warning device: Device that can be set by an equipment operator to warn that the boom or jib tip is at a plane or multiple planes

Rated capacity: The maximum working load permitted by the manufacturer under specified working conditions. Such working conditions typically include a specific combination of factors such as equipment configuration, radii, boom length and other parameters of use.

Rated capacity indicator: An indicator that tells the operator what percent of capacity they are at. Refer to indicator on the crane.

Rated capacity limiter: See load moment limiter

Regional crane coordinator (RCC): The regional crane coordinator may be a full-time position with duties that include oversight and planning of all monthly and annual crane inspections and the overall regional compliance with this document. The RCC utilizes a CGC to track the location and status of all cranes and their inspections. Each region will have an RCC.

Repetitive lift-up points: When operating on a short cycle operation, the rope used on a single layer and spooled repetitively over a short portion of the drum

Rigging plan: Portion of the lift plan related to the method and materials used to rig a load. It specifically details all rigging to be used in the lift.

Running wire rope: A wire rope that moves over sheaves or drums

Runway: A firm, level surface designed, prepared and designated as a path of travel for the weight and configuration of the crane being used to lift and travel with the crane-suspended load. An existing surface may be used as long as it meets these criteria.

Side boom crane: Track-type or wheel-type tractor with a boom mounted on the side used for lifting, lowering or transporting a load suspended on the load hook. The boom or hook can be lifted or lowered in a vertical direction only.

Signal person: The individual who gives signals to the crane operator. Must be trained as a competent person in signaling.

Signal plan: The portion of the lift plan related to signaling throughout the duration of the lift; outlines all signal-related details for the lift

Special hazard warnings: Warnings of site-specific hazards (e.g., proximity of power lines)

Subcontractor: Any individual or entity contracted and working under Skanska on Skanska's contract

Tagline: A rope (usually fiber) attached to a lifted load for purposes of controlling load spinning and pendular motions or used to stabilize a bucket or magnet during material handling operations

Tender: Individual responsible for monitoring and communicating with a diver

Third-party inspector: Certified crane inspector contracted for a specific purpose, such as the oversight of the erection of a tower crane, monthly and annual inspections on rubber tire, crawler, or bridge cranes and Magnetic Particle Testing (Magnaflux)

Tilt up or tilt down operation/tripping: Raising/lowering a load from the horizontal to vertical or vertical to horizontal position while using one or more lines or using more than one piece of equipment (e.g., cranes, excavators, loaders, dozers)

Tower crane: Type of lifting structure that uses a vertical mast or tower to support a working boom (jib) in an elevated position. Loads are suspended from the working boom.

Travel bogie (tower cranes): An assembly of two or more axles arranged to permit vertical wheel displacement and equalize the loading on the wheels

Trim: Angle of inclination about the transverse axis of a barge, pontoon, vessel or other means of floatation

Two blocking: A condition in which a component that is uppermost on the hoist line, such as the load block, hook block, overhaul ball or similar component, comes in contact with the boom tip,

fixed upper block or similar component. This binds the system and continued application of power can cause failure of the hoist rope or other component.

Unavailable procedures: Procedures that are no longer available from the manufacturer or have never been available from the manufacturer

Upper works: The revolving frame of equipment on which the operating machinery (and in many cases the engine) is mounted, along with the operator's cab. The counterweight is typically supported on the rear of the upper structure and the boom or other front end attachment is mounted on the front.

Wire rope: A flexible rope constructed by laying steel wires into various patterns of multi-wired strands around a core system to produce a helically wound rope

11.1.4 Regional/Project-Specific Requirements

DOB 32-hour Rigging Supervisors course and DOB 16- hour Rigging Worker course required.

11.2 Site Prep

11.2.1 Required Documentation

The following documentation must be present inside the cab before the crane may be placed into service:

- Current Monthly Inspection
- Manufacturer's Load Chart
- Manufacturer's Operating Manual

It is the responsibility of project management, the operator and craft personnel involved with the crane operation to ensure this documentation is present in the cab of the crane for the duration of the crane's presence on a Skanska project. If this documentation is not present, it should be reported to the project crane coordinator immediately.

11.2.2 Owner Notification/Requirements

Some owners or agencies may require the contractor to follow a specific procedure to notify them of the intent to bring a crane onto their jobsite. All project teams should consult project specifications for notification requirements specific to their projects. In general, project teams should:

- Notify the owner or authority prior to mobilization of any crane
- Obtain and comply with owner or authority requirements for project crane operations
- Verify owner or authority requirements regarding crane capacity
- Notify the Skanska Insurance Department if rented cranes are being used

11.2.3 Geotechnical and Crane Location Plan (CLP) Requirements

The CLP is created at the beginning of the project, revisited during the monthly crane program meeting and routinely adjusted to reflect current site conditions. Each time a crane is moved and set up onsite, a checklist is completed that displays that the site conditions have been examined and are adequate to support the crane. All ground improvements (leveling, stone, matting, etc.) must be noted on the CLP.

The CLP must include crane locations and a description of the crane to which it corresponds, as well as a classification of the crane and pictures of the existing ground conditions in each proposed set-up location. Include the geotechnical report(s), if available, along with any soil

borings or test pits within the proposed crane locations. A jobsite visit may be scheduled to perform an evaluation of the ground conditions and overhead conditions at each proposed set up location at the discretion of the qualified person reviewing the submittal.

Cranes without the ability to level themselves (crawler cranes) require ground improvement, at a minimum, to level the area. This will most often be achieved with the construction of a stone crane pad. Crawler cranes with 250 tons or greater capacity must be set on crane mats, at a minimum. Poor ground conditions could also necessitate matting for cranes of smaller capacity. If the project team can provide calculations showing that the existing ground conditions are adequate to support a crane with 250 tons or greater capacity, they may request a dispensation from the regional crane coordinator (RCC) and Skanska engineering as well as acquire sign-off from the assigned project vice president or designee. For cranes not owned or operated by Skanska a third-party engineer and subcontractor senior executive may fulfill this requirement and submit to Skanska for review and approval.

All outrigger-supported cranes need appropriate dunnage under the outriggers. Where possible, 100 percent outriggers should be used. Partial outriggers may only be used if a manufacturer's load chart is issued for that configuration. If partial outriggers are used, the partial load chart must be used in all lift classification calculations. The project crane coordinator (PCC) must verify that the crane is set up in an appropriate configuration.

11.2.4 Subcontractors

All subcontractors working under Skanska contract will abide by the Skanska Crane Policy.

11.2.5 Monthly Project Crane Meeting

The project team will hold a meeting chaired by the PCC to discuss crane- and rigging-related issues once every month. Examples of topics to be discussed with the project team include training; any reoccurring repairs or issues identified with cranes or rigging that may indicate improper use or maintenance; recent or future changes to the project site that will impact the CLP; and any other issues related to cranes or rigging on the project. This meeting should be documented with the Crane Meeting Agenda Form.

11.2.6 Annual Project Crane Meeting

Once per year, the RCC will attend a monthly project crane meeting for each project. This will provide the project team an opportunity to ask questions about the evolving crane policy as well as give input and suggestions for improvement. At the same time, it will allow the RCC to

evaluate how the company-wide crane policies are being implemented at the project level. This meeting should be documented with the Crane Meeting Agenda Form.

11.2.7 Regional/Project-Specific Requirements

Enter project-specific requirements

11.3 Operations

11.3.1 Authority to Stop Operation/Emergency Stop

Whenever there is a safety concern, every employee has the authority to stop work and refuse to handle loads until the issue has been corrected. Every employee has the right to give an emergency stop signal.

11.3.2 Proper Operation Required

Operations must not begin unless all of the devices listed in this section are in proper working order. If a device stops working properly during operations, the operator must safely stop operations. If any of the devices listed in this section are not in proper working order, the equipment must be taken out of service and operations must not resume until the device is again working properly. Alternative measures are not permitted.

11.3.3 Notifications

The minimum notice for a project team to provide notice to the regional crane coordinator (RCC) for the intended use of a crane is eight weeks. The RCC will consult the equipment manager and determine, based on the type of crane and duration required, whether to rent, purchase or utilize a Skanska-owned crane. If a project crane coordinator (PCC) is not already designated on the jobsite, the RCC and project team will designate one at this time.

11.3.4 Safety Devices

The following safety devices are required on all company-owned and rented equipment, unless otherwise specified:

- Boom angle indicator
- Crane level indicator: Equipment must have a crane level indicator that is either built into the equipment or available on the equipment. If a built-in crane level indicator is not working properly, it must be tagged-out or removed and replaced. If a removable crane level indicator is not working properly, it must be removed. This requirement does not apply to portal cranes, derricks, floating cranes/derricks and land cranes/derricks on barges, pontoons, vessels or other means of flotation.
- Boom stops, except for derricks and hydraulic booms
- Jib stops (if a jib is attached), except for derricks
- Locks on equipment with foot pedal brakes

- Integral holding device/check valve on hydraulic outrigger jacks and hydraulic stabilizer jacks
- Rail clamps and rail stops on equipment on rails, except for portal cranes
- Horn: Equipment must have a horn that is both built in or on the equipment and immediately available to the operator. If a built-in horn is not working properly, it must be tagged-out or removed and replaced. If a removable horn is not working properly, it must be removed. In either case, the horn must be replaced or repaired.

11.3.5 Assembly/Disassembly

Selection of Skanska or Manufacturer Procedures

- When assembling or disassembling equipment (or attachments), Skanska/crane user must comply with all applicable manufacturer prohibitions and with either the manufacturer's procedures applicable to assembly/ disassembly (A/D) or an approved Skanska A/D plan
- Synthetic slings may only be used for A/D rigging when specifically approved or directed by the manufacturer
- Skanska procedures must be developed by a qualified person
- An A/D director will be identified in the construction plan
- Prevent unintended dangerous movement and prevent collapse of any part of the equipment
- Provide adequate support and stability of all parts of the equipment
- Position employees involved in the A/D operation so that their exposure to unintended movement or collapse of part or all of the equipment is minimized

11.3.6 Assembly/Disassembly General Requirements

For all cranes working on a Skanska-controlled site, including rented, owned and subcontractor supplied, the A/D must be directed by a person who meets the criteria for both a competent person and a qualified person, or by a competent person who is assisted by one or more qualified persons (A/D director). Where the A/D is being performed by only one person, that person must meet the criteria for both a competent person and a qualified person.

11.3.7 Knowledge of Procedures

The A/D director must clearly understand the applicable A/D procedures.

11.3.8 Review of Procedures

The A/D director must review the applicable assembly/disassembly procedures immediately before beginning assembly/disassembly, unless the A/D director understands the procedures and has applied them to the same type and configuration of equipment (including accessories, if any).

11.3.9 Assembly/Disassembly Crew Responsibilities

The crew is required to review and sign off on the construction plan, the A/D plan and any applicable manufacturer's requirements.

Before commencing A/D operations, the A/D director must ensure that the crew members understand all of the following:

- Their tasks
- The hazards associated with their tasks
- The hazardous positions/locations that they need to avoid

During A/D operations, before a crew member takes on a different task, or when adding new personnel during the operations, the construction plan must be reviewed and updated as necessary by said personnel.

11.3.9.1 Protecting Assembly/Disassembly Crew Members out of Operator View

Before a crew member goes to a location that is out of view of the operator and is either in, on, under the equipment or near the equipment (or load) where the crew member could be injured by movement of the equipment (or load), the crew member must inform the operator that he/she is going to that location. When the operator knows that a crew member went to a location out of view, the operator must not move any part of the equipment (or load) until the operator is informed in accordance with a prearranged system of communication that the crew member is in a safe position.

11.3.9.2 Working under the Boom, Jib or Other Components

When pins (or similar devices) are being removed, employees must not be under the boom, jib or other components.

Exception: If the employer demonstrates that site constraints require one or more employees to be under the boom, jib or other components when pins (or similar devices) are being removed, the A/D director must implement procedures that minimize the risk of unintended dangerous

movement and minimize the duration and extent of exposure under the boom. At a minimum, the components must be adequately blocked and, when possible, supported by an assist crane. A documented Construction Work Plan must be developed.

11.3.9.3 Capacity Limits

During all phases of A/D, rated capacity limits for loads imposed on the equipment, equipment components (including rigging), lifting lugs and equipment accessories must not be exceeded for the equipment being assembled/disassembled.

11.3.9.4 Addressing Specific Hazards

The A/D director supervising the A/D operation must address the hazards associated with the operation, which will be identified in the Construction Work Plan.

11.3.9.5 Site and Ground Bearing Conditions

Site and ground conditions must be adequate for safe A/D operations and to support the equipment during assembly/disassembly.

11.3.9.6 Blocking Material

The size, amount, condition and method of stacking the blocking must be sufficient to sustain the loads and maintain stability.

11.3.9.7 Proper Location of Blocking

When used to support lattice booms or components, blocking must be appropriately placed to:

- Protect the structural integrity of the equipment
- Prevent dangerous movement and collapse

11.3.9.8 Verifying Assist Crane Loads

When using an assist crane, the loads that will be imposed on the assist crane during the A/D process must be verified by a Construction Work Plan and with the corresponding lift plan.

11.3.9.9 Boom and Jib Lift Points

The point(s) of attachment of rigging to a boom (or boom sections or jib or jib sections) must be suitable for preventing structural damage and facilitating safe handling of these components.

11.3.9.10 Center of Gravity

The center of gravity of the load must be identified if it is integral to maintaining stability. Where there is insufficient information to accurately identify the center of gravity, measures designed to prevent unintended dangerous movement resulting from an inaccurate identification of the center of gravity must be used.

11.3.9.11 Stability upon Pin Removal

The boom sections, boom suspension systems (such as gantry A-frames and jib struts) and components must be rigged or supported to maintain stability upon the removal of the pins.

11.3.9.12 Snagging

Suspension ropes and pendants must not be allowed to catch on the boom or jib connection pins or cotter pins (including keepers and locking pins).

11.3.9.13 Struck By Counterweights

Rigging and blocking must be sufficient to minimize the potential for unintended movement from inadequately supported counterweights and from hoisting counterweights.

11.3.9.14 Boom Hoist Brake Failure

Each time the boom hoist brake is being relied on to prevent boom movement during A/D; the brake must first be tested. If the brake proves insufficient, a boom hoist pawl, other locking device/back-up braking device or another method of preventing dangerous movement of the boom (such as blocking or an assist crane) and a boom hoist brake failure must be used.

11.3.9.15 Loss of Backward Stability

Backward stability must be ensured before swinging the upper works, travel and when attaching or removing equipment components.

11.3.9.16 Wind Speed and Weather

The effect of wind speed and weather on the equipment (refer to manufacturer's procedures) must be considered.

11.3.9.17 Cantilevered Boom Sections

Manufacturer limitations on the maximum amount of boom supported only by cantilevering must not be exceeded. If the manufacturer's limitations are not available, a registered professional

engineer familiar with the type of equipment involved must determine this limitation and provide it in writing. The limitation must not be exceeded.

11.3.9.18 Weight of Components

The weight of each of the components must be readily available and known to the riggers or suitable qualified competent person.

11.3.9.19 Components and Configuration

The selection of components and configuration of the equipment that affect the capacity or safe operation of the equipment must be in accordance with manufacturer instructions, prohibitions, limitations and specifications. If these are unavailable, a registered professional engineer familiar with the type of equipment involved must approve, in writing, the selection and configuration of components. Upon completion of assembly, the equipment must be inspected by a qualified inspector.

11.3.9.20 Shipping Pins

Reusable shipping pins, straps, links and similar equipment must be removed. Once removed, they must either be stowed or otherwise stored so they do not present a falling object hazard.

11.3.9.21 Pile Driving

Equipment used for pile driving must not have a jib attached during pile driving operations.

11.3.9.22 Outriggers and Stabilizers

When the load to be handled and the operating radius require the use of outriggers or stabilizers or at any time when outriggers or stabilizers are used, all of the following requirements must be met (except as otherwise indicated):

- The outriggers or stabilizers must be either fully extended or, if the manufacturer's procedures permit, deployed as specified in the load chart
- The outriggers must be set to remove the equipment weight from the wheels, except for locomotive cranes. This provision does not apply to stabilizers.
- When outrigger floats are used, they must be attached to the outriggers. When stabilizer floats are used, they must be attached to the stabilizers.

- Each outrigger or stabilizer must be visible to the operator or to a signal person during extension and setting

11.3.9.23 Outrigger and Stabilizer Material

Outrigger and stabilizer blocking must:

- Be placed only under the outrigger or stabilizer float/pad of the jack or, where the outrigger or stabilizer is designed without a jack, under the outer bearing surface of the extended outrigger or stabilizer beam
- Be a minimum 4" solid oak or the equivalent and be sized such that individual pad blocking covers an area equal to three times the overall pad dimension. All blocking will be tightly spaced and in contact with the outrigger pad (cross blocking may be required) or be suitably engineered to carry anticipated loads with a given soil capacity.
- Follow manufacturer's procedures when using locomotive cranes. When lifting loads without using outriggers or stabilizers, the manufacturer's procedures must be met regarding truck wedges or screws.

11.3.9.24 Rigging

When rigging is used for A/D, Skanska must ensure that:

- The rigging work is done by a qualified rigger
- Synthetic slings are protected from abrasive, sharp or acute edges, and configurations that could cause a reduction of the sling's rated capacity, such as distortion or localized compression. "Sling Saver" rigging attachments are recommended.
- When synthetic slings are used, the synthetic sling manufacturer's instructions, limitations, specifications and recommendations are followed

11.3.9.25 Operation

Skanska will comply with all manufacturer procedures applicable to the operational functions of equipment, including its use with attachments. Before starting the engine, the operator will verify that all controls are in the proper starting position and that all personnel are in the clear. The operator must be familiar with the equipment and its proper operation. If adjustments or repairs are necessary, the operator will promptly inform the person designated by Skanska to receive such information and, where there are successive shifts, the next operator. Safety devices and operational aids will not be used as a substitute for the exercise of professional judgment by the operator.

11.3.10 Crane Moves

Whenever a mobile crane is to be moved onsite, a spotter must be present to supplement the operator's visibility and clear all personnel from the area. The PCC will consult the crane location plan (CLP) and the crane move checklist to approve the activity. Prior to the move, the starting point, the end point and the route of the move must be reviewed with the operator and the spotter. If the crane must travel or set up in an area not specified on the CLP, a project superintendent or project manager must sign off.

11.3.11 Updates to Crane Location Plan

Any time any portion of the jobsite that is indicated as an approved area for a crane to set up on the CLP undergoes a significant change that could impact the area's ability to support that crane, the CLP must be updated. Examples of such changes include excavation, construction or demolition of sheeting or piles, any change in support of excavation, demolition of structures and any change in ground conditions that could impact the ability of the ground conditions to support a crane. The crane user's updated CLP must be submitted to Skanska Engineering with a description of the changes and photographs, where applicable. At the discretion of Skanska Engineering, a jobsite visit may be scheduled to evaluate the impact of the changes. At a minimum, the CLP must be updated annually regardless of the changes to the ground conditions.

11.3.12 Cell Phones or Other Devices

The operator and crew will not engage in any practice that diverts his/her attention while actually engaged in operating the crane, such as the use of cell phones or other attention-diverting activities.

11.3.13 Grounding

While working in close proximity to sources of electrical discharge, cranes on Skanska sites are to be operated in compliance with OSHA 1926.1501 (a)(15)(vii) to ensure work crew safety.

Additionally, all sites must have materials necessary to properly ground cranes and loads as is specified in OSHA 1926.1501 (a) (15) (vii) readily available.

11.3.14 Leaving the Equipment Unattended

At any time on any Skanska project the operator, including subcontractors, is not permitted to leave the controls while the load is suspended.

11.3.15 Keeping Clear of the Load

Where available, hoisting routes that minimize the exposure of employees to hoisted loads must be used, to the extent consistent with public safety. While the operator is not moving a suspended load, no employee must be within the fall zone, except for employees:

- Engaged in hooking, unhooking or guiding a load
- Engaged in the initial attachment of the load to a component or structure
- Operating a concrete hopper or concrete bucket

When employees are engaged in hooking, unhooking, guiding the load or in the initial connection of a load to a component or structure and are within the fall zone, all of the following criteria must be met:

- The materials being hoisted must be rigged to prevent unintentional displacement
- Hooks with self-closing latches or their equivalent must be used
- The materials must be rigged by a qualified rigger

11.3.16 Receiving a Load

Only those employees needed to receive a load are permitted to be within the fall zone when a load is being landed. These employees must be on the construction plan.

During a tilt-up or tilt-down operation:

- No employee can be directly under the load. Only employees essential to the operation are permitted in the fall zone (but not directly under the load).

An employee is essential to the operation if the employee is conducting one of the following operations and the employer can demonstrate it is infeasible for the employee to perform that operation from outside the fall zone:

- Physically guiding the load
- Closely monitoring and giving instructions regarding the load's movement
- Either detaching it from or initially attaching it to another component or structure (such as, but not limited to, making an initial connection or installing bracing)

Note: Boom free fall is prohibited when an employee is in the fall zone of the boom or load and load line free fall is prohibited when an employee is directly under the load.

11.3.17 Free Fall and Controlled Load Lowering

11.3.17.1 Boom Free Fall Prohibitions

The use of equipment in which the boom is designed to free fall (live boom) is prohibited in each of the following circumstances:

- An employee is in the fall zone of the boom or load
- An employee is being hoisted
- The load or boom is directly over a power line, or over any part of the area extending the Table A clearance distance to each side of the power line
- The load is over a shaft or a cofferdam, except where there are no employees in the fall zone

11.3.17.2 Preventing Boom Free Fall

Where the use of equipment with a boom that is designed to free fall (live boom) is prohibited, the boom hoist will have a secondary mechanism or device designed to prevent the boom from falling in the event the primary system used to hold or regulate the boom hoist fails, as follows:

- Friction drums will have:
  - A friction clutch and, in addition, a braking device to allow for controlled boom lowering
  - A secondary braking or locking device that is manually or automatically engaged to back up the primary brake while the boom is held (such as a secondary friction brake or a ratchet and pawl device)
- Hydraulic drums will have an integrally mounted holding device or internal static brake to prevent boom hoist movement in the event of hydraulic failure
- Neither clutches nor hydraulic motors will be considered brake or locking devices for purposes of this document
- Hydraulic boom cylinders will have an integrally mounted holding device

11.3.17.3 Preventing Uncontrolled Retraction

Hydraulic telescoping booms will have an integrally mounted holding device to prevent the boom from retracting in the event of hydraulic failure.

11.3.17.4 Load Line Free Fall

In each of the following circumstances, controlled load lowering is required and free fall of the load line hoist is prohibited:

- An employee is directly under the load
- An employee is being hoisted
- The load is directly over a power line or over any part of the area extending the Table A clearance distance to each side of the power line (refer to section 11.7.2.1)
- The load is over a shaft or cofferdam where people may be present

11.3.18 Compliance with Rated Capacity

The equipment will not be operated in excess of its rated capacity.

11.3.19 Load Weight

The weight of the load will be determined from a reliable source (such as the manufacturer of the contents of the load), by a reliable calculation method (such as calculating a steel beam from measured dimensions and a known per foot weight) or by other equally reliable means. All load information will be provided to the operator via the Skanska lift plan/Construction Work Plan prior to the lift. The operator will verify that the load is within the rated capacity of the equipment by slowly beginning to hoist the load to determine its weight, using a load weighing device, load moment indicator, rated capacity indicator or rated capacity limiter. Additionally:

- The boom or other parts of the equipment will not contact any obstruction
- The equipment will not be used to drag or pull loads sideways
- The operator will test the brakes each time a load that is 90 percent or more of the maximum line pull is handled by lifting the load a few inches and applying the brakes. In duty cycle and repetitive lifts where each lift is 90 percent or more of the maximum line pull, this requirement applies to the first lift but not to successive lifts.
- Neither the load nor the boom will be lowered below the point where less than two full wraps of rope remain on their respective drums
- A tag or restraint line will be used if necessary to prevent rotation of the load that would be hazardous
- The brakes will be adjusted in accordance with manufacturer procedures to prevent unintended movement
- The operator will obey a stop (or emergency stop) signal, irrespective of who gives it

11.3.20 Use of Load Chart

The competent personnel involved in designing and executing a lift, including the operator, must know how to use a load chart. This includes understanding:

- The terminology necessary to interpret load charts
- How to ensure that the load chart is the appropriate chart for the equipment in its particular configuration and application
- The operational limitations of load charts and footnotes
- How to relate the chart to the configuration of the crane, crawlers, outriggers/stabilizers extended or retracted, jib erected or offset and various counterweight configurations
- The difference between structural capacity and capacity limited by stability
- What is included in capacity ratings
- The range diagram and its relationship to the load chart
- The work area chart and its relationship to the load chart
- Where to find and how to use the "parts-of-line" information
- How to use the load chart together with the load indicators and/or load moment devices

11.3.21 Work Area Control

The following requirements apply where there are accessible areas in which the equipment's swing radius or rotating superstructure (whether permanently or temporarily mounted) poses a reasonably foreseeable risk of:

- Striking and injuring an employee
- Pinching/crushing an employee against another part of the equipment or another object

11.3.21.1 To Prevent Employees from Entering These Hazard Areas

Skanska/crane user must inform each employee assigned to work on or near the equipment (''authorized personnel'') of how to recognize struck-by and pinch/crush hazard areas posed by the rotating superstructure. Control lines, warning lines, railings or similar barriers to mark the boundaries of the hazard areas will be erected and maintained.

Exception: When Skanska/crane user can demonstrate that it is neither feasible to erect such barriers on the ground nor on the equipment, the hazard areas must be clearly marked by a combination of warning signs (such as ''Danger — Swing/Crush Zone'') and high visibility

markings on the equipment that identify the hazard areas. In addition, Skanska/crane user must train each employee to understand what these markings signify.

11.3.21.2 Protecting Employees in the Hazard Area

Before an employee enters a location in the hazard area that is out of view of the operator, the employee (or someone instructed by the employee) must ensure that the operator is informed that he/she is going to that location. Where the operator knows that an employee went to a location covered by this section, the operator must not rotate the superstructure until the operator is informed in accordance with a prearranged system of communication that the employee is in a safe position. Where any part of a crane/derrick is within the working radius of another crane/derrick, the controlling entity must institute a system to coordinate operations. If there is no controlling entity, the employer (if there is only one employer operating the multiple pieces of equipment), or employers, must institute such a system.

Where any part of a crane/derrick is within the working radius of another crane/derrick, the controlling entity will institute a system to coordinate operations. If there is no controlling entity, the employers will institute such a system.

11.3.22 Verification of Approved Location

The crane must be properly set up in a pre-approved location. The project crane coordinator is required keep a current CLP of approved set-up locations for all cranes on the job. When any crane is set up to make a lift, the PCC is required to consult the CLP specific to that crane and verify that the crane is setting up in an approved location. The PCC must verify that the location each time a crane is broken down and set up in a new location, is within the original limits of that crane's CLP. All assist cranes required for the mobilization of project cranes will follow the same guidelines listed throughout this document.

11.3.23 Pre-Operational / Pre-Lift Meeting

For any operation requiring the use of a crane, a pre-operational meeting is required to review the appropriate lift plan prior to making any lifts. The meeting should include the operator, signal person and all crew members involved in rigging and handling the load. During the meeting, a lift director will be appointed. The lift director's responsibility will be to directly oversee the work being performed by the crane and the associated rigging crew. This meeting will be used to make sure everyone involved in the lift is well versed on all details, including what rigging will be used, how the load will be rigged, the exact lift path of the load, who will be giving signals, the

method of signaling, where the signaler will be located, etc. It should never be assumed that any member of the crew is aware of any single aspect of the lift and therefore all aspects should be reviewed at the pre-operational/pre-lift meeting.

11.3.24 Lift and Carry

A lift and carry is always treated as a critical lift and must be approved by the appropriate management personnel. A competent person must supervise the operation, determine if it is necessary to reduce rated capacity and make determinations regarding load position, boom location, ground support, travel route, overhead obstructions and speed of movement necessary to ensure safety. For equipment with tires, tire pressure and the load location specified by the manufacturer must be maintained. The rotational speed of the equipment must be controlled that the load does not swing out beyond the radius at which it can be controlled.

11.3.25 Operator Requirements and Responsibilities

Operators are required to hold a valid National Commission for the Certification of Crane Operators (NCCCO) certification and provide to the PCC satisfactory evidence (experience) to establish their qualification to operate the specific equipment. The operator is responsible for the safe operation of the crane and successful execution of lifts. It should be noted that whenever there is a concern toward safety, anyone has the right to stop and refuse to handle the load until a qualified person has determined that safety has been assured.

11.3.26 Fall Protection

Skanska's Fall Protection Policy states that at all times when exposed to a fall hazard over 6 feet you must be properly equipped with fall protection system.

11.3.27 Regional/Project-Specific Requirements

Enter project-specific requirements

11.4 Lift Planning

For any operation that requires the use of a crane, the section within the Construction Work Plan entitled "Lift Information" must be completed. This document assists the project team in developing the proper lift plan for a specific operation by asking a series of questions. Upon answering these questions, a detailed lift plan will be generated for use during the pre-operational meeting, especially in regards to planned personnel, critical and major lifts. It is the responsibility of the project team to develop this plan with the assistance of the project crane coordinator. A copy of the planned personnel and critical lift will be forwarded to the regional crane coordinator (RCC) for review. If at any time any revisions need to be made to the lift plan, the operation must stop, the current lift plan must be updated and the project crane coordinator (PCC) must be notified prior to any further action taking place. As with the original plan, the entire crew and operator must be briefed on the amended plan prior to the lift taking place.

11.4.1 Lift Classification

A classification of the lift must be determined after evaluating the weight of the object, capacity of the crane and the radius throughout the lift. It is important to note that "capacity" refers to the capacity listed on the load chart posted in the cab of the crane.

11.4.2 Planned Personnel Lifts

The use of a crane to hoist employees on a personnel platform or man-basket will be prohibited, except when the erection, dismantling and use of conventional means of reaching a jobsite, such as ladder, stairway, aerial lift, scaffold or elevating platform would be more hazardous or is not possible because of jobsite conditions. In such cases, the project team must request a dispensation for the use of personnel platforms and man baskets by the Skanska EHS Department and RCC; the personnel platform or man basket must be designed and stamped by Skanska Engineering or a third party PE and approval from a Skanska officer or designee must be acquired.

Hoisting personnel is prohibited without appropriate planning and protection.

The requirements of this section apply when one or more employees are hoisted. A Skanska Construction Work Plan or planned personnel lift must be completed and notification and signatures are required from a Skanska officer or delegate, Corporate EHS Department, RCC, PCC, project manager and site EHS manager. Depending on the site location, some local governing agencies require notification prior to the lifting of any personnel.

The use of equipment to hoist employees is prohibited except when Skanska/crane user can demonstrate that the erection, use and dismantling of conventional means of reaching the work area, such as a personnel hoist, ladder, stairway, aerial lift, elevating work platform, or scaffold, would be more hazardous, or is not possible because of the project's structural design or jobsite conditions. This paragraph does not apply to work covered by steel erection.

11.4.2.1 Use of Personnel Platform

When using equipment to hoist employee(s), the employee(s) must be in a personnel platform that meets the requirements specified in this document. An exception is drill shafts (refer to section 11.4.2.13 for information).

11.4.2.2 Equipment Set Up

The equipment must be uniformly level, within one percent of level grade and located on footing that a qualified person has determined to be sufficiently firm and stable. Any outriggers or stabilizers must all be extended and locked. The amount of extension must be the same for all outriggers and stabilizers and in accordance with manufacturer's procedures and load charts.

11.4.2.3 Equipment Criteria

Use of suspended personnel platforms

The total load (with the platform loaded, including the hook, load line and rigging) must not exceed 50 percent of the rated capacity for the radius and configuration of the equipment, except during proof testing. Check the lift plan section of the Construction Work Plan to reduce lifting capacity to 50.

Use of boom-attached personnel platforms

The total weight of the loaded personnel platform must not exceed 50 percent of the rated capacity for the radius and configuration of the equipment (except during proof testing).

Hoisting personnel without a personnel platform

When hoisting personnel without a personnel platform as outlined in this document, the total load (including the hook, load line, rigging and any other equipment that imposes a load) must not exceed 50 percent of the rated capacity for the radius and configuration of the equipment, except during proof testing.

When the occupied personnel platform is in a stationary working position, the load and boom hoist brakes, swing brakes and operator-actuated secondary braking and locking features (such as pawls or dogs) or automatic secondary brakes must be engaged.

11.4.2.4 Devices

Equipment (except for derricks and articulating cranes) with a variable angle boom must be equipped with all of the following:

- A boom angle indicator, readily visible to the operator
- A boom hoist limiting device

Articulating cranes must be equipped with a properly functioning automatic overload protection device.

Equipment with a luffing jib must be equipped with:

- A jib angle indicator, readily visible to the operator
- A jib hoist limiting device

Equipment with telescoping booms must be equipped with a device to indicate the boom's extended length clearly to the operator or must have measuring marks on the boom.

Anti two-block

A device that automatically prevents damage and load failure from contact between the load block, overhaul ball or similar component and the boom tip (or fixed upper block or similar component) must be used. The device(s) must prevent such damage/failure at all points where two-blocking could occur.

Exception: This device is not required when hoisting personnel in pile driving operations; rather it specifies how to prevent two-blocking during such operations.

Controlled load lowering

The load line hoist drum must have a system, other than the load line hoist brake, that regulates the lowering rate of speed of the hoist mechanism. This system or device must be used when hoisting personnel.

Free fall of the load line hoist is prohibited. The use of equipment in which the boom hoist mechanism can free fall is also prohibited.

Personnel hoisting operations must not begin unless the devices listed in this section are in proper working order. If a device stops working properly during such operations, the operator must safely stop operations. Personnel hoisting operations must not resume until the device is again working properly. Alternative measures are not permitted.

Direct attachment of a personnel platform to a luffing jib is prohibited.

11.4.2.5 Personnel Platform Criteria

A qualified person familiar with structural design must design the personnel platform and attachment/suspension system used for hoisting personnel.

The system used to connect the personnel platform to the equipment must allow the platform to remain within 10 degrees of level, regardless of boom angle.

The suspension system must be designed to minimize tipping of the platform due to movement of employees occupying the platform.

The personnel platform itself (excluding the guardrail system and personal fall arrest system anchorages) must be capable of supporting, without failure, its own weight and at least five times the maximum intended load.

All welding of the personnel platform and its components must be performed by a certified welder familiar with the weld grades, types and material specified in the platform design.

The personnel platform must be equipped with a guardrail system that meets the requirements of OSHA 1926 Subpart M, and must be enclosed at least from the toe board to mid-rail with either solid construction material or expanded metal having openings no greater than 1⁄2 inch (1.27 cm).

Points to which personal fall arrest systems are attached must meet the anchorage requirements in OSHA 1926.502. A grab rail must be installed inside the entire perimeter of the personnel platform except for access gates/doors.

If installed, access gates/doors of all types (including swinging, sliding, folding or other types) must:

- Not swing outward. If, due to the size of the personnel platform, such as a one-person platform, it is not feasible for the door to swing inward and allow safe entry for the platform occupant, then the access gate/door may swing outward
- Be equipped with a device that prevents accidental opening
- Have headroom sufficient to allow employees to stand upright in the platform

In addition to the use of hard hats, employees must be protected by overhead protection on the personnel platform when employees are exposed to falling objects.

The platform overhead protection must not obscure the view of the operator or platform occupants (such as wire mesh that has up to 1⁄2" openings), unless full protection is necessary.

All edges exposed to employee contact must be smooth enough to prevent injury.

The weight of the platform and its rated capacity must be conspicuously posted on the platform with a plate or other permanent marking.

11.4.2.6 Personnel Platform Loading

The personnel platform must not be loaded in excess of its rated capacity. Personnel platforms must be used only for employees, their tools and the materials necessary to do their work. Platforms must not be used to hoist materials or tools when not hoisting personnel.

Exception: Materials and tools to be used during the lift, if secured and distributed in accordance with paragraph (8.1.6) (c) of OSHA 1926, may be in the platform for trial lifts.

Materials and tools must be:

- Secured to prevent displacement
- Evenly distributed within the confines of the platform while it is suspended

The number of employees occupying the personnel platform must not exceed the maximum number the platform was designed to hold or the number required to perform the work, whichever is less.

11.4.2.7 Attachment and Rigging

Hooks and other detachable devices:

- Hooks used in the connection between the hoist line and the personnel platform (including hooks on overhaul ball assemblies, lower load blocks, bridle legs or other attachment assemblies or components) must be:
  - Of a type that can be closed and locked, eliminating the throat opening
  - Closed and locked when attached
- Shackles used in place of hooks must be of the alloy anchor type, with either a bolt, nut and retaining pin in place or of the screw type with the screw pin secured preventing accidental removal
- Where other detachable devices are used, they must be of the type that can be closed and locked to the same extent as the devices addressed in the beginning of this section. Such devices must be closed and locked when attached.
- When a rope bridle is used to suspend the personnel platform, each bridle leg must be connected to a master link or shackle in a manner that ensures that the load is evenly divided among the bridle legs
- Rigging hardware (including wire rope, shackles, rings, master links and other rigging hardware) and hooks must be capable of supporting, without failure, at least five times the maximum intended load applied or transmitted to that component. Where rotation-resistant rope is used, the slings must be capable of supporting without failure at least ten times the maximum intended load.
- Eyes in wire rope slings must be fabricated with thimbles
- Bridles and associated rigging for suspending the personnel platform must be used only for the platform and the necessary employees, their tools and materials necessary to do their work.
- The bridles and associated rigging must not have been used for any purpose other than hoisting personnel

11.4.2.8 Trial Lift and Inspection

A trial lift with the unoccupied personnel platform loaded at least to the anticipated lift weight must be made from ground level or from any other location where employees will enter the platform, to each location at which the platform will be hoisted and positioned. Where there is more than one location to be reached from a single set-up position, either individual trial lifts for each location or a single trial lift, in which the platform is moved sequentially to each location, must be performed. The method selected must be the same as the method that will be used to hoist the personnel. The trial lift must be performed immediately prior to each shift in which

personnel will be hoisted. In addition, the trial lift must be repeated prior to hoisting employees in each of the following circumstances:

- The equipment has been moved and set up in a new location or returned to a previously used location
- The lift route has changed, unless the competent person determines that the new route presents no new factors affecting safety

The competent person must determine that:

- Safety devices and operational aids required by this section are activated and functioning properly
- Nothing interferes with the equipment or the personnel platform in the course of the trial lift
- The lift will not exceed 50 percent of the equipment's rated capacity at any time during the lift
- The load radius to be used during the lift has been accurately determined

Immediately after the trial lift, the competent person must:

- Conduct a visual inspection of the equipment, base support or ground and personnel platform to determine whether the trial lift has exposed any defect or problem or produced any adverse effect
- Confirm that, upon the completion of the trial lift process, the test weight has been removed

Immediately prior to each lift:

- The platform must be hoisted a few inches with the personnel and materials/tools on board and inspected by a competent person to ensure that it is secure and properly balanced

The following conditions must be determined by a competent person to exist before the lift of personnel proceeds:

- Hoist ropes must be free of deficiencies
- Multiple part lines must not be twisted around each other

- The primary attachment must be centered over the platform; if the load rope is slack, the hoisting system must be inspected to ensure that all ropes are properly seated on drums and in sheaves

Any condition found during the trial lift and subsequent inspections that fails to meet a requirement of this policy or otherwise creates a safety hazard must be corrected before hoisting personnel.

11.4.2.9 Proof Testing

At each jobsite prior to hoisting employees on the personnel platform and after any repair or modification, the platform and rigging must be proof tested to 125 percent of the platform's rated capacity. The proof test may be done concurrently with the trial lift.

The platform must be lowered by controlled load lowering then braked and held in a suspended position for a minimum of five minutes with the test load evenly distributed on the platform.

After proof testing, a competent person must inspect the platform and rigging to determine if the test has been passed. If any deficiencies are found that pose a safety hazard, the platform and rigging must not be used to hoist personnel unless the deficiencies are corrected, the test is repeated and a competent person determines that the test has been passed.

Personnel hoisting must not be conducted until the competent person determines that the platform and rigging have successfully passed the proof test.

11.4.2.10 Work Practices

Hoisting of the personnel platform must be performed in a slow, controlled, cautious manner with no sudden movements of the equipment or the platform.

Platform occupants must:

- Keep all parts of the body inside the platform during raising, lowering and horizontal movement. This provision does not apply to an occupant of the platform when necessary to position the platform or while performing the duties of a signal person
- Refrain from standing, sitting on or working from the top or intermediate rail or toe board or use any other means/device to raise their working height
- Refrain from pulling the platform out of plumb in relation to the hoisting equipment

- Secure the platform to the structure where work is to be performed before exiting or entering a hoisted personnel platform that is not landed, unless Skanska/crane user can demonstrate that securing to the structure would create a greater hazard

If the platform is tied to the structure, the operator must not move the platform until he/she receives confirmation that it is freely suspended.

Tag lines must be used when necessary to control the platform.

Platforms without controls

Where the platform is not equipped with controls, the equipment operator must remain at the equipment controls, onsite and in view of the equipment at all times while the platform is occupied.

Platforms with controls

Where the platform is equipped with controls, all of the following must be met at all times while the platform is occupied:

- The occupant using the controls in the platform must be a qualified person with respect to their use, including the safe limitations of the equipment and hazards associated with its operation
- The equipment operator must be at a set of equipment controls that include boom and swing functions of the equipment and must be onsite and in view of the equipment
- The platform operating manual must be in the platform or on the equipment

Wind

When wind speed (sustained or gusts) exceeds 20 mph at the personnel platform, a qualified person must determine if, in light of the wind conditions, it is safe to lift personnel. If it is not, the lifting operation must not begin (or, if already in progress, must be terminated).

Other Weather and Environmental Conditions

A qualified person must determine if, in light of indications of dangerous weather conditions, or other impending or existing danger, it is safe to lift personnel. If it is not, the lifting operation must not begin (or if already in progress must be terminated). Employees being hoisted must remain in direct communication with the signal person, where used, or the operator.

Fall Protection

Except over water, employees occupying the personnel platform must be provided and use a personal fall arrest system. The system must be attached to a structural member within the personnel platform. When working over or near water, the requirements of OSHA 1926.106 apply. The fall arrest system, including the attachment point (anchorage), must meet the requirements in OSHA 1926.502.

Other Load Lines

No lifts will be made on any other of the equipment's load lines while personnel are being hoisted, except in pile driving operations.

Factory-Produced Boom-Mounted Personnel Platforms that Incorporate a Winch as Original Equipment

Loads are permitted to be hoisted by such a winch while employees occupy the personnel platform only where the load on the winch line does not exceed 500 pounds and does not exceed the rated capacity of the winch and platform.

Traveling—Equipment other than Derricks

Hoisting of employees while the equipment is traveling is prohibited, except for:

- Equipment that travels on fixed rails
- Where the employer demonstrates that there is no less hazardous way to perform the work. This exception does not apply to rubber-tired equipment

Where employees are hoisted while the equipment is traveling, all of the following criteria must be met:

- Equipment travel must be restricted to a fixed track or runway
- W here a runway is used, it must be a firm, level surface designed, prepared and designated as a path of travel for the weight and configuration of the equipment being used to lift and travel with the personnel platform. An existing surface may be used as long as it meets these criteria.
- Equipment travel must be limited to boom length
- The boom must be parallel to the direction of travel, except where it is safer to do otherwise

- A complete trial run must be performed to test the route of travel before employees are allowed to occupy the platform. This trial run can be performed at the same time as the trial lift which tests the lift route

Traveling—derricks

Derricks are prohibited from traveling while personnel are hoisted.

11.4.2.11 Pre-Lift Meeting

A pre-lift meeting must be held to review the applicable requirements of this section and the procedures that will be followed. It will be attended by the equipment operator, signal person (if used for the lift), employee(s) to be hoisted and the person responsible for the task to be performed. The pre-lift meeting will be held prior to the trial lift at each new work location and must be repeated for any employees newly assigned to the operation.

11.4.2.12 Hoisting Personnel near Power Lines

Hoisting personnel within 25 feet of a power line that is up to 350 kV and hoisting personnel within 50 feet of a power line that is over 350 kV is prohibited, except for work covered by Section 11.7.2.9 Power Transmission and Distribution.

11.4.2.13 Hoisting Personnel in Drill Shafts

When hoisting employees into and out of drill shafts that are up to and including 8 feet in diameter, all of the following requirements must be met:

- The employee must be in either a personnel platform or on a boatswain's chair
- If using a personnel platform, paragraphs (a) through (n) of 1926.1400 apply
- If using a boatswain's chair the following paragraphs of OSHA 1926.1400 apply: (a), (c), (d)(1), (d)(3), (d)(4), (e)(1), (e)(2), (e)(3), (f)(1), (f)(2)(i), (f)(3)(i), (g), (h), (k)(1), (k)(6), (k)(8),(k)(9), (k)(11)(i), (m), (n). Where the terms ''personnel platform'' or ''platform'' are used in these paragraphs, substitute them with ''boatswain's chair.''
- A signal person must be stationed at the shaft opening
- The employee must be hoisted in a slow, controlled descent and ascent
- The employee must use personal fall protection equipment, including a full body harness, attached independent of the crane/derrick
- The fall protection equipment must meet the applicable requirements in OSHA 1926.502

- The boatswain's chair itself (excluding the personal fall arrest system anchorages) must be capable of supporting, without failure, its own weight and at least five times the maximum intended load
- No more than one person must be hoisted at a time

11.4.2.14 Hoisting Personnel for Pile Driving Operations

When hoisting an employee in pile driving operations, the following requirements must be met:

- The employee must be in a personnel platform or boatswain's chair
- For lattice boom cranes, clearly mark the cable (so that it can easily be seen by the operator) at a point that will give the operator sufficient time to stop the hoist to prevent two-blocking or use a spotter who is in direct communication with the operator to inform the operator when this point is reached
- For telescopic boom cranes, clearly mark the cable (so that it can be easily seen by the operator) at a point that will give the operator sufficient time to stop the hoist to prevent two blocking and use a spotter who is in direct communication with the operator to inform the operator when this point is reached
- If using a personnel platform, paragraphs OSHA 1926.1400 (b) through (n) of this section apply
- If using a boatswain's chair the following paragraphs of OSHA 1926.1400 apply: (a), (c), (d)(1), (d)(3), (d)(4), (e)(1), (e)(2), (e)(3), (f)(1), (f)(2)(i), (f)(3)(i), (g), (h), (j), (k)(1), (k)(6), (k)(8), (k)(9), (k)(11)(i), (m), and (n). Where the terms ''personnel platform'' or ''platform'' are used in these paragraphs, substitute them with ''boatswains chair".
- The employee must be hoisted in a slow, controlled descent and ascent
- The employee must use personal fall protection equipment, including a full body harness, independently attached to the lower load block or overhaul ball
- The fall protection equipment must meet the applicable requirements in OSHA 1926.502
- The boatswain's chair itself (excluding the personal fall arrest system anchorages) must be capable of supporting, without failure, its own weight and at least five times the maximum intended load
- No more than one person may be hoisted at a time

11.4.2.15 Operational Aids

The devices listed as operational aids are required on all equipment covered under Skanska's crane policy, unless otherwise specified.

Operations will not begin unless the listed operational aids are in proper working order, except where Skanska/crane user meets the specified temporary alternative measures. More protective alternative measures specified by the crane/derrick manufacturer, if any, shall be followed.

If a listed operational aid stops working properly during operations, the operator will safely stop operations until the temporary alternative measures are implemented or the device is again working properly. If a replacement part is no longer available, the use of a substitute device that performs the same type of function is permitted and is not considered a modification under OSHA 1926.1434 - Category I operational aids and alternative measures.

Operational aids that are not working properly will be repaired no later than seven days after the deficiency occurs.

Exception: If the employer documents that it has ordered the necessary parts within seven days of the occurrence of the deficiency, the repair will be completed within seven days of receipt of the parts.

11.4.2.16 Boom Hoist Limiting Device

For equipment manufactured after December 16, 1969, a boom hoist limiting device is required. Temporary alternative measures (use at least one) are as follows:

- Use a boom angle indicator
- Clearly mark the boom hoist cable (so that it can easily be seen by the operator) at a point that will give the operator sufficient time to stop the hoist to keep the boom within the minimum allowable radius. In addition, install mirrors or remote video cameras and displays if necessary for the operator to see the mark.
- Clearly mark the boom hoist cable (so that it can easily be seen by a spotter) at a point that will give the spotter sufficient time to signal the operator and have the operator stop the hoist to keep the boom within the minimum allowable radius
- If the equipment was manufactured on or before December 16, 1969 and was not originally equipped with a boom hoist limiting device, at least one of the measures in paragraphs (d)(1)(i)(A) through (C) of OSHA 1926.1400 shall be used on a permanent basis

11.4.2.17 Luffing Jib Limiting Device

Equipment with a luffing jib will have a luffing jib limiting device. Temporary alternative measures are the same as in paragraph (d) (1) (i) of OSHA 1926.1400, except to limit the movement of the luffing jib.

11.4.2.18 Anti Two-Blocking Device

Telescopic boom cranes

- Telescopic boom cranes manufactured after February 28, 1992, will be equipped with a device that automatically prevents damage from contact between the load block, overhaul ball or similar component and the boom tip (or fixed upper block or similar component). The device(s) must prevent such damage at all points where two-blocking could occur.

Temporary alternative measures: Clearly mark the cable (so that it can easily be seen by the operator) at a point that will give the operator sufficient time to stop the hoist to prevent two-blocking, and use a spotter when extending the boom.

Lattice boom cranes

- Lattice boom cranes manufactured after Feb 28, 1992, will be equipped with a device that either automatically prevents damage and load failure from contact between the load block, overhaul ball or similar component and the boom tip (or fixed upper block or similar component) or warns the operator in time for the operator to prevent two-blocking. The device(s) must prevent such damage/failure or provide adequate warning for all points where two-blocking could occur.
- Lattice boom cranes and derricks manufactured one year after the effective date of this standard will be equipped with a device that automatically prevents damage and load failure from contact between the load block, overhaul ball, or similar component and the boom tip (or fixed upper block or similar component). The device(s) must prevent such damage/failure at all points where two-blocking could occur.

Exception: The requirements of this section do not apply to such lattice boom equipment when used for dragline, clamshell (grapple), magnet, drop ball, container handling, concrete bucket and marine operations that do not involve hoisting personnel and pile driving work.

Temporary alternative measures: Clearly mark the cable (so that it can easily be seen by the operator) at a point that will give the operator sufficient time to stop the hoist to prevent two blocking or use a spotter.

Category II operational aids and alternative measures

Operational aids that are not working properly will be repaired no later than 30 days after the deficiency occurs.

Exception: If the employer can document that it has ordered the necessary parts within seven days of the occurrence of the deficiency and the part is not received in time to complete the repair in 30 days, the repair will be completed within seven days of receipt of the parts.

Boom Angle or Radius Indicator

The equipment will have a boom angle or radius indicator readable from the operator's station.

Temporary alternative measures: Radii or boom angle will be determined by measuring the radii or boom angle with a measuring device.

Jib Angle Indicator (if the equipment has a luffing jib)

Temporary alternative measures: Radii or jib angle will be determined by ascertaining the main boom angle and then measuring the radii or jib angle with a measuring device.

Boom Length Indicator

When the equipment is equipped with a telescopic boom, except where the rated capacity is independent of the boom length, one of the following methods will be used:

- Mark the boom with measured marks to calculate boom length
- Calculate boom length from boom angle and radius measurements
- Measure the boom with a measuring device

Load weighing and similar devices

Equipment (other than derricks) manufactured after March 29, 2003 with a rated capacity over 6,000 pounds will have at least one of the following:

- Load weighing device
- Load moment (or rated capacity) indicator
- Load moment (or rated capacity) limiter

Temporary alternative measures: The weight of the load will be determined from a reliable source (e.g., the load's manufacturer), by a reliable calculation method (i.e., calculating a steel

beam from measured dimensions and a known per foot weight) or by other equally reliable means. This information will be provided to the operator prior to the lift.

The following devices are required on equipment manufactured after January 1, 2008:

- Outrigger position (horizontal beam extension) sensor/monitor. If the equipment has outriggers the operator will verify that the position of the outriggers is correct (in accordance with manufacturer procedures) before beginning operations requiring outrigger deployment.
- Hoist drum rotation indicator. If the drum is not visible from the operator's station mark the drum. In addition, install mirrors or remote video cameras and displays if necessary for the operator to see the mark.

11.4.3 Critical Lift

A lift is a critical lift when:

- More than 75 percent of the crane's load chart as configured is being utilized during the lift
- The lift requires more than one crane
- The load on the crane cannot be accurately determined including pulling or side loading
- Equipment that contains an operator's cabin is being lifted
- Lift and Carry: The lift is considered a critical lift and the critical lift checklist must be completed.

Sign-offs must be obtained from the RCC, PCC, project manager and EHS manager before the lift is made. Refer to 11.3.24 Lift and Carry

<u>Plan Development</u>

Before beginning a crane operation in which more than one crane will be supporting the load, the operation must be planned. The planning must meet the following requirements:

- The plan must be developed by a qualified person
- Where the qualified person determines that engineering expertise is needed for the planning, Skanska must ensure that it is provided

<u>Plan Implementation</u>

- The multiple-crane lift must be supervised by a person who meets the criteria for both a competent person and a qualified person, or by a competent person who is assisted by one or more qualified persons

- The supervisor must review the plan with all workers who will be involved with the operation
- Some local governing agencies may require notification before a multiple crane lift

11.4.4 Major Lift

A lift is a major lift when:

- The item lifted has a significant impact to the project schedule or budget
- The item has a lead time greater than 12 months
- The item is valued at more than $100,000
- The crane is on a barge, regardless of weight of load or capacity of crane

The major lift checklist must be completed, and sign-offs must be obtained by the PCC, project manager and safety engineer before the lift is made.

Depending on the weight of the object and the capacity of the crane, a lift could be classified as both a critical and major lift, in which case the critical lift checklist and approvals are solely required.

11.4.5 Standard Lift

If the weight of the object and its radius throughout the duration of the lift are such that it is less than 75 percent capacity of the crane's capacity and none of the major or critical lift items are present, it is a standard lift. A Construction Work Plan and lift plan must still be completed.

11.4.6 Repetitive/Similar Lifts

If a crew makes the same lift throughout the day, they need only go through the standard lift process once at the beginning of the day. For example, if the task is to remove spoils from an area with a 45-ton cherry lifter and a skip pan, then the weight of the skip pan and radius needs to be evaluated once. A pre-operational meeting must take place before the first lift, and the crew can continue to work at the same operation with the same plan and no additional pre-operational meetings are required, with the exception that all rigging must be visually inspected prior to every lift. However, if any significant aspect of the operation changes (a larger skip pan is

substituted for the one in the plan, the spoils need to be placed in a location that requires a longer boom and larger radius, the nature of the spoils change and therefore the weight of the load changes, or any change is made to any single detail of the operation), the pre-operational meeting should take place again.

11.4.7 Multiple Crane Lifts

Plan Development

Before beginning a crane operation in which more than one crane will be supporting the load, the operation must be planned. The planning must meet the following requirements:

- The plan must be developed by a qualified person
- Where the qualified person determines that engineering expertise is needed for the planning, Skanska must ensure that it is provided

Plan Implementation

- The multiple-crane lift must be supervised by a person who meets the criteria for both a competent person and a qualified person or by a competent person who is assisted by one or more qualified persons
- The supervisor must review the plan with all workers who will be involved with the operation
- Some local governing agencies may require notification before a multiple crane lift

11.4.8 Regional/Project-Specific Requirements

Enter project-specific requirements

11.5 Left Intentionally Blank for Review Purposes

This section has been left intentionally blank for annual changes from the regional crane committees and EHS senior leadership.

11.6 Maintenance and Inspection

11.6.1 Inspection and Oversight Requirements

Prior to any crane being placed in service, each crane must have an up-to-date monthly and annual inspection. The project crane coordinator (PCC) is responsible for ensuring that at the

time of the crane's arrival at the jobsite, these inspections are up-to-date and present in the cab. If they are not, the PCC is required to notify the regional crane coordinator (RCC) who will arrange for the inspections to be completed as soon as possible. The crane will not be operated until these inspections are completed or documentation is provided. Upon expiration of initial inspections, Skanska/crane user is required to provide for subsequent inspections.

11.6.2 On-Hire/Off-Hire Inspections

When a crane arrives on the jobsite, whether company-owned or rented, an on-hire inspection must be performed. It is the responsibility of the PCC to ensure this activity is performed. This inspection is separate from a safety inspection and is intended to document incidental damage to the crane body, condition of cab, etc., to protect Skanska/crane user from claims for alleged damage to the equipment. The condition of the crane should be documented with photographic evidence especially with regard to any pre-existing damage. When a crane is leaving the jobsite, an off-hire inspection must be performed by the PCC or a member of the project team to document the condition of the crane with new photographs showing all previously existing damage as well as any new damage. Both reports will be included in the crane file maintained by the RCC.

11.6.3 Inspection Requirements

If a company-owned or rented crane arrives on any site and it does not have a current monthly inspection, the RCC will determine whether the crane will need to have a monthly inspection completed on that crane. The on-hire inspection should be completed as soon as the crane is assembled and prior to going to work. A full monthly inspection will be completed on rentals longer than five consecutive days. If a rental is less than five consecutive days, then daily inspections should be performed by the appropriate parties. Current, comprehensive inspections are essential to ensure safe operation of all cranes.

The following mandatory inspections apply to all cranes on Skanska USA projects:

11.6.3.1 Daily/Pre Shift Inspections

Daily and pre-shift inspections must be conducted by the operator assigned to each crane. Regardless of whether the operator agrees to sign the inspection form, it is the responsibility of the PCC to confirm with the operator that the inspection has been completed each day. The inspection should be a visual "walk-around" inspection and function test covering:

- Control mechanisms for maladjustments interfering with proper operations

- Control and drive mechanisms for apparent excessive wear of components and contamination by lubricants, water or other foreign matter
- Air, hydraulic and other pressurized lines for deterioration or leakage, particularly those which flex in normal operation
- Hydraulic system for proper fluid level
- Hooks and latches for deformation, cracks, excessive wear or damage such as from chemicals or heat
- Wire rope reeving for compliance with the manufacturer's specifications
- Electrical apparatus for malfunctioning, signs of apparent excessive deterioration, dirt or moisture accumulation
- Tires (when in use) for proper inflation and condition
- Ground conditions around the equipment for proper support, including ground settling
- Under and around outriggers/stabilizers and supporting foundations, ground water accumulation, or similar conditions
- The equipment for level position within the tolerances specified by the equipment manufacturer's recommendations, both before each shift and after each move and setup
- Operator cab windows for significant cracks, breaks or other deficiencies that would hamper the operator's view
- Safety devices and operational aids required for proper operation. Any deficiencies identified during the inspection must be communicated to the PCC, who is required to provide documentation describing the deficiency as well as the corrective action taken to remedy it.

All deficiencies found must be reported to the RCC immediately. Deficiencies that are related to safety will result in the immediate removal of the crane from service until the deficiencies are corrected. Non-safety related deficiencies will be repaired as soon as deemed practical. A copy of the completed daily inspection form should be left in the cab of the crane or filed and made available at the jobsite.

11.6.3.2 Monthly Inspections

Monthly inspections must be conducted by a qualified inspector or an approved third-party inspection company. Inspections are to be scheduled by the RCC, who is responsible for keeping a current database of cranes on all projects and identifying when inspections are required and completed. Any deficiencies identified during the inspection must be communicated to the PCC, who is required to provide documentation describing the deficiency as well as the corrective

action taken to remedy it. All deficiencies found must be reported to the RCC immediately. Deficiencies that are safety related will result in the immediate removal of the crane from service until the deficiencies are corrected. Non-safety related deficiencies will be repaired as soon as deemed practical. A copy of the completed inspection form should be left in the cab of the crane or at the jobsite. A copy of the inspection will be available on the Skanska crane and rigging website.

11.6.3.3 Annual Inspections/Annual Magnetic Particle Testing

Annual inspections must be conducted by a qualified inspector or an approved third-party inspection company. As with monthly inspections, annual inspections are scheduled by the RCC.

Any deficiencies identified during the inspection must be communicated to the PCC, who is required to provide documentation describing the deficiency as well as the corrective action taken to remedy it. All deficiencies found must be reported to the RCC immediately. Deficiencies that are safety related will result in the immediate removal of the crane from service until the deficiencies are corrected. Non-safety related deficiencies will be repaired as soon as deemed practical.

A non-destructive testing method must be completed at least once a year on all lattice boom cranes, hydraulic cranes and pile drivers. This test may include magnetic particle, ultrasound, x-ray or other means necessary to establish the structural integrity of boom and members. This test is to be performed by a qualified individual. On lattice boom cranes, when intending to increase the boom length, the section of boom to be installed must be tested before it is inserted. Once the section is inserted, a qualified inspector or an independent qualified company will conduct a complete inspection.

When crane operations or the crane environment may increase the “wear and tear” on the crane (e.g., pile driving, pulling sheets, barge-mounted mobile cranes), additional or more frequent inspections may be required, as determined by the RCC in conjunction with the project team responsible for that crane during the monthly crane program meeting.

If any unusual incident or accident occurs on any project involving a crane, which may affect the strength, stability or potentially may have damaged loadbearing components, the crane will be removed from service until the satisfactory completion of an inspection by a qualified person or third-party inspection team.

11.6.3.4 Modified Equipment Inspection

No modifications will be made to any crane without the manufacturer's approval or written approval from a professional engineer.

11.6.3.5 Repaired/Adjusted Equipment

Equipment that has had a repair or adjustment that relates to safe operation (e.g., a repair or adjustment to a safety device or operator aid, or to a critical part of a control system, power plant, braking system, load-sustaining structural components, load hook, or in-use operating mechanism) must be inspected by a qualified person after such a repair or adjustment has been completed, prior to initial use. The inspection must meet all of the following requirements:

- The qualified person must determine if the repair/adjustment meets manufacturer equipment criteria (where applicable and available)
- Where manufacturer equipment criteria are unavailable or inapplicable, the qualified person must:
  - Include functional testing of the repaired/adjusted parts and other components that may be affected by the repair/ adjustment
  - Determine if a registered professional engineer (RPE) is needed to develop criteria for the repair/adjustment. If an RPE is not needed, Skanska must ensure that the criteria are developed by the qualified person. If an RPE is needed, Skanska must ensure that they are developed by an RPE.
  - Determine if the repair/adjustment meets the criteria developed in accordance with OSHA 1926.1400 (b)(i)(c)
- The inspection must include functional testing of the repaired/adjusted parts and other components that may be affected by the repair/adjustment

11.6.3.6 Post-Assembly Inspection

Upon completion of assembly, the equipment must be inspected by a qualified person to assure that it is configured in accordance with manufacturer equipment criteria. Where manufacturer equipment criteria are unavailable, a qualified person must determine if an RPE familiar with the type of equipment involved is needed to develop criteria for the equipment configuration. If an RPE is not needed, Skanska must ensure that the criteria are developed by the qualified person. If an RPE is needed, Skanska must ensure that they are developed by an RPE.

Equipment must not be used until an inspection and function test are complete and the equipment is configured in accordance with the applicable criteria.

11.6.3.7 Equipment Modifications

Modifications or additions that affect the capacity or safe operation of the equipment are prohibited, except where the requirements of this section are met.

11.6.3.8 Manufacturer Review and Approval

The manufacturer approves the modifications/additions in writing.

The load charts, procedures, instruction manuals and instruction plates/tags/decals will be modified as necessary to accord with the modification/addition. The original safety factor of the equipment is not reduced.

11.6.3.9 Manufacturer Refusal to Review Request

If the manufacturer is provided a detailed description of the proposed modification/addition and is asked to approve the modification/addition but declines to review the technical merits of the proposal or fails to acknowledge the requestor within 30 days of the review, then an RPE who is a qualified person with respect to the equipment involved must:

Approve the modification/addition and specify the equipment configurations to which that approval applies and modify the load charts, procedures, instruction manuals and instruction plates/tags/decals as necessary to align with the modification/addition, without reducing the original safety factor of the equipment.

11.6.3.10 Unavailable Manufacturer

Modifications or additions that affect the capacity or safe operation of the equipment are prohibited where the manufacturer, after a review of the technical safety merits of the proposed modification/addition, rejects the proposal and explains the reasons for the rejection in a written response. If the manufacturer rejects the proposal but does not explain the reasons for the rejection in writing, the employer may treat this as a manufacturer refusal to review the request under paragraph 11.6.3.9 of this policy.

11.6.3.11 Severe Service

Where the severity of use/conditions is such that there is a reasonable probability of damage or excessive wear (e.g., loading that may have exceeded rated capacity, shock loading that may have exceeded rated capacity, prolonged exposure to a corrosive atmosphere), Skanska/crane user must stop using the equipment and a qualified person must inspect the equipment for structural damage to determine if the equipment can continue to be used safely.

If a deficiency is found and it is deemed unsafe, Skanska/crane user must stop crane operation until the deficiency is repaired and re-inspected.

11.6.3.12 Equipment not in Regular Use

Equipment that has been idle for three months or more will be inspected by a qualified inspector or third-party inspector. Prior to use, a monthly inspection will be performed.

11.6.4 Tagout

11.6.4.1 Tagging Out of Service Equipment/Functions

When Skanska/crane user has taken the equipment out of service, a tag will be placed in the cab stating that the equipment is out of service and is not to be used. When Skanska/crane user has taken a function(s) out of service, a tag will be placed in a conspicuous position stating that the function is out of service and is not to be used.

11.6.4.2 Response to "Do Not Operate"/Tagout Signs

If there is a warning (tag-out or maintenance/do not operate) sign on the equipment or starting control, the operator will not activate the switch or start the equipment until the sign has been removed by a person authorized to remove it.

11.6.4.3 Maintenance and Repair Employees

Maintenance, inspection and repair personnel without NCCCO Operators certification are permitted to operate the equipment only where the following requirements are met:

- The operation is limited to those functions necessary to perform maintenance, inspect or verify the performance of the equipment
- The personnel are familiar with the operation, safe limitations, characteristics and hazards associated with the type of equipment
- Maintenance and repair personnel meet the definition of a qualified person with respect to the equipment and maintenance/repair tasks performed

11.6.5 Wire Rope Inspection

11.6.5.1 Shift inspection

A competent person must begin a visual inspection prior to each shift the equipment is used, which must be completed before or during that shift. The inspection must consist of observation

of wire ropes (running and standing) that are likely to be in use during the shift for apparent deficiencies, including those listed below. Untwisting (opening) of wire rope or booming down is not required as part of this inspection.

Apparent Deficiencies

Category I

Apparent deficiencies in this category include significant corrosion, electric arc damage (from a source other than power lines) or heat damage, improperly applied end connections or significantly corroded, cracked, bent or worn end connections (such as from severe service).

Category II

Apparent deficiencies in this category are visible, broken wires, as follows:

- In running wire ropes: Six randomly distributed broken wires in one rope lay or three broken wires in one strand in one rope lay, where a rope lay is the length along the rope in which one strand makes a complete revolution around the rope
- In rotation resistant ropes: Two randomly distributed broken wires in six rope diameters or four randomly distributed broken wires in 30 rope diameters
- In pendants or standing wire ropes: More than two broken wires in one rope lay located in rope beyond end connections and/or more than one broken wire in a rope lay located at an end connection
- A diameter reduction of more than five percent from nominal diameter.

Category III

Apparent deficiencies in this category include rotation-resistant wire rope core protrusion or any other distortion indicating core failure, and prior electrical contact with a power line.

11.6.5.2 A Broken Strand

Critical Review Items

The competent person must give particular attention to all of the following:

- Rotation-resistant wire rope in use
- Wire rope being used for boom hoists and luffing hoists, particularly at reverse bends
- Wire rope at flange points, crossover points and repetitive lift-up points on drums

- Wire rope at or near terminal ends
- Wire rope in contact with saddles, equalizer sheaves or other sheaves where rope travel is limited

11.6.5.3 Removal from Service

If a deficiency in Category I is identified, an immediate determination must be made by the competent person as to whether the deficiency constitutes a safety hazard. If the deficiency is determined to constitute a safety hazard, operations involving use of the wire rope in question must be prohibited until the wire rope is replaced.

If the deficiency is localized, the problem is corrected by severing the wire rope in two; the undamaged portion may continue to be used. Joining lengths of wire rope by splicing is prohibited. If a rope is shortened, Skanska must ensure that the drum will still have two wraps of wire when the load and/or boom are in its lowest position.

If a deficiency in Category II is identified, operations involving use of the wire rope in question must be prohibited until Skanska/crane user complies with the wire rope manufacturer's established criterion for removal from service or a different criterion that the wire rope manufacturer has approved in writing for that specific wire rope, or until the wire rope is replaced. If the deficiency is localized, the problem is corrected by severing the wire rope in two; the undamaged portion may continue to be used. Joining lengths of wire rope by splicing is prohibited. If a rope is shortened, Skanska must ensure that the drum will still have two wraps of wire when the load and/or boom are in its lowest position.

Significant distortion of the wire rope structure such as kinking, crushing, unstranding, bird caging, signs of core failure or steel core protrusion between the outer strands is grounds for removal from service.

If a deficiency in Category III is identified, operations involving use of the wire rope in question must be prohibited until the wire rope is replaced. If the deficiency (other than power line contact) is localized and the problem is corrected by severing the wire rope in two, the undamaged portion may continue to be used. Joining lengths of wire rope by splicing is prohibited. Repair of wire rope that contacted an energized power line is also prohibited. If a rope is shortened, Skanska must ensure that the drum will still have two wraps of wire when the load and/or boom are in its lowest position.

Where a wire rope is required to be removed from service per this section, either the equipment (as a whole) or the hoist with that wire rope must be tagged-out, until the wire rope is repaired or replaced.

11.6.5.4 Monthly Inspection

Each month an inspection must be conducted in accordance with section 11.6.5.1 (shift inspection) of this policy. The inspection must include any deficiencies that the qualified person who conducts the annual inspection determines under section 11.6.5.2 must be monitored.

- Wire ropes on equipment must not be used until an inspection demonstrates that no corrective action under section 11.6.5.3 is required
- The inspection must be documented

11.6.5.5 Annual/Comprehensive

At least every 12 months, wire ropes in use on equipment must be inspected by a qualified person as defined in this policy. The inspection must identify deficiencies of the types listed below. The inspection must be complete and thorough, covering the surface of the entire length of the wire ropes, with particular attention given to all of the following:

- Critical review items
- Those sections that are normally hidden during shift and monthly inspections
- Wire rope subject to reverse bends
- Wire rope passing over sheaves

Exception: In the event an inspection is not feasible due to existing set-up and configuration of the equipment (such as where an assist crane is needed) or due to site conditions (such as a dense urban setting), such inspections must be conducted as soon as it becomes feasible but no longer than an additional 6 months for running ropes and for standing ropes at the time of disassembly.

If a deficiency is identified, an immediate determination must be made by the qualified person as to whether the deficiency constitutes a safety hazard. If the deficiency is determined to constitute a safety hazard, operations involving use of the wire rope in question must be prohibited until the wire rope is replaced. If the deficiency is localized, the problem is corrected by severing the wire rope in two; the undamaged portion may continue to be used. Joining lengths of wire rope by splicing is prohibited. If a rope is shortened, Skanska must ensure that the drum will still have two wraps of wire when the load and/or boom are in its lowest position. If the qualified person determines that, though not presently a safety hazard, the deficiency needs to be monitored, the

employer must ensure that the deficiency is checked in the monthly inspections. The inspection must be documented.

11.6.5.6 Rope Lubricants

Lubricants that hinder inspection must not be used. All documents produced under this section must be available, during the applicable document retention period, to all persons who conduct inspections under this section.

11.6.5.7 Wire Rope Selection and Installation Criteria

Original equipment wire rope and replacement wire rope must be selected and installed in accordance with the requirements of this section. Selection of replacement wire rope must be in accordance with the recommendations of the wire rope manufacturer, the equipment manufacturer or a qualified person.

Wire Rope Design Criteria

Wire rope (other than rotation-resistant rope) must comply with either Option (1) or Option (2) of this section, as follows:

- Option (1): Wire rope must comply with section 5–1.7.1 of ASME B30.5– 2004 (incorporated by reference, see OSHA 1926.6) except that section's paragraph (c) must not apply
- Option (2): Wire rope must be designed to have, in relation to the equipment's rated capacity, a sufficient minimum breaking force and design factor so that compliance with the applicable inspection provisions in OSHA 1926.1413 will be an effective means of preventing sudden rope failure

Wire rope must be compatible with the safe functioning of the equipment.

Boom Hoist Reeving

Fiber core ropes must not be used for boom hoist reeving, except for derricks.

Rotation-resistant ropes must be used for boom hoist reeving only where the requirements of this section are met.

11.6.5.8 Rotation-Resistant Ropes

Definitions

Type I rotation-resistant wire rope (‘‘Type I’’): Type I rotation-resistant rope is stranded rope constructed to have little or no tendency to rotate or, if guided, transmits little or no torque. It has at least 15 outer strands and comprises an assembly of at least three layers of strands laid helically over a center in two operations. The direction of lay of the outer strands is opposite to that of the underlying layer.

Type II rotation-resistant wire rope (‘‘Type II’’): Type II rotation-resistant rope is stranded rope constructed to have significant resistance to rotation. It has at least 10 outer strands and comprises an assembly of two or more layers of strands laid helically over a center in two or three operations. The direction of lay of the outer strands is opposite to that of the underlying layer.

Type III rotation resistant wire rope (‘‘Type III’’): Type III rotation-resistant rope is stranded rope constructed to have limited resistance to rotation. It has no more than nine outer strands and comprises an assembly of two layers of strands laid helically over a center in two operations. The direction of lay of the outer strands is opposite to that of the underlying layer.

11.6.5.9 Requirements

Types II and III with an operating design factor of less than 5 must not be used for duty cycle or repetitive lifts. Rotation-resistant ropes (including Types I, II and III) must have an operating design factor of no less than 3.5. Type I must have an operating design factor of no less than 5, except where the wire rope manufacturer and the equipment manufacturer approves the design factor, in writing. Types II and III must have an operating design factor of no less than 5, except where the requirements of paragraph OSHA 1926.1414(e)(3) are met. When Types II and III with an operating design factor of less than 5 are used (for non-duty cycle, non-repetitive lifts), the following requirements must be met for each lifting operation:

- A qualified person must inspect the rope. The rope must be used only if the qualified person determines that there are no deficiencies constituting a hazard. In making this determination, more than one broken wire in any one rope lay must be considered a hazard.
- Operations must be conducted in such a manner and at such speeds as to minimize dynamic effects
- Each lift made under OSHA 1926.1414(e) (3) must be recorded in the monthly and annual inspection documents. Such prior uses must be considered by the qualified person in determining whether to use the rope again.

- Additional requirements for rotation resistant ropes for boom hoist reeving
- Rotation-resistant ropes must not be used for boom hoist reeving, except where the requirements of this section are met
- Rotation-resistant ropes may be used as boom hoist reeving when load hoists are used as boom hoists for attachments such as luffing attachments or boom and mast attachment systems. Under these conditions, all of the following requirements must be met:
  - The drum must provide a first layer rope pitch diameter of not less than 18 times the nominal diameter of the rope used
  - The requirements in OSHA 1926.1426(a) (irrespective of the date of manufacture of the equipment) and OSHA 1926.1426(b)
  - All sheaves used in the boom hoist reeving system must have a rope pitch diameter of not less than 18 times the nominal diameter of the rope used
  - The operating design factor for the boom hoist reeving system must be not less than five
  - The operating design factor for these ropes must be the total minimum breaking force of all parts of rope in the system divided by the load imposed on the rope system when supporting the static weights of the structure and the load within the equipment's rated capacity
  - When provided, a power controlled lowering system must be capable of handling rated capacities and speeds as specified by the manufacturer
  - Wire rope clips used in conjunction with wedge sockets must be attached to the unloaded dead end of the rope only, except that the use of devices specifically designed for dead-ending rope in a wedge socket is permitted
  - Socketing must be done in the manner specified by the manufacturer of the wire rope or fitting
  - Prior to cutting a wire rope, seizing must be placed on each side of the point to be cut. The length and number of seizing must be in accordance with the wire rope manufacturer's instructions.

11.6.6 Regional/Project-Specific Requirements

Enter project-specific requirements

11.7 Electrical

11.7.1 Power Line Safety – Assembly and Disassembly

Regarding assembly and/or disassembly, all Table A clearances apply.

Before beginning equipment A/D, Skanska/crane user must have a Construction Work Plan identifying the electrical hazards associated with the work. Identify the work zone by either:

- Demarcating boundaries (such as with flags, or a device such as a range limit device or range control warning device) and prohibiting the operator from operating the equipment past those boundaries
- Defining the work zone as the area 360 degrees around the equipment, up to the equipment's maximum working radius

For power lines < 350kV, determine if any part of the equipment, load line or load (including rigging and lifting accessories), if operated up to the equipment's maximum working radius in the work zone, could get closer than 20 feet to a power line. If so, Skanska/crane user must meet the following requirements in Option (1), Option (2), or Option (3) of this section, as follows.

For power Lines > 350kV – Option (3) only.

Option (1): De-energize and ground

- Confirm from the utility owner/ operator that the power line has been de-energized and visibly grounded at the jobsite.

Option (2): 20 foot clearance

- Ensure that no part of the equipment, load line or load (including rigging and lifting accessories) gets closer than 20 feet to the power line by implementing the measures specified in paragraph 11.7.2.2, Titled Preventing encroachment/electrocution.

Option (3): Table A clearance

TABLE A—MINIMUM CLEARANCE DISTANCES

Note: The value that follows ''to'' is up to and includes that value. For example, "up to 200" means up to and including 200kV.

Voltage (nominal, kV, alternating current)		Minimum clearance distance (feet)
< 50	…….	10
Over 50 up to 200	…….	15
Over 200 to 350	…….	20

Over 350 to 500	…….	25
Over 500 to 750	…….	35
Over 750 to 1,000	…….	45
Over 1,000	…….	as established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution)

11.7.1.1 Preventing Encroachment Electrocution

Where encroachment precautions are required under Option (2) or Option (3) of this section, all of the following requirements must be met:

- Conduct a planning meeting with the assembly/disassembly (A/D) director, operator, A/D crew and the other workers who will be in the A/D area to review the location of the power line(s) and the steps that will be implemented to prevent encroachment/electrocution
- Tag lines must be non-conductive
- At least one of the following additional measures must be in place. The measure selected from this list must be effective in preventing encroachment. The additional measures are:
    - Use a dedicated spotter who is in continuous contact with the equipment operator. The dedicated spotter must:
        - Be equipped with a visual aid to assist in identifying the minimum clearance distance. Examples of a visual aid include, but are not limited to, clearly visible line painted on the ground, a clearly visible line of stanchions a set of clearly visible line-of-sight landmarks (e.g., a fence post behind the dedicated spotter and a building corner ahead of the dedicated spotter).
        - Be positioned to effectively gauge the clearance distance
        - Where necessary, use equipment that enables the dedicated spotter to communicate directly with the operator
        - Give timely information to the operator so that the required clearance distance can be maintained
        - A proximity alarm set to give the operator sufficient warning to prevent encroachment
        - A device that automatically warns the operator when to stop movement, such as a range control warning device. Such a device must be set to give the operator sufficient warning to prevent encroachment.

- A device that automatically limits range of movement, set to prevent encroachment
- An elevated warning line, barricade or line of signs in view of the operator, equipped with flags or similar high-visibility markings

11.7.1.2 Assembly/Disassembly below Power Lines Prohibited

During A/D, no part of a crane/derrick, load line or load (including rigging and lifting accessories), whether partially or fully assembled, is allowed below a power line unless Skanska has confirmed that the utility owner/operator has de-energized and (at the jobsite) visibly grounded the power line.

11.7.1.3 Assembly/Disassembly inside "Table A" Clearance Prohibited

During A/D, no part of a crane/derrick, load line or load (including rigging and lifting accessories), whether partially or fully assembled, is allowed closer than the minimum approach distance under Table A (see below) to a power line unless the employer has confirmed that the utility owner/operator has de-energized and (at the jobsite) visibly grounded the power line.

11.7.1.4 Voltage Information

Where Option 3, section 11.7.2.1 is used, the utility owner/operator of the power lines must provide the requested voltage information within two working days of the employer's request.

11.7.1.5 Power Lines Presumed Energized

Skanska/crane user must assume that all power lines are energized unless the utility owner/operator confirms that the power line has been and continues to be de-energized and visibly grounded at the jobsite.

11.7.1.6 Posting of Electrocution Warnings

There must be at least one electrocution hazard warning conspicuously posted in the cab so that it is in view of the operator and, except for overhead gantry and tower cranes, at least two on the outside of the equipment.

11.7.2 Power Line Safety -Equipment Operations

11.7.2.1 Hazard Assessments and Precautions inside the Work Zone

Before beginning equipment operations, Skanska/crane user must have a Construction Work Plan identifying the electrical hazards associated with the work. Identify the work zone by either:

- Demarcating boundaries (e.g., with flags or a device such as a range limit device or range control warning device) and prohibiting the operator from operating the equipment past those boundaries
- Defining the work zone as the area 360 degrees around the equipment, up to the equipment's maximum working radius

For power lines < 350kV: Determine if any part of the equipment, load line or load (including rigging and lifting accessories), if operated up to the equipment's maximum working radius in the work zone, could get closer than 20 feet to a power line. If so, Skanska/crane user must meet the following requirements in Option (1), Option (2) or Option (3) of this section, as follows.

For power Lines > 350kV: Option (3) only.

Option (1): De-energize and ground

- Confirm from the utility owner/ operator that the power line has been de-energized and visibly grounded at the jobsite.

Option (2): 20 foot clearance

- Ensure that no part of the equipment, load line or load (including rigging and lifting accessories) gets closer than 20 feet to the power line by implementing the measures specified in paragraph 11.7.2.2, Titled Preventing encroachment/electrocution.

Option (3): Table A clearance

TABLE A—Minimum Clearance Distances

Note: The value that follows ''to'' is up to and includes that value. For example, "up to 200" means up to and including 200kV.

Voltage (nominal, kV, alternating current)		Minimum clearance distance (feet)
< 50	…….	10
Over 50 up to 200	…….	15
Over 200 to 350	…….	20
Over 350 to 500	…….	25
Over 500 to 750	…….	35
Over 750 to 1,000	…….	45

Over 1,000	…….	as established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution)

Determine if any part of the equipment, load line or load (including rigging and lifting accessories), while operating up to the equipment's maximum working radius in the work zone, could get closer than the minimum approach distance of the power line permitted under Table A. If so, then Skanska/crane user must follow the requirements for preventing encroachment/electrocution of this section to ensure that no part of the equipment, load line, or load (including rigging and lifting accessories), approaches the overhead source.

Diagram A.1

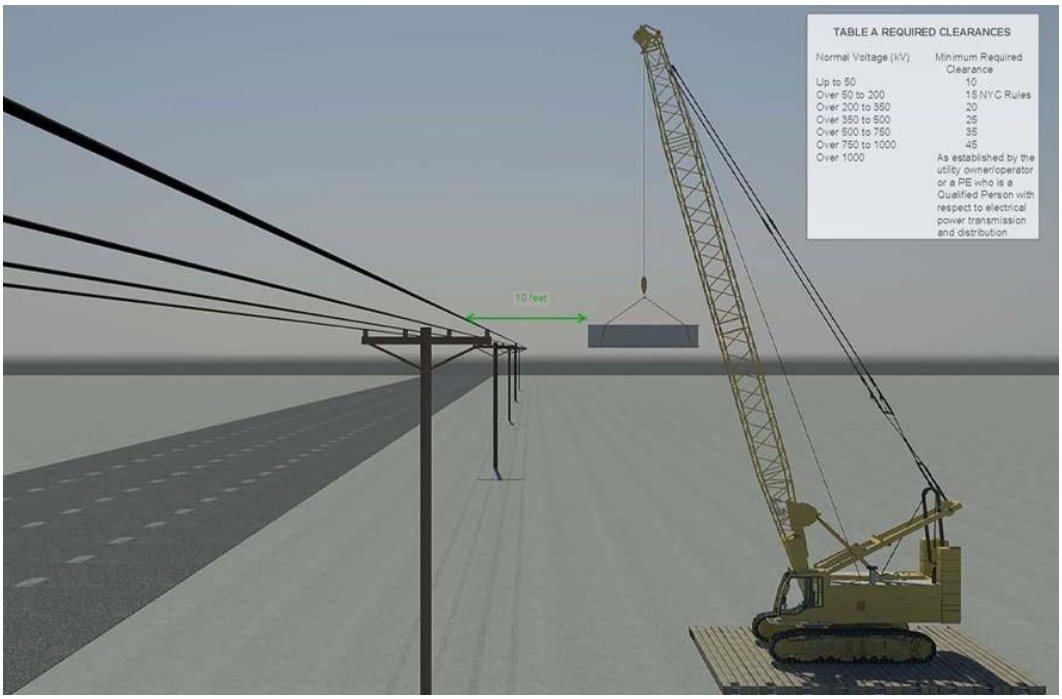


Diagram A.2

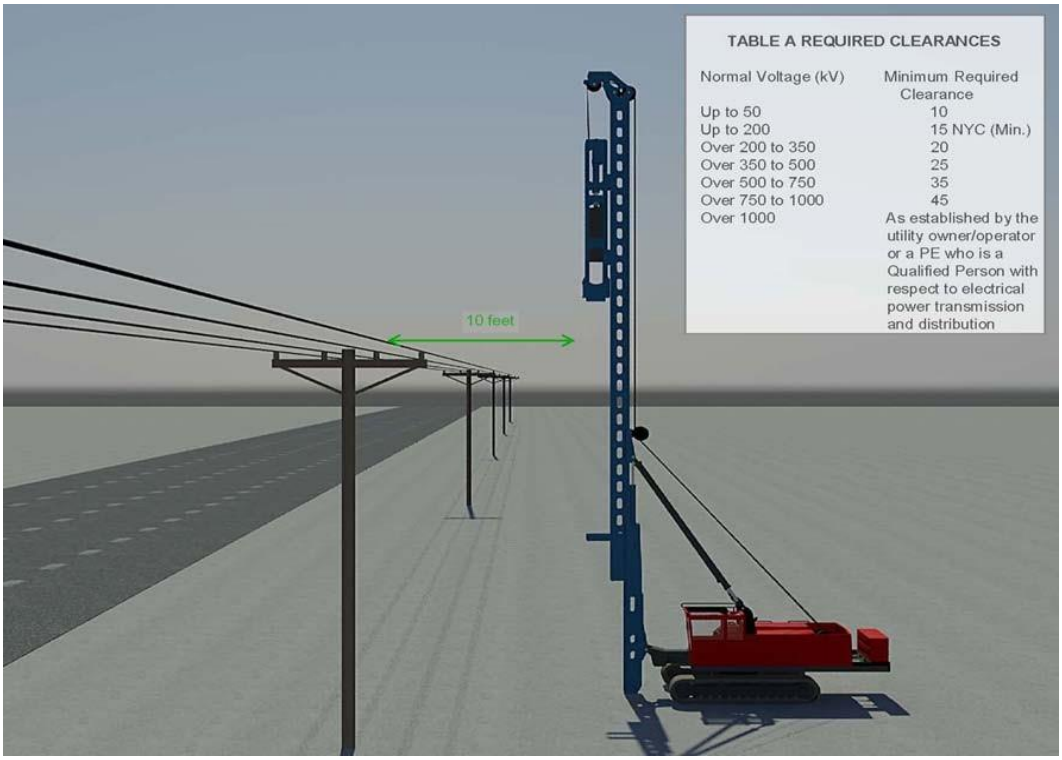


TABLE A REQUIRED CLEARANCES
Normal Voltage (kV)
Minimum Required Clearance
Up to 50
10
Up to 200
15 NYC (Min.)
Over 200 to 350
20
Over 350 to 500
25
Over 500 to 750
35
Over 750 to 1000
45
Over 1000
As established by the utility owner/operator or a PE who is a Qualified Person with respect to electrical power transmission and distribution
10 feet

Diagram A.3

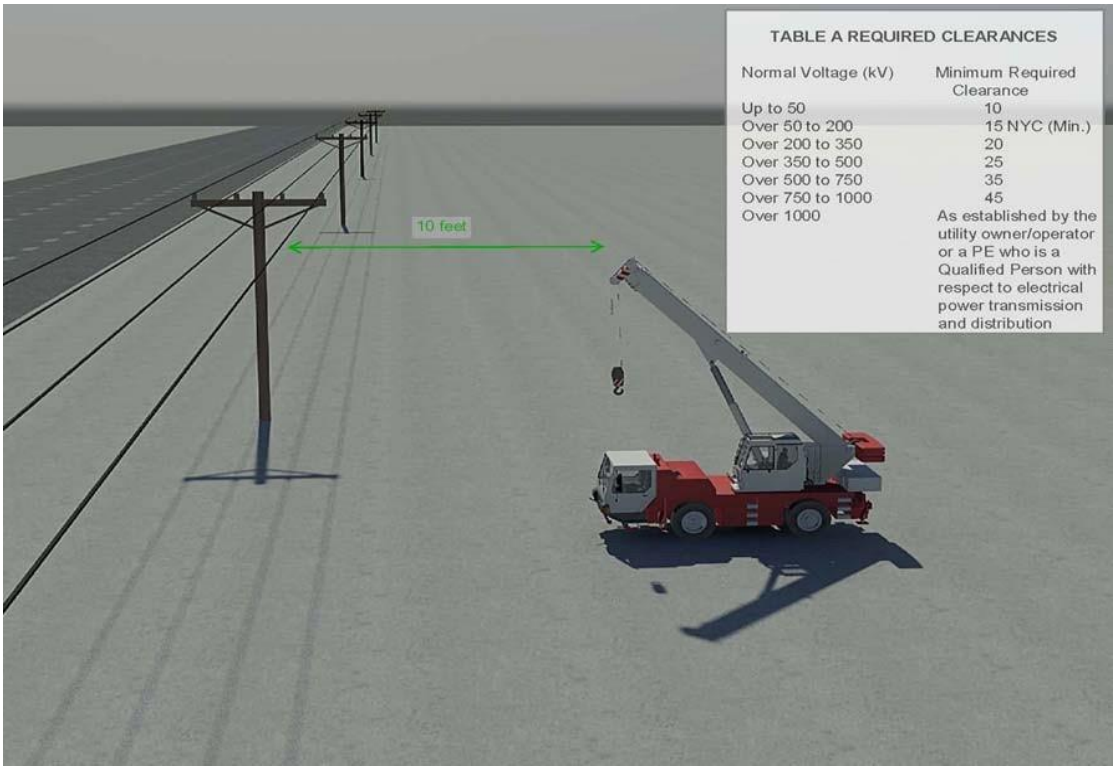


Diagram A.1-A.3 are examples of Table A – Minimum clearance while operating

11.7.2.2 Preventing Encroachment/Electrocution Equipment Operations

Where encroachment precautions are required under Option (2) or Option (3) of this section, all of the following requirements must be met:

- Conduct a planning meeting reviewing the construction plan with the operator and the other workers who will be in the area of the equipment or load to review the location of the power line(s) and the steps that will be implemented to prevent encroachment/ electrocution
- Tag lines must be non-conductive
- Erect and maintain an elevated warning line, barricade or line of signs, in view of the operator, equipped with flags or similar high-visibility markings at 20’ from the power line (if using Option (2) of this section) or at the minimum approach distance under Table A, above (if using Option (3) of this section).
- Implement at least one the following measures:

- A proximity alarm, set to give the operator sufficient warning to prevent encroachment
- A dedicated spotter who is in continuous contact with the operator. Where this measure is selected, the dedicated spotter must:
  - Be equipped with a visual aid to assist in identifying the minimum clearance distance. Examples of a visual aid include, but are not limited to, a clearly visible line painted on the ground, a clearly visible line of stanchions or a set of clearly visible line-of-sight landmarks (e.g., a fence post behind the dedicated spotter and a building corner ahead of the dedicated spotter).
  - Be positioned to effectively gauge the clearance distance. Where necessary, use equipment that enables the dedicated spotter to communicate directly with the operator. Give timely information to the operator so that the required clearance distance can be maintained.

- A device that automatically warns the operator when to stop movement, such as a range control warning device. Such a device must be set to give the operator sufficient warning to prevent encroachment.
- A device that automatically limits range of movement, set to prevent encroachment.
- An insulating link/device installed at a point between the end of the load line (or below) and the load.

11.7.2.3 Voltage Information

Where Option (3) of this section is used, the utility owner/operator of the power lines must provide the requested voltage information within two working days of the employer's request.

11.7.2.4 Operations below Power Lines

No part of the equipment, load line or load (including rigging and lifting accessories) is allowed below a power line; unless Skanska has confirmed that the utility owner/operator has de-energized and (at the jobsite) visibly grounded the power line.

Exceptions:

- For equipment with non-extensible booms: The uppermost part of the equipment, with the boom at true vertical, would be more than 25' below the plane of the power line and more than the minimum clearance distance below the plane of the power line, as established in Table A.

- For equipment with articulating or extensible booms: The uppermost part of the equipment, with the boom in the fully extended position, at true vertical, would be more than 25' below the plane of the power line or more than the minimum clearance distance below the plane of the power line, as established in Table A of this section.

11.7.2.5 Power Lines Presumed Energized

Skanska/crane user must assume that all power lines are energized unless the utility owner/operator confirms that the power line has been and continues to be de-energized and visibly grounded at the jobsite.

When working near transmitter/communication towers where the equipment is close enough for an electrical charge to be induced in the equipment or materials being handled, the transmitter must be de-energized or the following precautions must be taken:

- The equipment must be provided with an electrical ground
- Tag lines must be non-conductive

11.7.2.6 Training

To be prepared in the event of electrical contact with a power line, Skanska/crane user must ensure each operator and crew member assigned to work with the equipment are trained on all of the following:

- Information regarding the danger of electrocution from the operator simultaneously touching the equipment and the ground
- The importance to the operator's safety of remaining inside the cab except where there is an imminent danger of fire, explosion or other emergency that necessitates leaving the cab
- The safest means of evacuating from equipment that may be energized
- The danger of the potentially energized zone around the equipment (step potential)
- The need for crew in the area to avoid approaching or touching the equipment and the load
- Safe clearance distance from power lines
- The limitations of an insulating link/device, proximity alarm and range control (and similar) device, if used
- The procedures to be followed to properly ground equipment and the limitations of grounding

Power lines are presumed to be energized unless the utility owner/operator confirms that the power line has been and continue to be de-energized and visibly grounded at the jobsite.

Power lines are presumed to be uninsulated unless the utility owner/operator or a registered engineer who is a qualified person with respect to electrical power transmission and distribution confirms that a line is insulated.

Employees working as dedicated spotters must be trained to effectively perform their task, including training on the applicable requirements of this section. Devices originally designed by the manufacturer for use as a safety device, operational aid or a means to prevent power line contact or electrocution when used to comply with this section, must meet the manufacturer's procedures for use and conditions of use.

Skanska must determine that it is not feasible to do the work without breaching the minimum approach distance under Table A

The employer may determine that, after consultation with the utility owner/operator, it is infeasible to de-energize and ground the power line or relocate the power line.

11.7.2.7 Power Line with Unknown Voltage

Refer to Option 1 in section 11.7.2.2.

11.7.2.8 Power Line Safety (All Voltages)—Equipment Operations Closer than the "Table A" Zone

Equipment operations in which any part of the equipment, load line or load (including rigging and lifting accessories) is closer than the minimum approach distance under Table A to an energized power line is prohibited, except where Skanska demonstrates that the following requirements are met:

- Hazards are identified in the Construction Work Plan
- Minimum clearance distance is identified
- The power line owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution determines the minimum clearance distance that must be maintained to prevent electrical contact in light of the onsite conditions. The factors that must be considered in making this determination include, but are not limited to, conditions affecting atmospheric conductivity, time necessary to bring the equipment, load line and load (including rigging and lifting accessories) to a complete stop, wind conditions, degree of sway in the power

line lighting conditions and other conditions affecting the ability to prevent electrical contact.

- A planning meeting with the employer and utility owner/operator (or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution) is held to determine the procedures that will be followed to prevent electrical contact and electrocution. At a minimum these procedures must include:
  - If the power line is equipped with a device that automatically reenergizes the circuit in the event of a power line contact, the automatic reclosing feature of the circuit interrupting device must be made inoperative if the design of the device permits before the work begins
  - The dedicated spotter must be equipped with a visual aid to assist in identifying the minimum clearance distance. Examples of a visual aid include, but are not limited to, a line painted on the ground; a clearly visible line of stanchions; a set of clearly visible line-of-sight landmarks (such as a fence post behind the dedicated spotter and a building corner ahead of the dedicated spotter) positioned to effectively gauge the clearance distance. Where necessary, use equipment that enables the dedicated spotter to communicate directly with the operator. Give timely information to the operator so that the required clearance distance can be maintained.
  - An elevated warning line or barricade (not attached to the crane) is in view of the operator (either directly or through video equipment) equipped with flags or similar high-visibility markings to prevent electrical contact
  - An insulating link/device is installed at a point between the end of the load line (or below) and the load
  - All employees, excluding equipment operators located on the equipment, who may come in contact with the equipment, the load line, or the load are insulated or guarded from the equipment, the load line, and the load through an additional means other than an insulating link device. Insulating gloves rated for the voltage involved are adequate additional means of protection for the purposes of this paragraph.
  - Nonconductive rigging is used if the rigging is within the Table A distance during the operation
  - The equipment is equipped with a device that automatically limits range of movement and that is set to prevent any part of the equipment, load line or load (including rigging and lifting accessories) from breaching the minimum approach distance established in Table A
  - Tag lines are of the nonconductive type

- Barricades forming a perimeter at least 10’ away from the equipment are used to prevent unauthorized personnel from entering the work area. In areas where obstacles prevent the barricade from being at least 10’ away, the barricade must be as far from the equipment as feasible.
- Workers other than the operator are prohibited from touching the load line above the insulating link/ device and crane. Operators remotely operating the equipment from the ground must use either wireless controls that isolate the operator from the equipment or insulating mats that insulate the operator from the ground.
- Only personnel essential to the operation are permitted to be in the area of the crane and load
- The equipment is properly grounded
- Insulating line hose or cover-up is installed by the utility owner/operator except where such devices are unavailable for the line voltages involved
- The procedures developed comply with this section and are documented and immediately available onsite
- The equipment user and utility owner/operator (or RPE) meets with the equipment operator and the other workers who will be in the area of the equipment or load to review the procedures that will be implemented to prevent breaching the minimum approach distance established in Table A of this section and prevent electrocution.
- The procedures developed to comply with this section are implemented
- The utility owner/operator (or RPE) and all employers of employees involved in the work identify one person who will direct the implementation of the procedures. The person identified in accordance with this paragraph must direct the implementation of the procedures and must have the authority to stop work at any time to ensure safety.
- If a problem occurs implementing these procedures or indicating that those procedures are inadequate to prevent electrocution, the employer must safely stop operations and either develop new procedures to comply with this section or have the utility owner/ operator de-energize and visibly ground or relocate the power line before resuming work
- Devices originally designed by the manufacturer for use as a safety device operational aid or a means to prevent power line contact or electrocution, when used to comply with this section, must comply with the manufacturer’s procedures for use and conditions of use

11.7.2.9 Safety while Traveling Under or Near Power Lines with No Load

Skanska will ensure that:

- The power lines are identified on the crane location plan
- The boom/mast and boom/mast support system are lowered sufficiently to meet the requirements of this paragraph
- The clearances specified in Table T (see below) of this section are maintained
- The effects of speed and terrain on equipment movement (including movement of the boom/mast) are considered so that those effects do not cause the minimum clearance distances specified in Diagram B of this section to be breached
- There is a dedicated spotter. If any part of the equipment while traveling will get closer than 15' to the power line, Skanska must ensure that a dedicated spotter who is in continuous contact with the driver/operator is used. The dedicated spotter must be positioned to effectively gauge the clearance distance. Where necessary, use equipment that enables the dedicated spotter to communicate directly with the operator. Give timely information to the operator so that the required clearance distance can be maintained.

Additional precautions for traveling in poor visibility:

- When traveling at night or in conditions of poor visibility, in addition to the measures previously specified in this section, Skanska will ensure that the power lines are illuminated or another means of identifying the location of the lines is used and a safe path of travel is identified and used

TABLE T —Minimum Clearance Distances While Traveling with No Load

Voltage(nominal, kV, alternating current) while traveling		Minimum clearance distance (feet)
up to 0.75	…..……..	4
over .75 to 50	…..……..	6
over 50 to 345	…..……..	10
over 345 to 750	…..……..	16
Over 750 to 1,000	…..……..	20
Over 1,000	…..……..	as established by the utility owner/operator or registered professional engineer who is a qualified person with respect to electrical power transmission and distribution

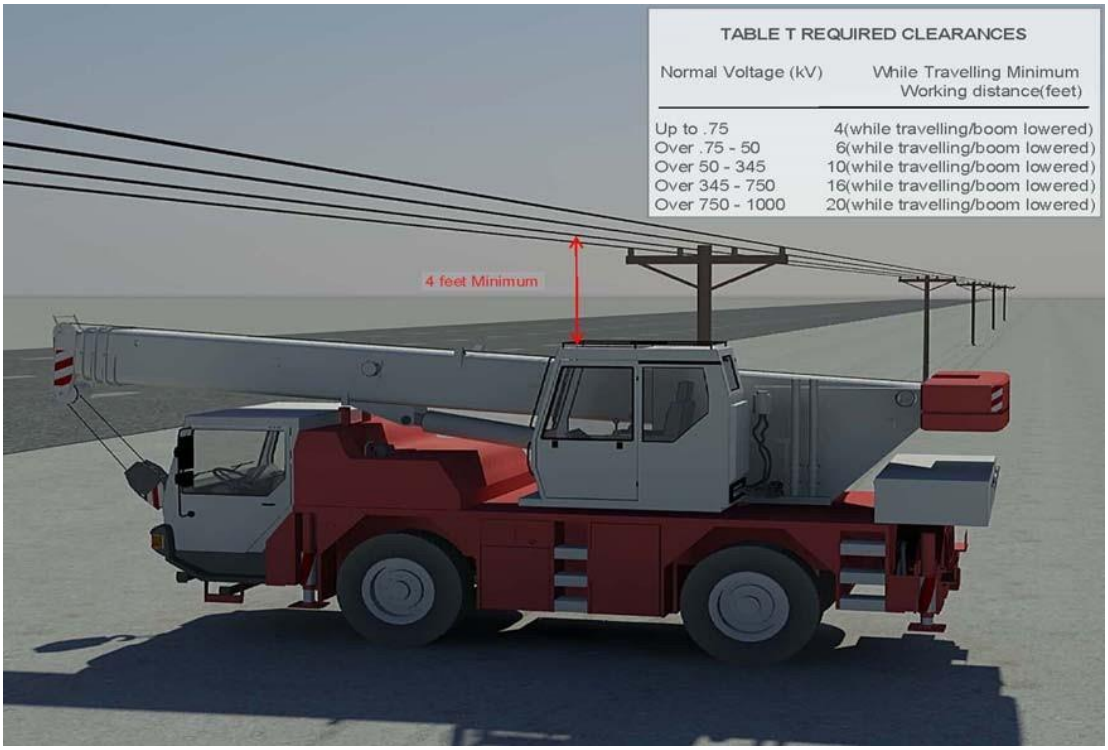


Diagram B – Examples of Table T – Required clearances while traveling

11.7.2.10 Unavailable Operation Procedures

Where the manufacturer's procedures are unavailable, Skanska will ensure compliance with all procedures necessary for the safe operation of the equipment and attachments. Procedures for the operational controls must be developed by a qualified person.

11.7.2.11 Accessibility of Procedures

The procedures applicable to the operation of the equipment, including rated capacities (load charts), recommended operating speeds, special hazard warnings, instructions and operator's manual will be readily available in the cab at all times for use by the operator. Where rated capacities are available in the cab only in electronic form and in the event of a failure that makes the rated capacities inaccessible, the operator must immediately cease operations or follow safe shut-down procedures until the rated capacities (in electronic or other form) are available.

11.7.3 Regional/Project-Specific Requirements

Enter project-specific requirements

11.8 Weather

When a local storm warning has been issued, the competent person will determine whether it is necessary to implement manufacturer recommendations for securing the equipment.

11.8.1 Wind

If wind conditions are such that the operator determines the lift is unsafe, the operation must be stopped. The U.S. Weather Bureau data from the nearest reporting station may be used for the determination of wind speed. Check the manufacturer's wind recommendations prior to use. Objects with large surface areas, such as formwork, may require a lower threshold in order to be safely lifted. Any condition that may affect the permissible limits for safe lifts should be identified in the lift plan.

11.8.2 Lightning

The use of a crane during lightning storms and events will be up to the sole discretion of the project team and/or work crews. Whenever there is a concern toward safety, the operator has the authority to stop and refuse to handle the load until a qualified person has determined the conditions are safe.

11.8.3 Winter Months

When using cranes during the winter months, it is important to check the boom and head sheaves for ice at the start of the shift. If at all possible, lower the boom to inspect for ice. If you cannot lower the boom, make sure the crew and surrounding work crews are aware of the possible danger of ice falling and do not stand under the boom when the crane is in use. Also, make sure that all personnel working with the crane stand in front of the crane beyond the hook or headache ball. In some operations, such as cranes on barges, ice may form more frequently. In these cases, be aware of slips and do not walk under the booms.

11.8.4 Regional/Project-Specific Requirements

Enter project-specific requirements

11.9 Training Requirements

11.9.1 Signal Training-General Requirements

Any person who will signal a crane must have passed the Skanska hand signal training class or possess a nationally recognized certificate from an accredited organization. A qualified signal person will display a recognizable visual marking on his/her hardhat while working on any site where owner requirements do not prohibit such displays. The signal person(s) for each specific lift are to be clearly identifiable by the operator. The preferred identification method is the display of a unique visual identifier (such as a green hardhat, vest and gloves) by the signal person(s) during the lift. This unique identifier is designated on a project-specific basis, depending on the owner and site conditions.

During operations requiring signals, the ability to transmit signals between the operator and signal person will be maintained. If that ability is interrupted at any time, the operator will safely stop operations requiring signals until the signal is reestablished and a proper signal is given and understood. If the operator becomes aware of a safety problem and needs to communicate with the signal person, the operator must safely stop operations. Operations will not resume until the operator and signal person agree that the problem has been resolved. Only one person gives signals to a crane/derrick at a time, except in circumstances where the operator cannot see the assigned signal person; in this case, a second signal person can relay signals to the operator from the signal person who is out of view. The Construction Work Plan must be amended at this time. Anyone who becomes aware of a safety problem must alert the operator or signal person by giving the stop or emergency stop signal. All directions given to the operator by the signal person will be given from the operator's direction perspective.

A signal person must be provided for any working or traveling crane on site.

Signals to operators must be by hand or dedicated two-way communication. When using hand signals, the standard method must be used (see Appendix B).

Exception: where use of the standard method for hand signals is infeasible, or where an operation or use of an attachment is not covered in the standard method, non-standard hand signals may be used.

<u>Non-Standard Hand Signals</u>

When using non-standard hand signals, the signal person, operator and lift supervisor (where there is one) will contact each other prior to the operation and agree on the non-standard hand signals that will be used.

New Signals

Signals other than hand, voice or audible signals may be used where the employer on any Skanska project, demonstrates that:

- The new signals provide communication at least equally effective as voice, audible or standard method hand signals, and are suitable
- The signals used (e.g., hand, voice, audible or new) and means of transmitting the signals to the operator (e.g., direct line of sight, video, radio, etc.) must be appropriate for the site conditions

Prior to beginning operations, the operator, signal person and lift supervisor (if there is one), will contact each other and agree on the voice signals that will be used. Once the voice signals are agreed upon, these workers do not need to meet again to discuss voice signals, unless another worker is substituted, there is confusion about the voice signals or a voice signal is to be changed. Each voice signal will contain the following three elements, given in the following order: function (e.g., hoist, boom, etc.), direction distance and/or speed function, stop command.

The operator, signal person and lift supervisor, if there is one, must be able to effectively communicate in the language used.

When using any electronic device for voice/audible signals, back-up batteries must be with the signal person prior to operation. A proactive plan for device failure must be discussed and documented.

Communication with Multiple Cranes/Derricks

Where a signal person(s) is in communication with more than one crane/derrick, a system for identifying which crane/derrick each signal is for must be established.

Radio or Other Electronic Transmission of Signals

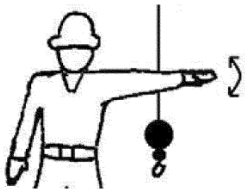
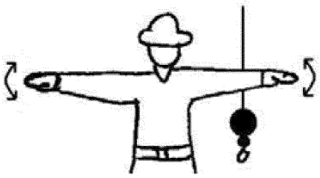
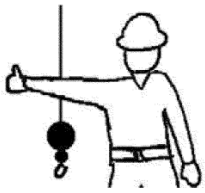
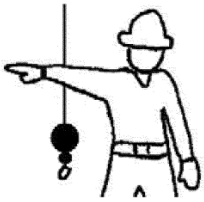
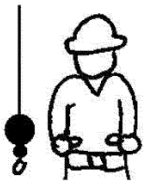
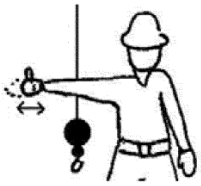
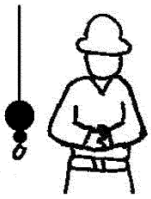
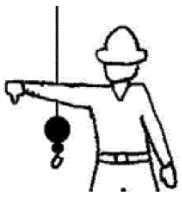
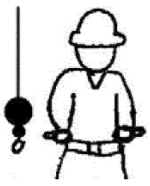
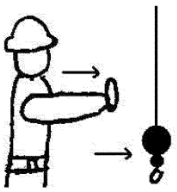
The device(s) used to transmit signals will be tested onsite before beginning operations to ensure that the signal transmission is clear and reliable. Signals must be transmitted through a dedicated channel.

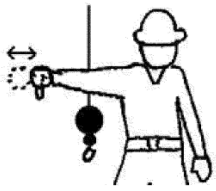
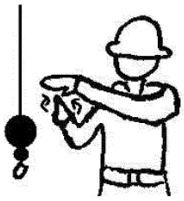
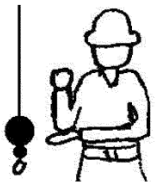
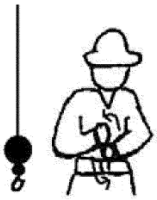
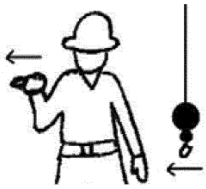
Exception: Multiple cranes/derricks and one or more signal persons may share a dedicated channel for the purpose of coordinating operations. The operator's reception of signals must be by a hands-free system

Signals

Hand signal charts must be both posted on the equipment and readily available at the site.

Upon completion of the Skanska hand signal training course or if the signalman possesses a nationally recognized certificate from an accredited organization, each individual will be issued the appropriate project- specific signalman visual identifier. See images below.

 **STOP –** With arm extended horizontally to the side, palm down, arm is swung back and forth.	 **EMERGENCY STOP** – With both arms extended horizontally to the side, palms down, arms are swung back and forth.	 **HOIST –** With upper arm extended to the side, forearm and index finger pointing straight up, hand and finger make small circles.
 **RAISE BOOM –** With arm extended horizontally to the side, thumb points up with other fingers closed.	 **SWING –** With arm extended horizontally, index finger points in direction that boom is to swing.	 **RETRACT TELESCOPING BOOM –** With hands to the front at waist level, thumbs point at each other with other fingers closed.
 **RAISE THE BOOM AND LOWER THE LOAD –** With arm extended horizontally to the side and thumb pointing up, fingers open and close while load movement is desired.	 **DOG EVERYTHING –** Hands held together at waist level.	 **LOWER –** With arm and index finger pointing down, hand and finger make small circles.
 **LOWER BOOM –** With arm extended horizontally to the side, thumb points down with other fingers closed.	 **EXTEND TELESCOPING BOOM –** With hands to the front at waist level, thumbs point outward with other fingers closed.	 **TRAVEL/TOWER TRAVEL** – With all fingers pointing up, arm is extended horizontally out and back to make a pushing motion in the direction of travel.

 **LOWER THE BOOM AND RAISE THE LOAD –** With arm extended horizontally to the side and thumb pointing down, fingers open and close while load movement is desired.	 **MOVE SLOWLY –** A hand is placed in front of the hand that is giving the action signal.	 **USE AUXILIARY HOIST** (whipline) **–** With arm bent at elbow and forearm vertical, elbow is tapped with other hand. Then regular signal is used to indicate desired action.
 **CRAWLER CRANE TRAVEL, BOTH TRACKS –** Rotate fists around each other in front of body; direction of rotation away from body indicates travel forward; rotation towards body indicates travel backward.	 **USE MAIN HOIST –** A hand taps on top of the head. Then regular signal is given to indicate desired action.	 **CRAWLER CRANE TRAVEL, ONE TRACK –** Indicate track to be locked by raising fist on that side. Rotate other fist in front of body in direction that other track is to travel.
 **TROLLEY TRAVEL** – With palm up, fingers closed and thumb pointing in direction of motion, hand is jerked horizontally in direction trolley is to travel.		

11.9.2 Electrical Training

General Requirements

Each crew member working with a crane must have completed the electrical training defined in Electrical 11.7.2.6.

11.9.3 Dedicated Spotter

General Requirements

A person working as a dedicated spotter around electrical hazards must be trained to fit the definition of signal person.

11.9.4 Rigging Training

General Requirements

All rigging personnel must meet the definition of a qualified rigger.

11.9.5 Regional/Project-Specific Requirements

Enter project-specific requirements

11.10 Unconventional Cranes

11.10.1 Tower Cranes

This section contains supplemental requirements for tower cranes. All sections apply to tower cranes unless specified otherwise.

11.10.1.1 Erecting, Climbing and Dismantling

The following sections apply to tower cranes (except as otherwise noted), except that the term assembly/disassembly (A/D) is replaced by "erecting, climbing and dismantling," and the term "disassembly" is replaced by "dismantling":

Assembly/Disassembly — Selection of manufacturer or employer procedures

Assembly/Disassembly — General requirements (applies to all assembly and disassembly operations)

Disassembly – Additional requirements for dismantling of booms and jibs (applies to both the use of manufacturer procedures and employer procedures)

11.10.1.2 Dangerous Areas (Self-Erecting Tower Cranes)

In addition to the requirements for self-erecting tower cranes, the following applies:

- Employees will not be in or under the tower, jib or rotating portion of the crane during erecting, climbing and dismantling operations until the crane is secured in a locked position and the competent person in charge indicates it is safe to enter this area, unless the manufacturer's instructions direct otherwise and only the necessary personnel are permitted in this area

In some jurisdictions, a master rigger and proper notification to local governing agencies are required. This is the responsibility of the jobsite.

11.10.1.3 Foundations and Structural Supports

Tower crane foundations and structural supports will be designed by the manufacturer or a registered professional engineer (RPE).

11.10.1.4 Addressing Specific Hazards

In addition to assembly/disassembly requirements, the A/D supervisor will address the following:

- Foundations and structural supports: The A/D supervisor will verify that the tower crane foundations and structural supports are installed in accordance with their design.
- Loss of backward stability: Backward stability must be considered before swinging self-erecting cranes or cranes on traveling or static undercarriages.
- Wind speed: Wind must not exceed the speed recommended by the manufacturer or where the manufacturer does not specify this information, the speed determined by a qualified person.

11.10.1.5 Plumb Tolerance

Towers will be erected plumb to the manufacturer's tolerance and verified by a qualified person. Where the manufacturer does not specify plumb tolerance, the crane tower will be plumb to a tolerance of at least 1:500 (approximately 1" in 40').

11.10.1.6 Multiple Tower Crane Jobsites

On jobsites where more than one fixed jib (hammerhead) tower crane is installed, the cranes will be located so no crane will come in contact with the structure of another crane. Cranes are permitted to pass over one another.

11.10.1.7 Climbing Procedures

Prior to, and during, all climbing procedures (including inside climbing and top climbing), the employer will:

- Comply with all manufacturer prohibitions
- Have an RPE verify that the host structure is strong enough to sustain the forces imposed through the braces
- Brace anchorages and supporting floors
- Ensure that no part of the climbing procedure takes place when wind exceeds the speed recommended by the manufacturer or, where the manufacturer does not specify this information, the speed determined by a qualified person. Some local governing agencies require 48-hour notifications.

11.10.1.8 Counterweight/Ballast

Equipment will not be erected, dismantled or operated without the amount and position of counterweight and/or ballast in place as specified by the manufacturer or an RPE familiar with the equipment. The maximum counterweight and/or ballast specified by the manufacturer or an RPE familiar with the equipment will not be exceeded.

11.10.1.9 Signs

The size and location of signs installed on tower cranes must be in accordance with manufacturer specifications. Where these are unavailable, an RPE familiar with the type of equipment involved must approve in writing the size and location of any signs.

11.10.1.10 Safety Devices

The following safety devices are required on all tower cranes unless otherwise specified:

- Boom stops on luffing boom type tower cranes
- Jib stops on luffing boom type tower cranes if equipped with a jib attachment
- Travel rail end stops at both ends of travel rail
- Travel rail clamps on all travel bogies
- Integrally mounted check valves on all load-supporting hydraulic cylinders
- Hydraulic system pressure limiting device
- The following brakes, which automatically set in the event of pressure loss or power failure:

  - A hoist brake on all hoists
  - Swing brake
  - Trolley brake
  - Rail travel brake
- Dead man control or forced neutral return control (hand) levers
- Emergency stop switch at the operator's station
- Trolley end stops at both ends of travel of the trolley

Proper operation required

Operations will not begin unless the devices listed in this section are in proper working order. If a device stops working properly during operations, the operator will safely stop operations. Operations will not resume until the device is again working properly. Alternative measures are not permitted to be used.

11.10.1.11 Operational Aids

The devices listed in the following sections ("operational aids") are required on all tower cranes, unless otherwise specified.

Operations will not begin unless the operational aids are in proper working order, except where Skanska/crane user meets the specified temporary alternative measures. More protective alternative measures specified by the tower crane manufacturer, if any, will be followed.

If an operational aid stops working properly during operations, the operator will safely stop operations until the temporary alternative measures are implemented or the device is again working properly. If a replacement part is no longer available, the use of a substitute device that performs the same type of function is permitted and is not considered a modification.

11.10.1.12 Category I Operational Aids and Alternative Measures

Operational aids listed in this below that are not working properly will be repaired no later than seven days after the deficiency occurs.

Exception: If the employer documents that it has ordered the necessary parts within seven days of the occurrence of the deficiency, the repair will be completed within seven days of receipt of the parts.

Trolley Travel Limiting Device

The travel of the trolley will be restricted at both ends of the jib by a trolley-travel limiting device to prevent the trolley from running into the trolley end stops.

Temporary alternative measures:

- Option A: The trolley rope will be marked (so it can be seen by the operator) at a point that gives the operator sufficient time to stop the trolley prior to the end stops
- Option B: A spotter will be used when operations are conducted within 10' of the outer or inner trolley end stops

Boom Hoist Limiting Device

The range of the boom will be limited at the minimum and maximum radius.

Temporary alternative measures: Clearly mark the cable (so it can be seen by the operator) at a point that gives the operator sufficient time to stop the boom hoist within the minimum and maximum boom radius or use a spotter.

Anti Two-Blocking Device

The tower crane will be equipped with a device that automatically prevents damage from contact between the load block, overhaul ball or similar component and the boom tip (or fixed upper block or similar component). The device(s) must prevent such damage at all points where two-blocking could occur.

Temporary alternative measures: Clearly mark the cable (so it can be seen by the operator) at a point that will give the operator sufficient time to stop the hoist to prevent two-blocking or use a spotter.

Hoist Drum Lower Limiting Device

Tower cranes manufactured more than one year after January 1st, 2011 must be equipped with a device that prevents the last three wraps of hoist cable from being spooled off the drum.

Temporary alternative measures: Mark the cable (so it can be seen by the operator) at a point that will give the operator sufficient time to stop the hoist prior to the last three wraps of hoist cable being spooled off the drum or use a spotter.

Load Moment Limiting Device

The tower crane must have a device that prevents moment overloading

Temporary alternative measures: A radius-indicating device will be used (if the tower crane is not equipped with a radius indicating device, the radius will be measured to ensure the load is within the rated capacity of the crane). In addition, the weight of the load will be determined from a reliable source (e.g., the load's manufacturer), by a reliable calculation method (i.e., calculating a steel beam from measured dimensions and a known per foot weight) or by other equally reliable means. This information will be provided to the operator prior to the lift.

Hoist Line Pull Limiting Device

The capacity of the hoist will be limited to prevent overloading including each individual gear ratio if equipped with a multiple-speed hoist transmission.

Temporary alternative measures: The operator will ensure that the weight of the load does not exceed the capacity of the hoist (including for each individual gear ratio if equipped with a multiple speed hoist transmission).

Rail Travel Limiting Device

The travel distance in each direction will be limited to prevent the travel bogies from running into the end stops or buffers.

Temporary alternative measures: A spotter will be used when operations are conducted within 10' of either end of the travel rail end stops.

Boom Hoist Drum Positive Locking Device

The boom hoist drum will be equipped with a device to positively lock the boom hoist drum.

Temporary alternative measures: The device will be manually set when required if an electric, hydraulic or automatic type is not functioning.

11.10.1.13 Category II Operational Aids and Alternative Measures

Operational aids listed in below that are not working properly will be repaired no later than 30 days after the deficiency occurs.

Exception: If the employer can document that it has ordered the necessary parts within seven days of the occurrence of the deficiency, and the part is not received in time to complete the repair in 30 days, the repair will be completed within seven days of receipt of the parts.

11.10.1.14 Boom Angle or Hook Radius Indicator

Luffing boom tower cranes will have a boom angle indicator readable from the operator's station.

Hammerhead tower cranes will have a hook radius indicator readable from the operator's station.

If either of the above criteria is not met, the following temporary alternative measures may be implemented:

Temporary alternative measures:

- Hook radii or boom angle will be determined by measuring the hook radii or boom angle
- Trolley travel deceleration device: the trolley speed will be automatically reduced prior to the trolley reaching the end limit in both directions

Temporary alternative measures:

- The operator will reduce the trolley speed when approaching the trolley end limits
- Boom hoist deceleration device: the boom speed will be automatically reduced prior to the boom reaching the minimum or maximum radius limit

Temporary alternative measures:

- The operator will reduce the boom speed when approaching the boom maximum or minimum end limits
- Load hoist deceleration device: the load speed will be automatically reduced prior to the hoist reaching the upper limit

Temporary alternative measures:

- The operator will reduce the hoist speed when approaching the upper limit
- Wind speed indicator: a device will be provided to display the wind speed and mounted above the upper rotating structure on tower cranes. On self-erecting cranes, it will be mounted at or above the jib level.

Temporary alternative measures:

- Use of wind speed information from a properly functioning indicating device on another tower crane on the same site or a qualified person estimates the wind speed

Load indicating device: Cranes manufactured after 2012 will have a device that displays the magnitude of the load on the hook. Displays that are part of load-moment limiting devices that display the load on the hook meet this requirement.

Temporary alternative measures:

- The weight of the load will be determined from a reliable source (e.g., the load's manufacturer), by a reliable calculation method (i.e., calculating a steel beam from measured dimensions and a known per foot weight) or by other equally reliable means. This information will be provided to the operator prior to the lift.

11.10.1.15 Pre-Erection Inspections

Before each crane component is erected

- It must be inspected by a qualified person for damage or excessive wear. The qualified person must pay particular attention to components that will be difficult to inspect thoroughly during shift inspections.
- If the qualified person determines that a component is damaged or worn to the extent that it would create a safety hazard if used on the crane, that component must not be erected on the crane unless it is repaired and, upon re-inspection by the qualified person, found to no longer create a safety hazard.
- If the qualified person determines that, though not presently a safety hazard, the component needs to be monitored, the employer must ensure that the component is checked in the monthly inspections. Any such determination must be documented and the documentation must be available to any individual who conducts a monthly inspection.

11.10.1.16 Post-Erection Inspection

The following requirements will be met:

- A load test using certified weights or scaled weights using a certified scale with a current certificate of calibration will be conducted after each erection. The load test will be conducted in accordance with the manufacturer's instructions. Where these instructions are will develop written load-test procedures.

11.10.1.17 Monthly

The following additional items will be included:

- Tower (mast) bolts and other structural bolts (for loose or dislodged condition) from the base of the tower crane up or, if the crane is tied to or braced by the structure, those above the upper-most brace support
- The uppermost tie-in, braces, floor supports and floor wedges where the tower crane is supported by the structure, shall be inspected for loose or dislodged components

11.10.1.18 Annual

In addition to the items that must be inspected, all turntable and tower bolts must be inspected for proper condition and torque.

11.10.2 Derricks

This section contains supplemental requirements for derricks. Whether temporarily or permanently mounted, all sections of this subpart apply to derricks unless specified otherwise. A derrick is powered equipment consisting of a mast or equivalent member that is held at or near the end by guys or braces, with or without a boom and its hoisting mechanism. The mast/equivalent member and/or the load is moved by the hoisting mechanism (typically base-mounted) and operating ropes. Derricks include: A-frame, basket, breast, Chicago boom, gin pole (except gin poles used for erection of communication towers), guy, shearleg, stiffleg and variations of such equipment.

11.10.2.1 Operation – Procedures

Section OSHA 1926.1417 (Operation) applies except for OSHA 1926.1417(c) Accessibility of procedures.

Load Chart Contents

Load charts will contain at least:

- Rated capacity at corresponding ranges of boom angle or operating radii
- Specific lengths of components to which the rated capacities apply
- Required parts for hoist reeving
- Size and construction of rope
- Load chart location

Permanent Installations

For permanently installed derricks with fixed lengths of boom, guy and mast, a load chart will be posted where it is visible to personnel responsible for the operation of the equipment.

Non-Permanent Installations

For derricks that are not permanently installed, the load chart will be readily available at the job site to personnel responsible for the operation of the equipment.

11.10.2.2 Construction and Anchoring

General Requirements

- Derricks will be constructed to meet all stresses imposed on members and components when installed and operated in accordance with the manufacturer's procedures and within its rated capacity
- Welding of load-sustaining members will conform to recommended practices in ANSI/AWS D14.3 -94 or D1.1-2

11.10.2.3 Guy Derricks

The minimum number of guys is six, with equal spacing, except where a qualified person or derrick manufacturer approves variations from these requirements and revises the rated capacity to compensate for such variations. Guy derricks will not be used unless the employer has the following guy information:

- The number of guys
- The spacing around the mast
- The size, grade and construction of rope to be used for each guy

The anchorage and guying will be designed to withstand maximum horizontal and vertical forces encountered when operating within rated capacity with the particular guy slope and spacing specified for the application.

For guy derricks manufactured after December 18, 1970, in addition to the information required in this section, the employer will have the following guy information:

- The amount of initial sag or tension
- The amount of tension in guy line rope at anchor

The mast base will permit the mast to rotate freely with allowance for slight tilting of the mast caused by guy slack.

The mast cap will:

- Permit the mast to rotate freely
- Withstand tilting and cramping caused by the guy loads
- Be secured to the mast to prevent disengagement during erection
- Be provided with means for attaching guy ropes

11.10.2.4 Stiffleg Derricks

The mast will be supported in the vertical position by at least two stifflegs. One end of each will be connected to the top of the mast and the other end securely anchored. The stifflegs will be capable of withstanding the loads imposed at any point of operation within the load chart range, and the mast base will:

- Permit the mast to rotate freely (when necessary)
- Permit deflection of the mast without binding
- Be prevented from lifting out of its socket when the mast is in tension
- Be anchored
- Be designed to withstand maximum horizontal and vertical forces encountered when operating within rated capacity with the particular stiffleg spacing and slope specified for the application

The stiffleg connecting member at the top of the mast will:

- Permit the mast to rotate freely (when necessary)
- Withstand the loads imposed by the action of the stifflegs
- Be secured so as to oppose separating forces
- Be anchored
- Be designed to withstand maximum horizontal and vertical forces encountered when operating within rated capacity with the particular stiffleg spacing and slope specified for the application

11.10.2.5 Gin Pole Derrick

Guy lines will be sized and spaced to stabilize the gin pole in both boomed and vertical positions.

Exceptions:

- Where the size and/or spacing of guy lines do not result in the gin pole being stable in both boomed and vertical positions, the employer will ensure that the derrick is not used in an unstable position
- The base of the gin pole will permit movement of the pole (when necessary). The gin pole shall be anchored at the base against horizontal forces (when such forces are present)

11.10.2.6 Chicago Boom Derrick

The fittings for stepping the boom and for attaching the topping lift will be arranged to:

- Permit the derrick to swing at all permitted operating radii and mounting heights between fittings
- Accommodate attachment to the upright member of the host structure
- Withstand the forces applied when configured and operated in accordance with the manufacturer's procedures and within its rated capacity
- Prevent the boom or topping lift from lifting out under tensile forces

11.10.2.7 Swingers and Hoists

The boom, swinger mechanisms and hoists will be suitable for the derrick work intended and will be anchored to prevent displacement from the imposed loads. Base-mounted drum hoists will meet the requirements in the following sections of ASME B30.7–2001:

- Sections 7-1.1 (Load ratings and markings)
- Section 7-1.2 (Construction), except: 7-1.2.13 (Operator's cab) 7-1.2.15 (Fire extinguishers)
- Section 7-1.3 (Installation)
- Applicable terms in section 7-0.2 (Definitions)

11.10.2.8 Load Tests for New Hoists

The employer will ensure that new hoists are load tested to a minimum of 110 percent of rated capacity, but not more than 125 percent of rated capacity, unless otherwise recommended by the manufacturer. This requirement is met where the manufacturer has conducted this testing.

11.10.2.9 Repaired or Modified Hoists

Hoists that have had repairs, modifications or additions affecting their capacity or safe operation will be evaluated by a qualified person to determine if a load test is necessary. If it is, load testing will be conducted in accordance with this policy and manufacturer requirements.

11.10.2.10 Load Test Procedure

Load tests required by this policy will be conducted as follows:

- The test load will be hoisted a vertical distance to assure that the load is supported by the hoist and held by the hoist brake(s)
- The test load will be lowered, stopped and held with the brake(s)
- The hoist will not be used unless a competent person determines that the test has been passed

11.10.2.11 Operational Aids

Section OSHA 1926.1416 (Operational aids) applies, except for OSHA 1926.1416 (d)(1) Boom hoist limiting device and OSHA 1926.1416(e)(1) Boom angle or radius indicator and OSHA 1926.1416(e)(4) Load weighing and similar devices.

Boom Angle Aid

The employer will ensure that either:

- The boom hoist cable is marked with caution and stop marks. The stop marks will correspond to maximum and minimum allowable boom angles. The caution and stop marks will be in view of the operator or a spotter who is in direct communication with the operator.
- An electronic or other device that signals the operator in time to prevent the boom from moving past its maximum and minimum angles, or automatically prevents such movement, is used

Load Weight/Capacity Devices

Derricks manufactured after 2012 with a maximum rated capacity over 6,000 pounds will have at least one of the following: load weighing device, load moment indicator, rated capacity indicator or rated capacity limiter.

Temporary alternative measures: The weight of the load will be determined by a reliable source (e.g., the load's manufacturer), by a reliable calculation method (i.e., calculating a steel beam

from measured dimensions and a known per foot weight) or by other equally reliable means. This information will be provided to the operator prior to the lift.

11.10.2.12 Post-Assembly Approval and Testing – New or Reinstalled Derricks

11.10.2.13 Functional Test

Prior to initial use, new or reinstalled derricks will be tested with no hook load by a competent person to verify proper operation. This test will include:

- Lifting and lowering the hook(s) through the full range of hook travel
- Raising and lowering the boom through the full range of boom travel
- Swinging in each direction through the full range of swing
- Actuating the anti two-block and boom hoist limit devices (if provided)
- Actuating the locking, limiting and indicating devices (if provided)

11.10.2.14 Load Test

Prior to initial use, new or reinstalled derricks will be load tested by a competent person.

The test load will meet the following requirements:

- Test loads will be at least 100 percent and no more than 110 percent of the rated capacity unless otherwise recommended by the manufacturer or qualified person but in no event will the test load be less than the maximum anticipated load

The test will consist of:

- Hoisting the test load a few inches and holding to verify that the load is supported by the derrick and held by the hoist brake(s)
- Swinging the derrick, if applicable, the full range of its swing, at the maximum allowable working radius for the test load
- Booming the derrick up and down within the allowable working radius for the test load
- Lowering, stopping and holding the load with the brake(s).

The derrick will not be used unless the competent person determines that the test has been passed.

<u>Documentation</u>

Tests conducted under this section will be documented. The document will contain the date, test results and the name of the tester. The document will be retained until the derrick is re-tested or dismantled, whichever occurs first.

11.10.2.15 Load Testing Repaired or Modified Derricks

Derricks that have had repairs, modifications or additions affecting the derrick's capacity or safe operation will be evaluated by a qualified person to determine if a load test is necessary. If a load test is necessary, it will be conducted and documented in accordance with this policy.

11.10.2.16 Power Failure Procedures

If power fails during operations, the derrick operator will safely stop operations. This includes setting all brakes or locking devices and moving all clutch and other power controls to the off position.

11.10.2.17 Use of Winch Heads

Ropes will not be handled on a winch head without the knowledge of the operator. While a winch head is being used, the operator will be within reach of the power unit control lever.

11.10.2.18 Securing the Boom

When the boom is being held in a fixed position, dogs, pawls or other positive holding mechanisms on the boom hoist will be engaged. When taken out of service for 30 days or more, the boom will be secured by one of the following methods:

- Laid down
- Secured to a stationary member, as nearly under the head as possible, by attachment of a sling to the load block for guy derricks, lifted to a vertical position and secured to the mast for stiffleg derricks, secured against the stiffleg

The process of jumping the derrick will be supervised by the A/D supervisor.

Derrick operations will be supervised by a competent person.

Inspections

In addition to the requirements in OSHA 1926.1412, the following additional items will be included in the inspections:

- Daily: Guys for proper tension
- Annual: Gudgeon pin for cracks, wear and distortion
- Foundation supports for continued ability to sustain the imposed loads. OSHA 1926.1427 Operator qualification and certification does not apply.

11.10.3 Floating Cranes, Derricks and Land Cranes, Derricks on Barges

This section contains supplemental requirements for floating cranes/derricks and land cranes/derricks on barges, pontoons, vessels or other means of flotation (vessel/flotation device). All sections of this subpart apply to floating cranes/derricks and land cranes/derricks on barges, pontoons, vessels or other means of flotation, unless specified otherwise. The requirements of this section do not apply when using jacked barges when the jacks are deployed to the river/lake/sea bed and the barge is fully supported by the jacks

11.10.3.1 General Requirements

The requirements in paragraphs (c) through (k) of this section apply to both floating cranes/derricks and land cranes/derricks on barges, pontoons, vessels or other means of flotation

11.10.3.2 Work Area Control

The requirements of OSHA 1926.1424 Work area control apply, except for OSHA 1926.1416 (a) (2) (ii). The employer will either:

- Erect and maintain control lines, warning lines, railings or similar barriers to mark the boundaries of the hazard areas
- Clearly mark the hazard areas using a combination of warning signs (such as “Danger — Swing/Crush Zone”) and high visibility markings on the equipment that identify the hazard areas. In addition, the employer will train the employees to understand what these markings signify.

11.10.3.3 Keeping Clear of the Load

OSHA 1926.1425 does not apply.

11.10.3.4 Additional Safety Devices

In addition to the safety devices listed in OSHA 1926.1415, the following safety devices are required:

- Barge, pontoon, vessel or other means of flotation list and trim device, located in the cab or, where there is no cab, at the operator's station
- Horn
- Positive equipment house lock
- Wind speed and direction indicator: A competent person will determine if wind is a factor that needs to be considered. If it needs to be considered, a wind speed and direction indicator will be used

11.10.3.5 Operational Aids

An anti two-block device is required only when hoisting personnel or hoisting over an occupied cofferdam or shaft

OSHA 1926.1416(e)(4) Load weighing and similar devices does not apply to dragline, clamshell (grapple), magnet, drop ball, container handling, concrete bucket and pile driving work.

11.10.3.6 Accessibility of Procedures Applicable to Equipment Operation

If the crane/derrick has a cab, the requirements of OSHA 1926.1417(c) apply. If the crane/derrick does not have a cab, rated capacities (load charts) will be posted at the operator's station. If the operator's station is moveable (such as with pendant-controlled equipment), the load charts will be posted on the equipment

Procedures applicable to the operation of the equipment (other than load charts), recommended operating speeds, special hazard warnings, instructions and operators manual, will be readily available on board.

11.10.3.7 Inspections

In addition to meeting the requirements of OSHA 1926.1412 for inspecting the crane/derrick, the employer will ensure that the barge, pontoons, vessel or other means of flotation used to support a floating crane/derrick or land crane/derrick is inspected as follows:

<u>Shift Inspections</u>

The means used to secure/attach the equipment to the vessel/flotation device will be inspected for proper condition, including wear, corrosion, loose or missing fasteners, defective welds and (where applicable) insufficient tension.

<u>Monthly Inspections</u>

The vessel/flotation device used will be inspected for the following:

- The means used to secure/attach the equipment to the vessel/flotation device will be inspected for proper condition, including wear, corrosion and (where applicable) insufficient tension
- Taking on water
- Deck load for proper securing
- Chain lockers, storage, fuel compartments and battening of hatches for serviceability as a water-tight appliance
- Firefighting and lifesaving equipment in place and functional

The shift and monthly inspections will be conducted by a competent person. If any deficiency is identified, an immediate determination will be made by a qualified person as to whether the deficiency constitutes a hazard. If the deficiency is determined to constitute a hazard, the vessel/flotation device will be removed from service until it has been corrected.

Annual

External vessel/flotation device inspection

The external portion of the barge, pontoons, vessel or other means of flotation used will be inspected annually by a qualified person who has expertise with respect to vessels/flotation devices. The inspection will include the items identified above as Shift and Monthly of this section.

In addition, cleats, bitts, chocks, fenders, capstans, ladders and stanchions will be inspected for significant:

- Corrosion, wear, deterioration and deformation
- External evidence of leaks and structural damage
- Four-corner draft readings checked
- Firefighting equipment for serviceability
- Rescue skiffs, lifelines, work vests, life preservers and buoys for condition

If any deficiency is identified, an immediate determination will be made by the qualified person as to whether the deficiency constitutes a hazard or, though not yet a hazard, needs to be monitored in the monthly inspections. If the deficiency is determined to constitute a hazard, the vessel/flotation device will be removed from service until it has been corrected. If the qualified

person determines that, though not presently a hazard, the deficiency needs to be monitored, the employer will ensure that the deficiency is checked in the monthly inspections.

Quadrennial

Internal vessel/flotation device inspection

The internal portion of the barge, pontoons, vessel or other means of flotation used will be surveyed once every four years by a marine engineer, marine architect, licensed surveyor or other qualified person who has expertise with respect to vessels/flotation devices.

If any deficiency is identified, an immediate determination will be made by the surveyor as to whether the deficiency constitutes a hazard or, though not yet a hazard, needs to be monitored in the monthly or annual inspections, as appropriate. If the deficiency is determined to constitute a hazard, the vessel/flotation device will be removed from service until it has been corrected. If the surveyor determines that, though not presently a hazard, the deficiency needs to be monitored, the employer will ensure that the deficiency is checked in the monthly or annual inspections, as appropriate.

Documentation

The monthly and annual inspections required in this section (above) will be documented in accordance with OSHA 1926.1412 (e) (3) and 1926.1412(f)(7), respectively. The quadrennial inspection required in paragraph (h) (5) of this section will be documented in accordance with OSHA 1926.1412(f) (7), except that the documentation for that inspection will be retained for a minimum of four years.

11.10.3.8 Working with a Diver

The following additional requirements apply when working with a diver in the water:

- If a crane/derrick is used to get a diver into and out of the water, it will not be used for any other purpose until the diver is back on board. When used for more than one diver, it will not be used for any other purpose until all divers are back on board.
- The operator will remain at the controls of the crane/derrick at all times. In addition to the requirements in OSHA 1926.1419 through 1422 Signals, either:
  - A clear line of sight will be maintained between the operator and tender
  - The signals between the operator and tender will be transmitted electronically

- The means used to secure the crane/derrick to the vessel/flotation device will not allow any amount of shifting in any direction.
- The employer will ensure that the manufacturer's specifications and limitations with respect to environmental, operational and in-transit loads for the barge, pontoons, vessel or other means of flotation are not exceeded or violated

11.10.3.9 Load Charts

The manufacturer load charts applicable to operations on water will not be exceeded. When using these charts, the employer will comply with all parameters and limitations (such as dynamic/environmental parameters) applicable to the use of the charts. The load charts will take into consideration a minimum wind speed of 40 miles per hour. The requirements for maximum allowable list and maximum allowable trim as specified in Table M1 of this section will be met. Reference OSHA 1926.1437(m) (1) - (m) (4)

TABLE M1 – Maximum Allowable List and Trim

Rated Capacity	Maximum Allowable List	Maximum Allowable Trim
Equipment designed for marine use by permanent attachment (other than derricks):		
25 tons or less	5 degrees	5 degrees
Over 25 tons	7 degrees	7 degrees
Derricks designed for marine use by permanent attachment:	10 degrees	10degrees

The equipment will be stable under the conditions specified in Tables M2 and M3 of this section. Anything less than minimum freeboard list needs to be approved by an RPE.

TABLE M2: Equipment freeboard stability requirements

Operated at	Wind speed	Minimum freeboard
Rated capacity	60 mph	2 ft.

Rated capacity plus 25%	60 mph	1 ft.
High boom, no load	60 mph	2 ft.

TABLE M3 – Equipment freeboard stability requirements

Operated at	Wind speed
For backward stability of the boom: High boom, no load, full back list (least stable condition)	90 mph

If the equipment is employer-made, it will not be used unless the employer has documents demonstrating that the load charts and applicable parameters for use meet the requirements of this policy. Such documents will be signed by an RPE who is a qualified person with respect to the design of this type of equipment (including the means of flotation). The barge, pontoons, vessel or other means of flotation used will:

- Be structurally sufficient to withstand the static and dynamic loads of the crane/derrick when operating at the crane/derrick's maximum rated capacity with all anticipated deck loads and ballasted compartments
- Have a subdivided hull with one or more longitudinal watertight bulkheads for reducing the free surface effect
- Have access to void compartments to allow for inspection and pumping

The rated capacity of the equipment (load charts) applicable for use on land will be reduced to account for increased loading from list, trim, wave action and wind, be applicable to a specified location(s) on the specific barge, pontoons, vessel or other means of flotation that will be used, under the expected environmental conditions and ensure that the conditions required in this section are met.

The equipment manufacturer, or a qualified person who has expertise with respect to both land crane/derrick capacity and the stability of vessels/flotation device, will complete the rated capacity modification required in this section.

11.10.3.10 List and Trim

The maximum allowable list and the maximum allowable trim for the barge, pontoon, vessel or other means of flotation will not exceed the amount necessary to ensure that the conditions in Table M2 of this section are met. In addition, the maximum allowable list and the maximum allowable trim will not exceed the least of the following:

- Five degrees
- The amount specified by the crane/derrick manufacturer
- The amount specified by the qualified person, when an amount is not specified by the manufacturer

The maximum allowable list and the maximum allowable trim for the land crane/derrick will not exceed the amount specified by the crane/derrick manufacturer or, where an amount is not so specified, the amount specified by the qualified person.

The following conditions will be met:

- All deck surfaces of the barge, pontoons, vessel or other means of flotation used will be above water
- The entire bottom area of the barge, pontoons, vessel or other means of flotation used will be submerged

11.10.3.11 Physical Attachment, Corralling, Rails System and Centerline Cable System

The employer will meet the requirements in Option (1), Option (2), Option (3) or Option (4) of this section. Whichever option is used, the requirements of paragraph (11.57.12…4) must also be met.

Option (1)

Physical attachment

The crane/derrick will be physically attached to the barge, pontoons, vessel or other means of flotation. Methods of physical attachment include crossed-cable systems attached to the crane/derrick and vessel/flotation device (this type of system allows the crane/derrick to lift up slightly from the surface of the vessel/means of flotation), bolting or welding the crane/derrick to the vessel/flotation device, strapping the crane/derrick to the vessel/flotation device with chains or other methods of physical attachment.

Option (2)

Corralling

The crane/derrick will be prevented from shifting by installing barricade restraints (a corralling system). Corralling systems will not allow any amount of shifting in any direction by the equipment.

Option (3)

Rails

The crane/derrick will be mounted on a rail system to prevent shifting. Rail clamps and rail stops are required unless the system is designed to prevent movement during operation by other means.

Option (4)

Centerline cable system

The crane/derrick will be mounted to a wire rope system to prevent shifting. The wire rope system will meet the following requirements:

- The wire rope and attachments will be of sufficient size/strength to support the side load of crane/derrick
- The wire rope will be physically attached to the vessel/flotation device
- The wire rope will be attached to the crane/derrick by appropriate attachment methods (such as shackles or sheaves) on the undercarriage, which will allow the crew to secure the crane/derrick from movement during operation and to move the crane/derrick longitudinally along the vessel/flotation device for repositioning
- Means shall be installed to prevent the crane/derrick from passing the forward or aft end of the wire rope attachments
- The crane/derrick will be secured from movement during operation

The systems/means used to comply with Option (1), Option (2), Option (3) or Option (4) of this section will be designed by a marine engineer, an RPE familiar with floating crane/derrick design, or a qualified person familiar with floating crane/derrick design.

Exception: For mobile auxiliary cranes used on the deck of a floating crane/derrick, the requirement to use Option (1), Option (2), Option (3) or Option (4) of this section does not apply where the employer demonstrates implementation of a plan and procedures that meet the following requirements:

- A marine engineer or RPE familiar with floating crane/derrick design develops and signs a written plan for the use of the mobile auxiliary crane
- The plan will be designed so that the applicable requirements of this section are met despite the position, travel, operation and lack of physical attachment (or corralling, use of rails or cable system) of the mobile auxiliary crane
- The plan will specify the areas of the deck where the mobile auxiliary crane is permitted to be positioned, travel and operate and the parameters/limitations of such movements and operation.
- The deck will be marked to identify the permitted areas for positioning, travel and operation. The plan will specify the dynamic/environmental conditions that must be present for use of the plan.

If the dynamic/environmental conditions are exceeded, the mobile auxiliary crane will be physically attached or corralled in accordance with Option (1), Option (2) or Option (4) of this section.

The barge, pontoons, vessel or other means of flotation used will:

- Be structurally sufficient to withstand the static and dynamic loads of the crane/derrick when operating at the crane/derrick's maximum rated capacity with all anticipated deck loads and ballasted compartments
- Have a subdivided hull with one or more longitudinal watertight bulkheads for reducing the free surface effect
- Have access to void compartments to allow for inspection and pumping

11.10.4 Overhead & Gantry Cranes

Permanently Installed Overhead and Gantry Cranes

This paragraph applies to the following equipment when used in construction and permanently installed in a facility: overhead and gantry cranes, including semi gantry, cantilever gantry, wall cranes, storage bridge cranes, and others having the same fundamental characteristics.

The requirements of OSHA 1910.179, except for OSHA 1910.179(b) (1), apply to the equipment identified in paragraph above of this section.

Overhead and Gantry Cranes that are Not Permanently Installed in a Facility

This section applies to the following equipment when used in construction and not permanently installed in a facility: overhead and gantry cranes, overhead/bridge cranes, semi gantry, cantilever gantry, wall cranes, storage bridge cranes, launching gantry cranes and similar equipment, irrespective of whether it travels on tracks, wheels, or other means.

The following requirements apply to equipment identified in the paragraph directly above in this section:

- OSHA 1926.1400 through 1414; OSHA 1926.1417 through 1425; OSHA 1926.1426(d), OSHA 1926.1427 through 1434; OSHA 1926.1437, OSHA 1926.1439, and OSHA 1926.1441
- The following portions of OSHA 1910.179:
- Paragraphs (b)(5),(6),(7); (e)(1),(3),(5),(6); (f)(1),(4); (g); (h)(1),(3); (k); and (n) of OSHA 1910.179
- The definitions in OSHA 1910.179 (a) except for “hoist” and “load.” For those words, the definitions in OSHA 1926.1401 apply
- OSHA 1910.179 (b)(2) applies only to equipment identified in paragraph (b)(1) of this section manufactured before September 19, 2001
- For equipment manufactured on or after September 19, 2001, the following sections of ASME B.30.2–2011 apply: 2-1.3.1; 2-1.3.2; 2-1.4.1; 2-1.6; 2-1.7.2; 2-1.8.2; 2-1.9.1; 2-1.9.2; 2-1.11; 2-1.12.2; 2-1.13.7; 2-1.14.2; 2-1.14.3; 2-1.14.5; 2-1.15.; 2-2.2.2; 2-3.2.1.1. In addition, 2-3.5 applies, except in 2-3.5.1 (b), “29CFR 1910.147” is substituted for “ANSI Z244.1”

11.10.5 Regional/Project-Specific Requirements

Enter project-specific requirements

11.11 Program Management

11.11.1 Crane Management System

The regional crane coordinator (RCC) is responsible for reporting and tracking through Skanska's database (Intelex). The database will include all information related to each crane currently on a Skanska USA project. It will include size, capacity, make, model, location, status of inspections, certification number, historical maintenance data and all other applicable information related to each crane. This database will alert the RCC to upcoming expiring monthly, annual and periodic inspections. The RCC will then schedule those inspections with the project crane coordinator (PCC) on each project. If at any time a PCC is not available on a jobsite and an action needs to take place, the following hierarchy of authority governs:

- Superintendent
- Project manager
- Project executive

If a PCC is removed from the jobsite, there will be a transition period of one month while a new PCC is selected and trained.

11.11.2 Regional- and Project-Specific Requirement Approvals and Storage

Each region and project may require amendments to this minimum policy for a specific owner and/or regional variations. Regional and project-specific requirements need to be supplied to and approved by the EHS and Equipment Departments.

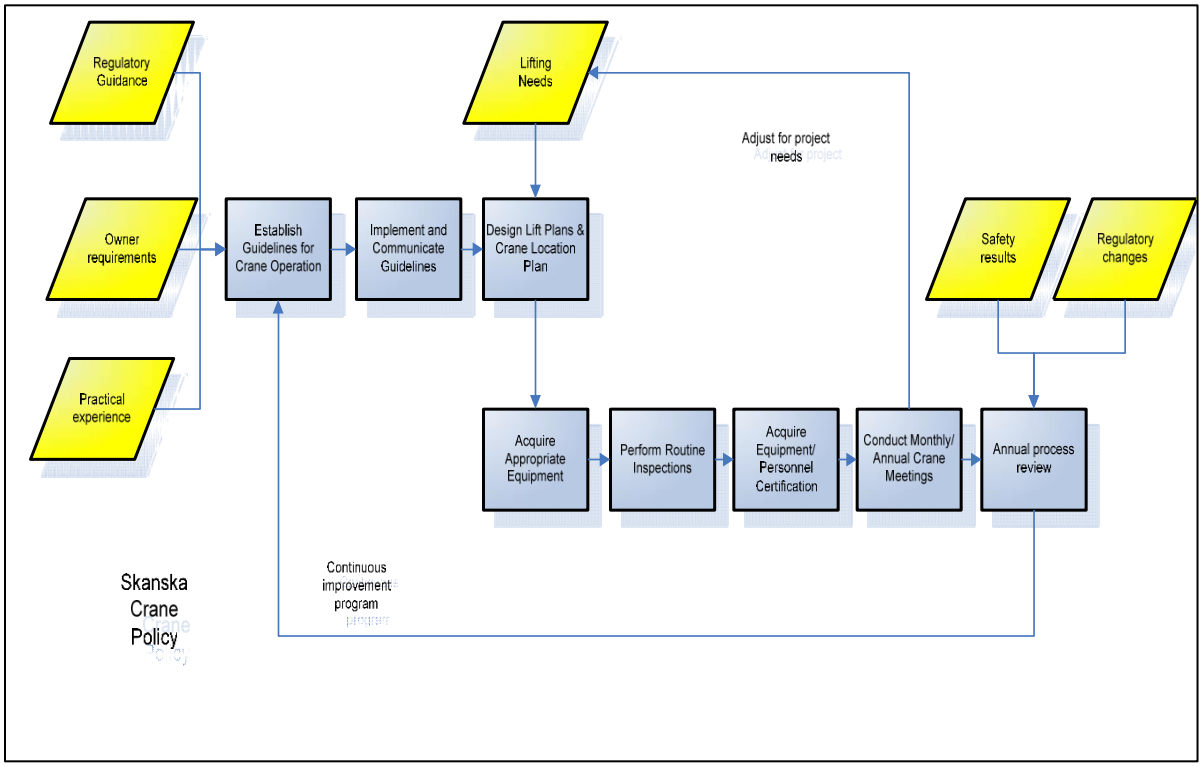
Enter project-specific requirements

11.11.3 Document Storage

Monthly and periodic inspections will be stored in multiple locations. Hard copies of the most recent inspection must be stored in the crane and in the equipment file. These documents will be available upon request at the site of operation.

11.11.4 Program Evaluation and Improvement

The Skanska Crane Policy will be evaluated and revised routinely in conjunction with Skanska's EHS manual.



Demolition

Objective

The purpose of this program is to establish project-specific guidelines to ensure the highest level of safety during demolition operations.

Legal and Other Requirements

OSHA 29 CFR 1926.850
NFPA 241

Federal, State, Local Regulations

- Provide Proper Notification of Asbestos Abatement to the State of NY prior to abatement/demo.

Skanska/Client Requirements

- Construction work plans, engineering survey, utility identification, hazardous chemical location report and drawings, demolition plan, competent person certification and training, demolition inspections by competent person.

Procedure

Demolition plan

- Prior to demolition activities, a hazardous material survey must be accomplished to identify all hazardous materials (e.g. asbestos, lead, PCB's mercury, etc.)
- Before starting any demolition activities, each job must develop a project-specific demolition plan
- The demolition plan must indicate the phases of work by method. Risk assessment is a critical component when selecting the final method
- The plan should include (if they are applicable):
  - Engineering survey report
  - Hazardous materials survey
  - Abatement plans for each hazardous material
  - Demolition method plan
  - Utility protection plan
  - Shoring or bracing plan
  - Fall protection plan
  - Worker access plan
  - Maintenance of Traffic (MOT) plans
  - Dust control plan
  - Waste/debris disposal plan
  - Pest and rodent control (vector control)
  - Noise and vibration assessment based on demolition means and methods
  - Permits
- Enter project-specific procedure

Engineering survey

- Prior to demolition operations, an engineering survey report will be made, by a competent person, of the structure per OSHA 29 CFR 1926.850, Subpart T, Demolition
- The completed engineering survey report form must be kept onsite during all operations

Enter project-specific procedure

Hazardous materials survey and abatement plan

- Prior to the disturbance/removal of any identified or suspect hazardous materials, take the necessary precautions to ensure worker and community safety
- Enter project-specific procedure

Utility protection plan

- All known or suspected utilities must be clearly identified (using Call Before you Dig or other utility locate service) and marked before demolition work begins
- The demolition plan must list each known or suspected utility and indicate the following:
  - Is the utility scheduled to remain or will it be removed before demolition begins?
  - If the utility remains, is protection required including any bracing or shoring?
  - Project management must decide if demolition work can safely proceed if high-risk utilities are suspected in the demolition area
  - Testing and purging of pipes, tanks, or other equipment containing hazardous, flammable, or explosive substances must be considered and highlighted in the demolition plan

Shoring or bracing plan

- The demolition plan must identify the structures impacted by demolition, including internal walls, flooring or bracing and external structures, particularly party walls that may rely on or be impacted by the demolished structures
- Enter project-specific procedure

Dust control plan

- The demolition plan must state if permitting requires dust control, the type of dust suppressant used (i.e., water, chemical or both), the source (i.e., fire hydrant, ponded water, or tanker) and what equipment is needed to spray the water (i.e., type of pump, length of hose, nozzles, etc.)
- Enter project-specific procedure

Disposal plan

- The demolition plan must list the type of debris requiring disposal and must state where each waste is being disposed and how it will be removed from the structure
- Manifests must be filled out anytime a truck leaves the site for disposal of debris.

Pest and rodent control plan

- The demolition plan must state if permitting requires a pest and rodent control plan and the procedures that will be taken
- Enter project-specific procedure

Noise and vibration assessment

- The demolition plan must assess noise and vibration impacts and appropriate controls
- Enter project-specific procedure

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Develop and maintain a project-specific demolition plan	Project team	Demolition plan
Review and approve the project-specific demolition plan	Project team/Engineer	Demolition plan
Required inspections	Superintendent/EHS Manager	Enter project specific document/Records/Performance indicators
Identify all hazardous materials (i.e., lead, asbestos, mercury, PCBs, etc.)	EHS Manager/ PB	Hazardous materials survey Waste manifests
Develop and maintain solid waste management plan	Enter project-specific roles and responsibilities	Vendor recycling reports
Ensure all permits and legal requirements are in place	Enter project-specific roles and responsibilities	Enter project specific document/Records/Performance indicators
Identify all utilities affected	Superintendent	As-builts/contract drawings

by scope of demolition		
Identify PPE and monitoring requirements	EHS Manager	Occupational monitoring results Respiratory program data
Enter project-specific information here	Enter project-specific roles and responsibilities	Enter project specific document/Records/Performance indicators

Applicable Training

- Respiratory training
- Specific hazardous material training
- Enter project-specific training

Potential Related Safety, Health and/or Environmental Aspects

Occupational exposures

Noise generating activities

Solid Waste Removal/Recycling

Dropped Object Protection

Objective

This plan establishes the guidelines to prevent tools and materials from falling from elevation and causing harm to workers, members of the public, and damage to tools and material.

Legal and Other Requirements

Federal, State, Local Regulations

- Enter project-specific regulations

Skanska/Client Requirements

Enter project-specific requirements

Procedure

General Requirements

- Those working above others will protect personnel below through an active plan that may include the use of tool lanyards, debris netting, and/or barricades
- Workers will communicate to any affected personnel of overhead hazards associated with their work tasks

Enter project-specific procedure

Tool and Material Storage

- Equipment or materials stored inside a building under construction will not be placed within six feet of any hoist way or inside floor openings, nor within 10 feet of an exterior wall that does not extend above the top of the material stored
- Materials will not be stacked above or against the guardrails
- All tools, equipment and materials used throughout the course of a shift that may pose a hazard of falling from an overhead work area (aerial lifts, scaffolds, permanent platforms, etc.) will be removed and properly stored whenever feasible and at the end of shift
- Communications devices, such as two-way radios, cell phones, etc., will be secured to prevent from dropping to a lower elevation
- All materials, equipment, and tools that are not in use while aloft will be secured against accidental displacement

  Enter project-specific procedure

The plan may include provisions for:

- Canvas bags (bolt bags)
- Barricades
- Safety watches
- Scaffolding
- Canopies
- Grating
- Rope and well wheels

- Hot work
- Tool lanyards
- Debris netting
- Hidden material
- Enter project-specific procedure

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Required inspections	EHS Professional, trade foreman and/or superitnedent.	General worksite Safety inspections.
Dropped object plan training	EHS Department	Training Records

Applicable Training

- Project-specific dropped object plan training

Enter project-specific training

Potential Related Safety, Health and/or Environmental Aspects

Enter project-specific potential health and/or environmental impacts

Electrical

Objective

The purpose of this program is to protect against the hazards associated with electricity. Our safeguards against electrical hazards will include a quarterly inspection program, lockout/tagout (LOTO) procedures, and general requirements for work involving any type of electricity or electric tool.

Legal and Other Requirements

Federal, State, Local Regulations

- OSHA 29 CFR 1926 Subpart K

- OSHA 29 CFR 1926 Subpart V
- NFPA 70 and 70E
- NEC
- Enter project-specific regulations

Skanska/Client Requirements

- Use Control of Hazardous Energies forms to verify LOTO procedures.

Procedure

General Requirements

- All cord sets will be elevated above the work surface when practical
- Wire, nails, or other conductive material will not be used to hang or attach cord sets or welding leads
- Cord sets that cross roadways will be protected from damage by vehicle and equipment traffic by devices such as hose bridges
- Nationally Recognized Testing Laboratories (NRTL) approved (e.g. UL) covers are required on all panels, load centers, pull boxes, etc. prior to energizing. Necessary steps will be taken to prevent unauthorized or unqualified workers access to energized electrical parts or equipment
- No work will be performed on any energized electrical circuit, busbars, equipment, or panels unless an approved written work plan is developed in accordance with Chapter 1 of NFPA 70E and submitted to Skanska for review prior to performance of work
- Electrical equipment and tools used on this project will be inspected by a competent person to prevent any worker from receiving an accidental electrical shock. This rule will apply to all cord sets, portable electrical equipment, tools and appliances not part of any permanent building or structural electrical systems.
- All temporary cords will be three wire, 16 gauge or heavier, with a hard or extra-hard duty rating
    - Electrical tape cannot be used to repair electrical cords.
    - Any repair must be accomplished by a designated competent person and be done in accordance with manufacturer's specifications
    - Daily visual inspections of all cords must be completed
- Once permanent power is energized all exposed live conductors must be covered (e.g., outlet covers)

- Enter project-specific procedure

Assured Grounding

- All portable electric tools, drop cords, extension cords, and similar items will be visually inspected before being put to use at the start of each shift
- Any items showing signs of possible damage will not be used until repaired as indicated and tested
- All portable electric tools, extension and drop cords, fixed temporary wiring and receptacles will be tested quarterly for continuity of the conductors and for the connection to the exposed frame in the case of tools
- All cord fittings and receptacles will be tested to make certain the conductors are connected to the proper terminals
- Any items inspected and tested during the periods listed below shall be marked with tape in the color assigned to that period as follows

Time Period	Color
January, February, March	White
April, May, June	Green
July, August, September	Red
October, November, December	Orange

- Color coded electrical tape at the male end of the cord shall be used to mark each item after it passes the above tests/inspections
- Placing a piece of the appropriate colored tape on the cover of the receptacle box will mark fixed temporary wiring
- Other items will be marked in a similar manner with the color-coded tape being attached in the manner and location that provides maximum protection
- Enter project-specific procedure

Ground Fault Circuit Interrupters (GFCI)

- All cord sets and cord-plug electrical equipment, tools or appliances that are 120 volts will be connected to a GFCI. Office equipment and appliances in site offices do not require GFCI devices.

- Each worker, after plugging in his/her tool and/or extension cord, will test and reset the GFCI device being used to ensure it is working properly with each use. If the GFCI device is not functioning properly they will repeat the process until a properly working GFCI device is found. They will report the defective GFCI device to their supervisor.
- Enter project-specific procedure

Double-Insulated Tools

- All tools must have a grounding conductor or be double-insulated
- Tools where this label has been removed, painted over, or is otherwise not readable must be removed from service
- Enter project-specific procedure

Electrical Systems

- Electrical systems will be inspected and maintained on a regular basis
- All equipment will have positive indication of "ON" (energized) and "OFF" (de-energized) clearly labeled on the device/equipment
- Electrical equipment will not be opened, adjusted, repaired, or otherwise handled until it is de-energized and locked-out according to the lockout program
- De-energized equipment will be tested before performing any work on the equipment
- If live electrical work is required during commissioning, troubleshooting and/or maintenance, work must be performed under an energized electrical permit and the requirements of NFPA 70E
- All metal panels, boxes, covers, conduit, etc., that are part of the electrical system will be grounded
- All electrical equipment exposed to flammable gases or vapors, combustible dust, or ignitable fibers must be explosion-proof
- Circuit breakers will be labeled to show what they control
- All circuit breaker panels will be labeled to show what voltage, phase, and feeder source they contain and will be marked in accordance with ANSI standards and National Electric Code (NEC)
- Panel covers will be kept in place whenever the panel is energized
- All cables exiting metal panels or boxes will be secured with stress relieving clamps
- Waterproof clamps will be used as necessary

- All splices and repairs will be made inside an approved box or sealed with epoxy or vulcanizing kits; tape alone is not acceptable
- All panels will be equipped with a lockable door so that power can be turned off and locked out for repairs. Adequate space is needed to open the door at least 90 degrees
- Clearance will be according to the table below:

Nominal voltage to ground	Minimum clear distance for conditions[1]		
	(A)	(B)	(C)
	Feet[2]	Feet[2]	Feet[2]
0-15	3	3	3
151-600	3	3 1/2	4

[1]Conditions (A), (B), (C) are as follows: (A) Exposed live parts on one side and no live or grounded parts on the other side of the working space, or exposed live parts on both sides effectively guarded by insulating material. Insulated wire or insulated busbars operating at no more than 300 volts are note considered live parts. (B) Exposed live parts on one side and grounded parts on the other side. (C) Exposed live parts on both sides of the workplace [not guarded as provided in condition (A)] with the operator between.

[2]For all international systems of unites (SI): one foot = 0.3048 meters

- Enter project-specific procedure

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Develop and maintain a project-specific temporary electrical plan	Superintendent/Engineer/EHS Manager	Sub-contractor electrical plans/drawings
Required inspections	EHS Manager	Tool inspections

Ensure electrical systems, tools, cords and lights meet the requirements of this program	Superintendent/EHS Manager	Compliance audits
Implement the Assured Grounding Program	Enter project-specific roles and responsibilities	Compliance audits and findings Quarterly inspections
Ensure that ground fault circuit interrupters (GFCIs) are used	Enter project-specific roles and responsibilities	Compliance audits and findings
Develop and submit energized electrical work plan, as necessary	Electrical subcontractor	Energized electrical work plan
Designate LOTO administrator	TBD	Enter project specific document/Records/Performance indicators
Enter project-specific information here	Enter project-specific roles and responsibilities	Enter project specific document/Records/Performance indicators

Applicable Training

- General Awareness electrical safety
- Competent Person electrical safety

Potential Related Safety, Health and/or Environmental Aspects

Failure to comply with the requirements of this program can result in potential electrical shock and or power outages.

Excavation and Trenching

Objective

The purpose of this program is to protect against the hazards associated with trenching and excavation operations.

Legal and Other Requirements

Federal, State, Local Regulations

- OSHA 29 CFR 1926.650
- OSHA 29 CFR 1926.651
- OSHA 29 CFR 1926.652
- OSHA Technical Manual (OTM) Section V: Chapter 2
- Enter project-specific regulations

Skanska/Client Requirements

- One Call must be called prior to any ground instrusive work. A dig permit must also be completed with all appropriate signatures prior to work.

Procedure

General Requirements

- A competent person must supervise all trenching and excavations and be onsite at all times during trenching and excavation operations
- All surface encumbrances such as signs, poles, and foundations that create a hazard will be removed or supported to safeguard employees
- Review drawings; contact “one call” or other entities to determine which utilities are expected to be encountered during excavation work
- If any damage occurs to any line, work will be terminated and the utility owner will be contacted
- Work may only proceed after the utility company gives authorization
- When approaching the estimated location of the underground installation, hand digging or alternative safe method will be used

- While the excavation is open, underground installations will be protected, supported, or removed as necessary to safeguard employees and the utility
- A stairway, ladder, or ramp will be provided in all trench excavations four feet or more in depth. Employees must not have to travel more than 25 feet to obtain access.
- If a ramp is selected, the employee must be able to exit the excavation in an upright posture without having to scale the slope
- If structural ramps are used by employees, the competent person must design the ramp, or, if for vehicle use, the competent person must be qualified in structural design
- All structural members of ramps and runways will be of uniform thickness
- Employees will not be under any loads handled by equipment
- Employees will be required to stand away from any vehicle being loaded or unloaded to avoid being struck by spillage or falling materials
- Where oxygen deficiency (atmospheres containing less than 19.5 percent oxygen) or a hazardous atmosphere exists or could reasonably be expected to exist, such as in excavations in landfill areas or areas where hazardous substances are stored nearby, the atmospheres in the excavation will be tested before employees enter excavations greater than four feet in depth
- A ventilation system will be utilized and monitored by the competent person if hazardous atmospheres are encountered
- Emergency rescue equipment will be available where hazardous atmospheric conditions exist or may reasonably be expected to develop
- Employees will not work in excavations in which there is accumulated water or in excavations in which water is accumulating
- Employees may re-enter the excavation after the water has been removed and the excavation is inspected and approved by a competent person
- All adjacent structures such as buildings, sidewalks, pavement, etc. will be shored, braced or underpinned as required
- Excavations below footings or foundations are not permitted unless an appropriate shoring system designed by a professional engineer is applied
- All excavations will be scaled to remove loose material that could pose a hazard by falling or rolling into the excavation
- All spoil piles will be kept in a minimum of two feet from the edge of the excavation, or by the use of a sufficient retaining device or by both

- The competent person will inspect all excavations daily and when conditions of the excavation have changed, in accordance with Skanska's trenching and excavation checklist
- No employee will be allowed to work in any excavation that the competent person deems unsafe
- Walkways over excavations will have proper guardrails
- Adequate barriers will be provided around the perimeter of all excavations
- Enter project-specific procedure

Soil

- All soil will be considered Type C until otherwise determined by a competent person
- The classification of the deposits will be made on the results of at least one visual and one manual analysis
- A visual test must be performed and include observing the soil during excavation specifically looking for cohesiveness, cracks, layered systems, surface water, vibration, other existing underground structures, etc., which can affect the stability of the excavation

One of the following tests will be performed along with the visual test:

- Plasticity – mold a moist or wet sample of soil into a ball and attempt to roll it into threads as thin as 1/8-inch in diameter. Cohesive material can be successfully rolled into threads without crumbling. For example, if at least a two-inch length of 1/8-inch thread can be held on one end without tearing, the soil is cohesive
- Dry Strength – if the soil is dry and crumbles on its own or with moderate pressure into individual grains of fine powder, it is granular. If the soil is dry and falls into clumps that break up into smaller clumps, but the smaller clumps can only be broken up with difficulty, it may be clay in any combination with gravel, sand or silt. If the dry soil breaks into clumps that do not break up into smaller clumps and can only be broken with difficulty and there is no visual indication the soil is fissured, the soil may be considered un-fissured
- Thumb penetration – the thumb penetration test can be used to estimate the unconfined compressive strength of 1.5 tons per square foot (tsf), which can be readily indented by the thumb. However, they can be penetrated by the thumb only with very great effort. Type C soils with an unconfined compressive strength of 0.5 tsf can be easily penetrated several inches by the thumb and can be molded by light finger pressure. This test should

be conducted on an undisturbed soil sample, such as a large clump of soil, as soon as practicable after excavation to keep to a minimum the effects of exposure to drying influences

- Pocket penetrometer – this device will provide the compressive strengths of soils
- After performing a visual and manual test you can then determine the soil classification including:
  - Stable rock – natural solid mineral matter that can be excavated with vertical sides remaining intact while exposed
  - Type A – cohesive soil with an unconfined compressive strength of 1.5 tons per square foot (tsf) or greater. This soil is highly cohesive and generally contains significant clay content or is a cemented soil
  - Type B – cohesive soil with an unconfined compressive strength greater than 0.5 tsf, but less than 1.5 tsf. This soil is less cohesive than Type A and can include certain angular gravel as well as previously disturbed soils that are well compacted
  - Type C – cohesive soil with an unconfined compressive strength of 0.5 tsf or less. This soil is the least stable, having little or no cohesive properties and includes most granular soil
- Enter project-specific procedure

Protective Systems

- All employees will be protected while working in an excavation by the use of a protective system unless deemed unnecessary by a competent person or engineer
- At a minimum, trenches five feet or greater must have a protective system or be properly sloped or benched in accordance with the table below
- Trenches less than five feet in depth may require protective systems, sloping, or benching depending on soil conditions and/or activities
- All protective systems will either be designed by a registered professional engineer or will be a commercially available system used per manufacturer's instructions
- Sloped or benched trenches and excavations will be consistent with the following table:

Maximum Allowable Slopes		
Stable Rock	Vertical	90 Degrees

Type A	¾ h : 1 v	53 Degrees
Type B	1 h : 1 v	45 Degrees
Type C	1 ½ h : 1 v	34 Degrees

Timber Shoring and Aluminum Shoring

- When using timber or aluminum shoring, it will be built in accordance with specifications and manufacturer's recommendations. Any deviation will only be allowed with the manufacturer's approval
- All manufacturer's data must be kept at the jobsite during construction
- Enter project-specific procedure

Designs by a Registered Professional Engineer

- Designs will be in written form and include sizes, types and configurations of the materials to be used
- The design must be properly stamped and at least one copy kept at the jobsite during construction
- Enter project-specific procedure

Materials and Equipment

- Material used for the protective systems must be free from damage that may impair their function
- Manufactured material will be used per their recommendations
- The competent person will examine material that has been damaged and evaluate if it can be used. If not sure, a professional engineer must be utilized

Installation and Removal of Support Systems

- Members of support systems will be securely connected together to prevent sliding, falling, kick-outs or other predictable failure
- Support systems will be installed and removed in a manner that protects employees

- Individual members of support systems will not be subjected to loads exceeding what they were designed to withstand
- Before temporary removal of individual members begins, additional precautions will be taken to ensure the safety of employees, such as installing other structural members to carry the loads imposed on the support system
- Removal will begin at, and progress from, the bottom of the excavation
- Backfilling will progress together with the removal of support systems from excavations
- Do not excavate more than two feet below the bottom member of a support system unless it is so designed
- Enter project-specific procedure

Shield System/Trench Box

- Shield systems will not be subjected to loads exceeding those that the system was designed to withstand
- Shields will be installed in a manner to restrict lateral or other hazardous movement of the shield in the event of the application of sudden lateral loads
- Employees will be protected from the hazard of cave-ins when entering or exiting the areas protected by shields
- Employees will not be allowed in shields when shields are being installed, removed or moved vertically
- Do not excavate more than two feet below the bottom of a shield unless it is so designed
- The manufacturer's data sheet for all trench boxes will be kept onsite during their use. Enter project-specific procedure

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Required inspections	EHS Manager	Compliance Audits
Verify utility locations	Superintendent	As-built drawings Utility strikes
Ensure protection systems engineered data is available	Engineer	Engineered design data
Ensure dewatering equipment is available	Superintendent	Enter project specific Document/Records/Performance

		Indicators
Soil classification	Competent person	Soil Classification documentation reports
Conduct atmospheric monitoring	Competent person	Air monitoring data Calibration records
Installation of positive perimeter protection	Superintendent	Compliance audits and findings Engineered design data
Enter project-specific information here	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance Indicators

Applicable Training

- General Awarenss Trenching and Shoring
- Competent Person Trenching and Shoring

Potential Related Safety, Health and/or Environmental Aspects

Trenching and excavation, dewatering.

Fall Prevention and Protection

Objective

The purpose of this program is to develop, implement, enforce, and maintain 100 percent continuous fall protection for employees that are exposed to potential fall hazards, based on risk assessment.

Legal and Other Requirements

Federal, State, Local Regulations

- OSHA 29 CFR 1926.500
- OSHA 29 CFR 1926.501
- OSHA 29 CFR 1926.502
- OSHA 29 CFR 1926.503

Skanska/Client Requirements

- SWJV will enforce fall protection at 6 feet and greater to a lower level. There will be times when SWJV enforces fall protection or perimeter protection when there is an exposure of less the 6 feet. SWJV will look at the risk and not the rule.

Procedure

All employees will be 100 percent protected while working six feet or higher off the ground or when hazards below six feet dictate enforcement at a lesser height. This policy will apply to all trades, even when OSHA allows for exceptions. In the event where local statutes require fall protection at less than six feet the more stringent standard will apply, (e.g., WA State requirements begin at four feet).

Guardrail systems

- Standard rail will consist of:
  - Top rail – 42 inches, plus or minus three (3) inches. When wire rope is selected it will be at least one-quarter inch diameter and will be flagged at six (6) foot intervals with high visibility material such as “Caution” ribbon or equivalent

  - Mid-rails – must be installed half way between top edge of guardrail and the walking/working surface
- Toe-board – must be minimum one of three-and-a-half inches
- A maximum allowable deflection in the system will not exceed three (3) inches
- When pipe railings are used, posts, top rails and intermediate railings will be at least one and a half inches nominal diameter (schedule 40 pipe) with posts spaced not more than eight (8) feet apart on center
- When structural steel railings are utilized, posts, top rails and intermediate rails will be at least two (2) inches x two (2) inches x three-eighths inch angles, with posts spaced not more than 8 feet apart on center
- Guardrail systems will be capable of withstanding, without failure, a force of at least 200 pounds for the top rail, and 150 pounds for the mid-rail, applied within two (2) inches of the top edge, in any outward or downward direction, at any point along the top edge
- Guardrail systems will be surfaced to prevent injury to an employee from punctures or lacerations and to prevent snagging of clothing
- Duplex nails are not allowed in the construction of guardrails
- When guardrail systems are used at access ways and hoisting areas, a chain, gate or removable guardrail section will be installed
- When guardrail systems are used around holes that are used as points of access (such as ladder ways), they will be provided with a gate, or be offset so that a person cannot walk directly into the hole
- Guardrail systems used on ramps and runways will be erected along each unprotected side or edge
- When guardrail systems are used around holes used for the passage of materials, the hole will have not more than two sides provided with removable guardrail sections to allow the passage of materials. When the hole is not in use, it will be closed over with a cover, or a guardrail system will be provided along all unprotected sides or edges.
- When guardrail systems are used at holes, they will be erected on all unprotected sides or edges of the hole
- If a component of guardrail system must be removed, the competent person must complete a Skanska Guardrail Removal Permit. The competent person is responsible for immediately replacing and restoring the protective system upon completion of the task.

Safety Nets

- Safety nets will never be relied upon as a sole form of fall protection
- Nets are designed to provide fall arrest under or around an elevated surface such as a bridge or steel structure
- The following criteria must be met when using nets:
  - Place nets as close to the work as possible, and not more than 30 feet below the work surface
  - Install nets so an item's weight does not come into contact with any lower surface when dropped
  - Extend the net outward from the outermost projection of the work surface as follows:

Distance Below Work Surface	Projection Distance
Up to 5 feet	8 feet
5 to 10 feet	10 feet
Over 10 feet	13 feet

- Mesh openings will not exceed six (6) feet by six (6) feet
- All scrap material that may have fallen into the net will be removed as soon as possible to help ensure a fallen employee's protection
- Nets will be drop-tested, using a 400 pound bag of sand dropped from 42 inches above the highest working surface that employees would be exposed to a fall, on the following occasions:
  - Immediately after installation
  - Prior to beginning work in the area
  - After relocation
  - Following any repairs
  - At six month intervals if left in one place
- A copy of the test results will be maintained at the jobsite
- If it is unreasonable to perform a test drop, a competent person may certify its compliance with the standards
- The compliance certificate must include the identification of the net and its installation, date it achieved compliance and the signature of the competent person. This certification must be located at the jobsite.

- All defective nets will be immediately removed from service
- A border rope for webbing capable of withstanding a minimum breaking strength of 5,000 pounds must be used
- Connections will be as strong as the integral net components and not spaced greater than six inches apart
- All nets will be inspected on a weekly basis for wear, damage or other deterioration, and after any occurrence that could affect the integrity of the net

Warning Line System

- When a guardrail system is not feasible, a warning line system can be used for working on elevated slabs or roof with approval from the Skanska EHS Director and Project Executive
- Warning lines should be set up around the work and be a minimum of fifteen (15) feet back from any unprotected or leading edge
- Lines should be 36 inches high and flagged every six feet to ensure visibility. They should withstand a minimal side load to avoid tipping over
- Signage must be posted in the area notifying of the unprotected edge
- Access will be a path formed by two warning lines leading to the work area
- Enter project-specific procedure

Safety Monitoring System

- A safety monitor system is not approved at any Skanska project.

Covers

- All holes two inches or greater in the least dimension in a floor, roof, or other walking/working surface must be covered
- Covers will be placed and labeled “Hole” or “Hole Cover” on holes in walking/working or road surfaces that present fall hazards and will be secured by nails or a chocking device
- Covers will be capable of supporting, without failure, at least twice the maximum weight of employees, materials and equipment

- Holes in roadways will be capable of supporting, without failure, at least twice the maximum axle load of the largest vehicle expected to cross over the cover based on an engineered design

Personal Fall Arrest Systems

General Requirements

- All personal fall arrest equipment will be inspected prior to use
- Any damaged, defective, or worn equipment must be removed from service
- Personal fall arrest systems and components subjected to impact loading will be immediately removed from service
- The project must provide prompt rescue of employees in the event of a fall or will ensure that employees are able to rescue themselves

Full Body Harness/Self-Retracting Lifelines or "Connectors"

- Approved full body harnesses are to be used when a personal fall arrest system must be used. The only exception is for lineman performing power transmission work (refer to OSHA 1926.959 for specific requirements).
- All connectors must be self-retracting lifelines with a locking snap hook that has a gate rated for 3,600 pounds.
- Self-retracting lifelines will be inspected prior to use by the user
- Decelerating lanyards will not be permitted
- The anchorage point must be able to withstand a minimum load of 5,000 pounds
- The anchorage point should ideally be located above the user's head in order to prevent "swing" type falls
- The D-ring of the body harness will be located in the center of the wearer's back

Horizontal/Vertical Lifelines

- Lifelines will be designed, installed, and used under the supervision of a qualified person and maintain a safety factor of at least two
- Lifeline systems will be engineered either by the manufacturer or a qualified engineer prior to use and should consider at a minimum:

  - The number of personnel tied to the lifeline
  - The size of wire rope to be used. It will be a minimum seven inches (7) by 19 and three-eighths inch galvanized aircraft cable. One shock absorber must be connected from the anchorage point (stanchion) to the wire rope. This must provide adequate protection for two people using self-retracting lifelines (deceleration) devices
  - Distance between anchorage points (slack)
  - Obstructions, permanent material, etc., which may cause injury should a person fall
- Synthetic rope may only be used for vertical applications (unless an engineered system is approved for horizontal use).
- Synthetic rope should be stored to protect against exposures to UV rays, extreme weather, and abrasion activities. Certain types of work may also degrade the integrity of synthetic rope systems (e.g. hot work)
- Ladder climbing safety devices and rope grabs that require hand manipulation are unacceptable
  - Where a self-retracting lanyard is incorporated in the system, the device must always be located overhead to limit fall distance

Positioning Devices

- At no time will a positioning device be used without fall protection via full-body harness, lanyard, and anchorage point
- Positioning devices will be rigged such that an employee cannot free fall more than two (2) feet
- Positioning devices will be secured to an anchorage capable of supporting at least twice the potential impact load of an employee's fall or 3,000 pounds (13.3 kN), whichever is greater
- Connectors will be drop forged, pressed or formed steel or made of equivalent materials

<u>Fall Protection Plan</u>

The fall protection work plan shall:

- Identify all fall hazards in the work area
- Describe the method of fall arrest or fall restraint to be provided

- Describe the proper procedures for the assembly, maintenance, inspection, and disassembly of the fall protection system to be used
- Describe the proper procedures for the handling, storage, and securing of tools and materials
- Describe the method of providing overhead protection for workers who may be in, or pass through, the area below the work site
- Describe the method for prompt, safe removal of injured workers
- Be available on the job site for inspection by the department.
- Enter project-specific procedure

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Prepare and implement fall protection plan	Superintendent	Enter project specific document/Records/Performance indicators
Provide appropriate fall protection equipment	Superintendent	Enter project specific document/Records/Performance indicators
Inspect fall protection equipment	User/Competent Person	Inspection records
Engineering data for fall protection systems	Superintendent	Engineering data

Applicable Training

General awareness for fall protection will be provided during our sitewide orientation to all new hires. There will be a designated competent person in each crew for fall protection.

Potential Related Safety, Health and/or Environmental Aspects

Steel erection, excavations and aerial lifts will relate to the fall protection aspect.

Fire Prevention and Protection

Objective

The purpose of this program is to establish procedures for jobsite fire protection and prevention measures. Skanska will take all necessary measures to protect employees from fire hazards and the hazards associated with flammable liquid storage, temporary heating devices, liquid propane (LP) gas, and propane.

Legal and Other Requirements

Federal, State, Local Regulations

- OSHA 29 CFR 1926.150
- OSHA 29 CFR 1926.151
- OSHA 29 CFR 1926.152
- OSHA 29 CFR 1926.153
- OSHA 29 CFR 1926.154
- OSHA 29 CFR 1926.155
- Standard methods of Fire Tests of Building Construction and Materials, NFPA 251-1995

Skanska/Client Requirements

- The Port Authority of NY/NJ requires the contractor to maintain the provisions under the FDNY Fire Safety Manager Fire Code.
- The Port Authority of NY/NJ requires the contractor to file a hotwork permit and keep in the field in close proximity to the operation.
- SWJV requires a daily hot work permit be filled out prior to hot work commencing.

Procedure

Fire Extinguishers

- All fire extinguishers will be ABC cartridge-type, except for the two and a half point extinguishers kept in project vehicles such as pick-up trucks which will be type BC

- Extinguishers will be inspected monthly for damage, leakage, discharge, and block accessibility; metal tags or equivalent will be used to signify proof of inspection
- At least one portable fire extinguisher will be located not less than 25 feet, nor more than 75 feet, from any flammable liquid storage area located outside
- Fire extinguishers will be mounted, labeled, and displayed in planned locations of building projects (e.g., stair cases, ingress and egress points, etc.)
- A 20 pound ABC cartridge-type extinguisher will be installed on all heavy equipment, trucks (other than pick-ups), connex boxes, welders, compressors, and asphalt/batch plants.
- Additional fire extinguishers will be kept readily available during any hot work operation

- Mount two extinguishers to all fuel and lube trucks according to the following guidelines:
  - Do not mount the fire extinguishers so close together that both could be made inaccessible by a localized fire
  - Mount them in locations where they will not be knocked off or clogged with mud and ice in the winter
  - If an extinguisher is mounted inside a cabinet, be sure that it will not become blocked by loose equipment. Put a sign on the cabinet to indicate that a fire extinguisher is located inside

Flammable Liquid Storage

Flammable liquids or other hazardous materials should be stored outdoors or in small detached structures

General Requirements

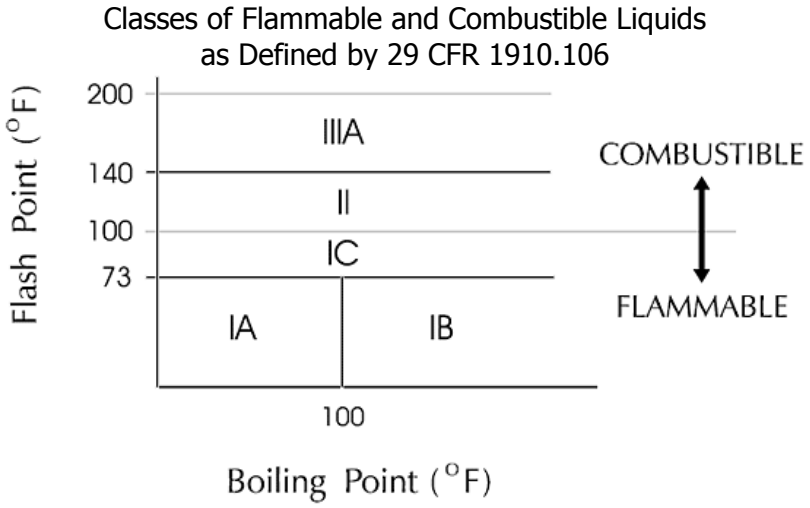
- Smoking is not permitted in any flammable liquid storage areas
- An inventory must be kept for all flammable or combustible storage areas
- Only approved containers and portable tanks will be used for storage and handling of flammable and combustible liquids
- Flammable or combustible liquids will not be stored in areas used for exits, stairways, or normally used for the safe passage of people

- Waste containers must be accumulated on a firm working base, such as asphalt or concrete. The base must be impervious and have a minimum thickness of four inches. There will be a berm of at least six inches around the base or allocation enclosed by walls.
- The storage structure must have a containment and collection system that is capable of holding in excess of 20 percent of the total capacity of all containers or 110 percent of the capacity of the largest container or tank, whichever is greater

Indoor Storage

- Design specifications for inside storage rooms are stated in the standard methods of Fire Tests of Building Construction and Materials, NFPA 251-1995
- An inside storage room must be designed in a manner that renders it liquid tight and provides adequate fire resistance to adjoining building areas
- The boundary between the walls and floor must be sealed so that liquid cannot leak through
- Openings to other rooms must be non-combustible, liquid tight raised sill or ramps that are at least six (6) inches in height
- An allowable alternative is to make the floor in the storage area six (6) inches lower than the floors in the adjoining rooms. The floor must be constructed of a liquid-tight material.
- All transfers of flammable chemicals performed inside a building must be done in the flammable chemical storage area. If there is another room in the building that is separated from other operations in the building, or that is protected by walls with adequate fire resistance, and that is provided with adequate ventilation, then flammable chemical transfers can also be performed in that area.
- The quantity of flammable and combustible chemicals stored outside of the flammable chemical storage cabinet and inside a building must be limited. The following limits are set by OSHA:
  - 25 gallons of Class 1A liquid in containers
  - 120 gallons of Class 1B, 1C, II or III liquids in containers
  - 660 gallons of class 1B, 1C, II OR III liquids in single portable tank
- OSHA also limits the quantity of flammable chemicals that can be stored in a flammable chemicals storage cabinet. The following limits are set by OSHA: no more than 60 gallons of Class I or Class II liquid or more than 120 gallons of a Class III liquid inside a

storage cabinet. When cabinets are used, these will be vented to an outside area free from external hazards



- Indoor storage includes building, shops, and ventilated connex boxes
- Cabinets should be labeled "Flammable – Keep Fire Away"
- At least one portable 20 pound ABC extinguisher will be located outside of, but not more than 10 feet from, the door opening into any room used for flammable or combustible liquid storage
- Lighting fixtures will be an explosion proof type and general storage areas will be ventilated

Outdoor Storage

- Storage of containers (not more than 60 gallons each) will not exceed 1,100 gallons in any one area
- Storage areas will be separated by a buffer zone of five (5) feet
- Storage areas will not be within 20 feet to a building. Minimum distance will also be maintained between the storage area, property lines, streets, alleys, or public ways. For Class I liquids, a minimum distance of 20 feet will be maintained between the flammable chemical storage area and the property line. At least 10 feet of distance must be maintained between the storage area and any street, alley or public way.

- There will be a 12-foot wide access way to permit approach of fire control apparatus within 200 feet of each storage area
- The storage area will be graded in a manner to divert possible spills away from buildings or other exposures or will be surrounded by a curb at least six (6) inches high. When curbs or dikes are used, provisions will be made for draining off accumulations of ground or rainwater or spills of flammable or combustible liquids. Drains will terminate at a safe location and will be accessible to operation under fire conditions.
- An outside storage building that is located 50 feet or less from another building or adjoining property line must have a two hour rated fire wall
- Storage areas must be secured against tampering by trespassers
- Keep weeds, debris, and other combustible materials 25 feet from the storage area.
- It is advisable to provide a covering over all containers.
- Lighting fixtures used in outdoor flammable chemical storage areas should be at least eight (8) feet above the containers. If the fixtures are less than eight feet above the containers an explosion proof lighting and electrical system must be used.

Outdoor Portable Tank Storage

- Portable tanks shall not be stored within 20 feet of any building
- Portable tanks with a combined capacity of 2,200 gallons shall have a minimum five-foot clearance between them
- A single portable tank exceeding 1,100 gallons shall have a minimum five-foot clearance around it
- There will be a 12-foot wide access way to permit approach of fire control apparatus within 200 feet of each storage area
- Storage areas should be kept free of weeds, debris, or other combustible materials within 25 feet of the storage area.
- At least one portable fire extinguisher will be located no less than 25 feet, and than 75 feet, from any flammable liquid storage area located outside
- Each tank will be labeled: "(Contents of Tank) – Flammable, No Smoking"

<u>Temporary Heating Devices</u>

General Requirements

- Combustible materials must be kept at least 10 feet away from heating devices.
- Fire barrels are not allowed on any project
- Do not allow clothes, gloves, shoes, etc., to be placed on, overhead or immediately next to a heater
- Never store compressed gas (acetylene, propane, etc.), gasoline, diesel fuel, paint thinner or any flammable liquid in a trailer or room where a temporary heating device is in use
- Do not allow paint or thinner to be sprayed in areas where a heater may ignite the explosive
- Make sure there is an easy escape route in case a heater malfunctions
- Keep fire extinguishers readily available and fully charged. Employees need to be trained on proper use of the fire extinguishers.
- Inspect the entire heating unit frequently for any defects, leaks or worn parts. Make repairs immediately.

Combustion Heaters

- Read manufacturer's instructions before lighting a heater
- Adequate ventilation must be provided and area must be monitored for oxygen and carbon monoxide levels
- Each unit shall be equipped with an automatic shut-off valve to stop the flow of gas or oil any time the flame goes out
- Refueling will be done only after the heater has been turned off and has had time to become cool to the touch
- Safety cans are required for all flammable liquids (including diesel fuel) and will be used along with funnels or spouts to prevent spills

Electric Heaters

- All electric heaters must be properly grounded and used in a dry area to prevent electric shock
- An automatic shut-off device must be built into the unit to prevent fire in the event the unit is tipped over
- Care must be taken to keep electric cords out of mud, snow, ice, and water.

LP Gas and Propane Requirements

- Each system will have containers, valves, manifolds, assemblies, and regulators of an approved type and in good repair
- Valves and fittings connected directly to the container will have a rated working pressure of at least 250 PSI
- Every container and vaporizer will be provided with one or more approved safety relief valves or devices. These valves will be arranged to afford free vent to the outer air
- Cylinder connectors will be provided with an excess flow valve to minimize the flow of gas in the event the fuel lines become ruptured

Storage

- Containers will be stored in cages upright on firm foundations or otherwise firmly secured
- Storage of propane cylinders within buildings or connex boxes is prohibited
- Propane storage locations will be provided with at least an approved portable 20 pound ABC fire extinguisher
- Propane will not be stored within 25 feet of the nearest building
- Storage areas/cages will be labeled with “Flammable Gas—No Open Flames” sign clearly mounted

Use

- Containers, regulating equipment, manifolds, pipe, tubing, and hose will be located to minimize exposure to high temperatures or physical damage
- For temporary heating, heaters will be located six (6) feet from any LP gas container. Blower and radiant type heaters will not be directed toward any LP gas container within 20 feet
- Valves in the assembly of multiple container systems will be arranged so that replacement of containers can be made without shutting off the flow of gas in the system
- The minimum separation between propane and ignition sources such as compressors, light plants, etc. will be 25 feet.
- Combustible material such as weeds and long dry grass will be removed within 10 feet of the container.

- Use a soap and water solution to detect leaks. Leaks should be corrected immediately
- No welding on containers or tanks

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Required inspections	EH&S Professional	Monthly fire extinguisher inspections Daily storage area inspections
Identify potential fire hazards and applicable legal requirements	EH&S Professional Superintendent	Enter project specific document/Records/Performance indicators
Hot work permit approval	Superintendent	Hot work permit
Include fire protection/response procedures in emergency action plan	EH&S Professional	Emergency action plan
Correctly store flammable liquids, LP gas, and propane	EH&S Professional	Compliance audits and findings

Applicable Training

- Fire extinguisher training
- FDNY Certiciate of Fitness F60 + G60

Potential Related Safety, Health and/or Environmental Aspects

Welding and Cutting is related to the Fire Protection and Prevention Aspect.

Housekeeping

Objective

The purpose of this program is to establish guidelines to protect employees from the hazards associated with poor housekeeping. This program details general housekeeping and the handling of waste and debris.

Legal and Other Requirements

Federal, State, Local Regulations

- OSHA 29 CFR 1926.25
- OSHA 29 CFR 1926.252

Skanska/Client Requirements

- SWJV will maintain workzones to prevent incidents related to the above aspect. SWJV will have designated roll-off containers set up for specific types of waste in an effort to maintain our recycling requirements.
- SWJV will maintain housekeeping throughout our workzones in an effort to uphold the apprearance of the airport while undergoing construction.

Procedure

General Housekeeping

- Work areas will be kept in an orderly manner at all times and all waste will be removed by the end of the shift
- Trash receptacles will be provided throughout each jobsite with safe means to facilitate removal and will be emptied regularly to prevent overflow
- Any extra materials from activities will be returned to storage facilities at the end of each shift
- Oily rags will be kept and disposed of separately in metal containers with tops
- All scrap lumber, forms, and crates will be kept cleared from work areas, passageways, stairs, in and around buildings or other structures

- All nails will be removed from lumber or other material
- Receptacles will have self-closing or securable lids to prevent pest and rodent infestation
- A trash receptacle will be placed in all designated break areas
- All trailers and office space will be kept clean at all times
  Crews will focus on housekeeping throughout their shift and maintain as needed.

Trash Chute

- When materials must be dropped more than 20 feet to any point lying outside the exterior walls of a structure, an enclosed chute of wood or equivalent material will be used as a ramp
- When debris is dropped through holes or openings in the floor without the use of a chute, the area onto which the material is dropped will be completely enclosed with barricades
- Enclosure requirements
  - Barricades must be at least 42 inches high and at least six (6) feet back from the projected edge of the opening above
  - Wind velocity and its potential for carrying materials should be calculated into the disposal plan
  - Signs warning of the hazard of falling materials should be posted at each level
  - A spotter may be posted at the area of retrieval to keep area clear of unnecessary traffic
  - Debris will not be removed from the disposal site until all handling ceases from above
- A dumpster or truck will be maintained at the bottom of the chute at all times.
- A physical barrier will be maintained around the trash receptacle at the bottom of the chute
- "Caution" signs will be posted on the barrier to warn employees of potential hazards

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Required inspections	EH&S Professional	Enter project specific document/Records/Performance indicators

Applicable Training

Sitewide orientation will cover maintaining housekeeping throughout the job as well as periodic toolbox talks on the subject.

Potential Related Safety, Health and/or Environmental Aspects

Housekeeping relates to all aspects in our EHS manual, it is everyone's responsibility to take part in maintaining a clean jobsite.

Illumination – Project Lighting

Objective

The purpose of this program is to ensure that adequate lighting is provided at all locations and during all work operations. In addition to providing necessary illumination for our workers, we must ensure that adequate lighting is provided for pedestrian traffic that may be passing around our sites.

Legal and Other Requirements

OSHA 29 CFR 1926.56

Federal, State, Local Regulations

5 Foot Candles for General construction area lighting.

3 Foot Candles for General construction areas, concrete placement,excavation and waste areas, access ways, active storage areas, loading platforms, refueling, and field maintenance areas.

5 Foot Candles for Indoors: warehouses, corridors, hallways, and exitways.

10 Foot Candles for General construction plant and shops (e.g., batch plants, screening plants, mechanical and electrical equipment rooms, carpenter shops, rigging lofts and active store rooms, mess halls, and indoor toilets and workrooms.)

30 Foot Canles for First aid stations, infirmaries, and offices.

Skanska/Client Requirements

SWJV will comply with the above Federal, State and Local Regulations.

Procedure

Fixtures

- Fixtures are to be rated for the project environment and/or classification.
- Fixtures are recommended to be made out of metal or high-strength plastics with suitable diffusers.
- Fixture guards are required to reduce breakage.

- Fixtures are to be fastened to a solid surface or suspended with proper cable or hangers to support the weight of the fixture, wire and environmental conditions (e.g., ice load).
- All fixtures are to be UL listed for the application.
- Streamers are discouraged and may only be used when allowed by local jurisdiction.
- Any streamers used are to have shielded compact fluorescent lamps (CFL) and required guards/cages of either plastic or metal.
- The use of multi-tap 175W, 250W or 400W metal halide fixtures for temporary lighting must be pulse start with wire guards

Power Source

- When required by local jurisdiction, all connections to fixtures will be made from individual branch circuits, specifically designated for lighting
- Egress signs will be on a separate circuit from general lighting
- A minimum of two circuits will be required in a work area/floor
- No “Laundry Drops” or connections for small tools will be permitted
- All circuits will be clearly labeled to indicate that they are served at the source panel. Fixtures connected to 277/480VAC circuits will have a separate label indicating voltage
- Minimum wire gauge is #12AWG for lighting
- Branch circuits for lighting will be supported so they do not interfere with construction activities and not rest on the floor or interfere with potential walking/equipment movement

Task Lighting

- Task lighting may be achieved for work activities utilizing commercially available fixtures/tripods for that purpose.
- All task lighting fixtures are to be UL listed for the application.
- The use of halogen lamps for task lighting is acceptable, providing the fixture has tempered glass and a wire shield.

Lighting Levels

- The minimum lighting levels will be in accordance with OSHA 1926.56 – Illumination. Measurements will be made from a calibrated light meter either new out of box or calibrated per the manufacturer's requirements

General Requirements

- Construction areas, ramps, runways, corridors, offices, shops, and storage areas will be illuminated to the intensities listed in the table below while any work is in progress
- Lighting plans will include additional requirements when walls and interior elements have been constructed
- Lighting in stairways and hallways must be maintained at all times

Illumination Requirements

Foot-Candles	Area Of Operation
5	General construction area lighting.
3	Concrete placement, excavation and waste areas, access ways, active storage areas, loading platforms, refueling, and field maintenance areas.
5	Indoors: warehouses, corridors, hallways, and exits.
5	Tunnels, shafts, and general underground work areas. (Exception: minimum of 10-foot candles is required at tunnel and shaft heading during drilling, mucking, and scaling. Bureau of Mines approved cap lights will be acceptable for use in the tunnel heading).

10	General Construction Work Plant and shops (e.g., batch plants, screening plants, mechanical and electrical equipment rooms, carpenter shops, rigging lofts and active store rooms, barracks or living quarters, locker or dressing rooms, mess halls, and indoor toilets and work rooms).
30	First aid stations, infirmaries, and offices.

- For areas or operations not covered above, refer to the American National Standard A11.1-1965, R1970, Practice for Industrial Lighting, for recommended values of illumination

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Prepare project-specific lighting plan	Superintendent	Enter project specific document/Records/Performance indicators
Required inspections	EH&S Professional	Enter project specific document/Records/Performance indicators
Measure light levels	EH&S Professional	Light readings
Calibration of light meter	EH&S Professional	Calibration records

Applicable Training

Training will consist of reviewing the construction work plan related to the work being performed requiring SWJV to comply with the above lighting standards.

Potential Related Safety, Health and/or Environmental Aspects

Maintaining adequate illumination is critical to achieving the objective to this aspect.

Lockout/Tagout

Objective

This procedure establishes a lockout/tagout procedure to ensure that workers are not exposed to the hazards from moving machinery or equipment and those hazards posed by an energized source (pneumatic, steam, hydraulic, electrical, chemical).

Legal and Other Requirements

OSHA 29 CFR 1910.147
OSHA 29 CFR 1926.417

Federal, State, Local Regulations

OSHA 29 CFR 1910.147
OSHA 29 CFR 1926.417

Skanska/Client Requirements

- All personnel performing lock out tagout must be trained as per the above standards.
- Prior to LOTO taking place the Lock out Tag out Conrol of Hazardous Energies forms must be filled out and completed. 1.)Lock out Tag out Evaluation Form 2.) Shut Down Equipment Form

Procedure

Procedure for Lockout/Tagout

- The project superintendent or designated qualified person will authorize the shutdown of the equipment after it has been established that:
  - The qualified person requesting the shutdown has a complete understanding of the equipment or system to be cleared
  - The qualified person has knowledge of the type and magnitude of the energy, the hazards of the energy to be controlled and the method to control the energy
  - A survey was made to locate and identify all isolating devices to be sure which breaker, valve, switch or other energy isolating devices are required to lockout the equipment or system. All items to be isolated will be listed on the clearance form under “devices to be isolated”

Shutdown

- After preparation for shutdown requirements have been satisfied, the qualified person will review the lockout/tagout identification form for completeness and accuracy

Isolation

To isolate the equipment or system from its energy source, the following actions will be taken in sequence:

- The qualified person lists all devices that must be locked out on the clearance form
- The qualified person will self-perform or assign another qualified person to physically operate all necessary devices to isolate the equipment or system (e.g., de-energizes, drain, vent, close valves, etc.)

Lockout

To lockout the equipment, the following actions will be taken in sequence:

- The qualified person will attach a locking device with a lock and "Do Not Operate" tag. All affected craft supervisors will verify the locks and tags have been hung.
- The qualified person and supervisor will initial the clearance form to verify the isolation is complete and that the key(s) will be maintained in or near the lockout office
- The key lock boxes or rods for the isolation lock(s) will be maintained in a predetermined, secure location. The qualified person will drop their key into the lock box. The clearance holder (craft supervisor) will add their lock to the lock box.
- Each trained employee will be provided one lock for each piece of equipment being locked out and will have only one key for each. Each employee must lockout at the disconnect switch and/or valve themselves.
- If more than one person is working on the same piece of equipment at the same time, each person is to have a personal lock on the lockout device. If the primary device will not accommodate each person's lock, multiple locking devices are to be used
- When multiple locking devices are required, the shank of the devices must immobilize the equipment and must not merely be attached to the shank of another lock

- It may be necessary to lockout/tagout energy caused by gravity
- Where a keyed switch controls the ignition, the key will be placed in the "off" position, removed, and the switch tagged with a "Do Not Start" tag
- If standard lockout switches are not available to immobilize the machinery, fuses should be pulled, terminals disconnected or other standard safety procedures applicable to the individual piece of equipment should be followed. "Do not start" tags will be placed at the starter button or switch
- In the event that tagging and removing the ignition key are not considered adequate protection, the battery cable that is connected to the starter will be removed at the battery end and tagged with a "Do Not Start" tag
- All other necessary precautions, such as opening or closing valves, changing valves, tagging and locking valves, installing blind flanges, etc., will be performed prior to starting the job
- No employee will remove another person's lock, lockout device or "Do Not Start" tag. Before leaving the job for another assignment, at shift end or upon completion of that job, each employee will personally remove their own lock.
- If an employee fails to remove a lock, that employee will be required to return to remove it in person. If the individual is not available, the lock will not be removed until the foreman in charge has made a thorough check of the equipment. The foreman will verify and make certain the equipment is safe to operate.

Verification of Isolation

Before starting work on the equipment or system, the following actions will be taken in the following sequence:

- After ensuring that no personnel are exposed and having checked on all disconnected energy sources, start the equipment or system
- Return all controls to the "off" position after the test
- The qualified person will notify the clearance holder that the lockout procedure is complete. The clearance holder and affected employee(s) will then discuss the specific equipment or system to be worked on and understand all the system boundaries (i.e., location of all locks and tags)
- The qualified person and clearance holder return to the control room to sign a Shutdown Equipment Form, signifying that the system is safe to work and isolation is complete

- The supervisor informs the affected employee(s) the system has been locked out and verified. The clearance holder drops their key in a separate lock box, all affected employee(s) lock back onto the box.
- Work can now begin

Release from Lockout (Return to Service)

- Before lockout devices are removed and energy is restored to the equipment or system, the following procedures will be followed and actions taken by the qualified person using a Release from Lockout Form
- After work on the equipment or system is complete, the area will be inspected to ensure nonessential items have been removed and equipment or system components are intact
- The work area will be checked to be sure that all employees have been safely positioned or removed
- All affected employee(s) will be notified that the lockout devices are to be removed
- The qualified person will use the identification form as a guide to ensure that all isolation devices listed in the identification form are properly accounted for. The following sequence is to occur:
  - The clearance holder verifies that all affected persons on the clearance form have signed the lockout form and show evidence of notification
  - All craft supervisors who are listed on the clearance form will return to the lockout station and sign and date the log book
  - The qualified person will remove all locks
- Should it become necessary to have a clearance released when the clearance holder (craft supervisor) is off duty, the procedure will be as follows:
  - The qualified person will contact the clearance holder and request a release of the clearance. If unable to do so, the clearance holder's supervisor will be notified
  - The supervisor will check the work prior to authorizing the release. They will then sign the clearance holder's name and their own name on the appropriate line of the identification form.

Testing

The following steps will be taken to test equipment or systems under the clearance procedures:

- Notify all craft supervisors on the clearance form that the system and/or isolated components are to be tested
- The qualified person along with the craft supervision will "walk down" the system to verify that component isolation/activation will not compromise the safety of personnel working in this area
- Each supervisor and the qualified person will sign the test release on the clearance form
- Affected employee(s) (listed on the identification form) in the immediate area of the isolated test will be notified by verbal warning, barricades, warning tape, etc., or by other appropriate means
- Locks will be removed on the isolated component by the qualified person and the test will be completed
- If no further work is required, the craft supervisor will initial the clearance form, returning the device into service
- If further work needs to be done on the component, the isolation devices (locks, blind, etc.) will be reattached and this policy will resume from the beginning

Medium and High Voltage Lockout Procedures (600 + volts)

Work on high voltage lines or equipment requires safety precautions in addition to the standard lockout program and procedures.

High Voltage Rooms and Collector Ring Compartments

- Whenever any high voltage rooms or areas such as collector ring compartments are unlocked and de-energized, the following must happen:
  - All personnel working in or near these areas will place their lock and tag on the junction box that is disconnected or at the gate on the appropriate substation or disconnect box
  - Multiple lockouts will be used so that each employee has a lock and tag in position

High Voltage Lines and Equipment

When a high voltage line is to be worked on, it must not be considered de-energized until a qualified person determines that the high voltage line has been de-energized and grounded.

Qualified persons will visually observe to:

- Determine that the disconnecting devices on the high voltage circuit are in the open position
- Ensure that each ungrounded conductor of the high voltage circuit, upon which work is to be done, is properly connected to the system ground medium
- Ground the ungrounded conductor, which will be on the source side of the circuit on which work is to be performed. Grounding jumpers connected to the ground bus will be provided for this purpose. Grounding will be accomplished by the following procedure:
  - Verifying that the feeder disconnect is open and locked out
  - Using a ground stick, ground each ungrounded phase to bleed off any residual electrical charge on the circuit
  - Attaching grounding jumpers to each ungrounded phase of the circuit on which work is to be performed

High voltage circuits will not be energized until:

- All work on the high voltage circuit is completed and inspected
- All personnel have been cleared from the high voltage area and notified that the circuit will be energized
- All protective grounding installed has been removed from ungrounded conductors
- The high voltage area has been secured and locked

<u>Lockout – General Requirements</u>

- All energy sources of power-driven equipment will be locked and/or tagged in the off-position when maintenance is being performed
- Energy sources that must be locked out include but are not limited to electrical, mechanical, chemical, steam, hydraulic, and pneumatic
- It is the responsibility of the qualified person to ensure that the proper lockout/tagout procedures are followed
- It is the responsibility of the qualified person and the clearance holder performing the maintenance to ensure that all equipment is properly locked and tagged out before starting any maintenance work

- Both the qualified person and the clearance holder must check the equipment before restarting it to make sure it is safe to operate
- Skanska requires that both lockout and tagout devices be used during equipment maintenance
- All lockout devices must be:
  - Durable, to withstand wear
  - Substantial, so they will not detach
  - Capable of identifying the person who applied it
  - Designed for a single use application
- Available lockout devices include:
  - A disconnect switch, circuit breaker, valve or other energy isolating mechanism that is placed in the safe on or off position
  - A device placed over the energy isolating mechanism to hold it in the safe position
  - A lock attached to the 'on' switch to ensure equipment cannot be energized without removal of the lock

Tagout–General Requirements

- Tagout refers to a sign or tag posted on a switch that physically cannot be locked out
- Once the switch has been placed in the off-position, the tag is placed over the switch and warns other employees that the equipment is under maintenance and should not be started
- This tag must also identify the person who applied it. In a tagout, the energy-isolating device is placed in the safe position and a written warning is attached to it
- All tagout materials must be:
  - Durable, to withstand wear
  - Substantial, so they will not detach
  - Capable of identifying the person who applied it
  - Designed for a single use application
- A lockout or tagout is applied whenever maintenance is performed around any machine where injury could occur from:
  - Unexpected startup of the equipment
  - Release of stored energy

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Verify implementation of lockout/tagout program	EH&S Professional	Daily/Weekly Compliance audits
Required inspections	EH&S Professional	Daily/Weely Compliance audits
Lockout/tagout coordinator(s)	Superintendent EH&S Professional	Construction Work Plans
Lockout/tagout clearance (return to service)	Superintendent	Lock out Tag out Conrol of Hazardous Energies forms
Communication with process/system owner	Superintendent	Lock out Tag out Conrol of Hazardous Energies forms
Subcontractor EHS Kick-off Meeting	EH&S Professional	Meeting agenda Agenda sign in sheets
Enter project-specific information here	Enter project-specific roles and responsibilities	Enter project specific document/Records/Performance indicators

Applicable Training

Management training and communications

Employee will be properly trained to ensure that all affected employee(s) understand the purpose and function of the lockout/tagout policy. The training will include the following:

Communications

- Each qualified person will receive training in the recognition of applicable hazardous energy sources, the type and magnitude of the energy available in the workplace and the methods and means necessary for energy isolation and control
- Each supervisor of the affected employee(s) will be instructed in the purpose and use of clearance procedure

- All other employees who work in construction or startup operations and may be in an area where energy control procedures may be utilized will be instructed about the procedure and about preventing any attempt to restart or re-energize equipment or systems that are locked out

Employee Retraining

- Retraining will be provided for all clearance holders, qualified persons and affected employee(s) whenever there is a change in their job assignments, equipment, or processes that present a new hazard or when there is a change in the safety clearance procedure
- Additional retraining will also be conducted wherever a periodic inspection of the section reveals or whenever management has reason to believe that there are deviations from or inadequacies in the employee's knowledge or use of the energy control procedures
- Management will verify that employee training has been accomplished and is being kept up to date. The verification will contain each employee's name, dates of training, and who conducted the training

Lockout/Tagout

- Employees performing any service or maintenance work must be made aware of the lockout and tagout program (this also applies to any vendors or subcontractors doing work on company jobsites)
- Employees will be taught the purpose and function of performing the lockout/tagout
- Employees will receive periodic training to ensure they are up-to-date and knowledgeable on the lockout/tagout program and procedure

Potential Related Safety, Health and/or Environmental Aspects

Electrical Safety, Confined Space, Demolition, Motor Vehicles and Mechanized Equipment, Community Impacts Utilities and Water Impacts are all related Aspects.

Maintenance and Protection of Traffic (Vehicular and Pedestrian)

Objective

The purpose of the Maintenance and Protection of Traffic (MPT) program is to protect our employees and the public when our projects directly impact traffic. This program will be project-specific according to the environment and needs of the site.

Legal and Other Requirements

Federal, State, Local Regulations

- OSHA 29 CFR 1926.200
- OSHA 29 CFR 1926.201
- Manual on Uniform Traffic Control Devices (MUTCD) http://mutcd.fhwa.dot.gov/
- American Traffic Safety Services Association (ATSSA)

Skanska/Client Requirements

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Procedure

When it becomes necessary to temporarily close a public street or alley, a written traffic control plan is required to show how the closure will occur. The plan must be submitted to Skanska for review.

Maintenance of Traffic (MOT) plan shall include:

- Copy of current specifications
- Barricade log
- Duration of plan
- Traffic survey identifying conditions (volume, speed, etc.)
- Existing traffic control measures
- Photos and/or video of existing conditions along with periodic photos as the plan changes

- Applicable permits

Specialized vehicles

Projects that require extensive traffic control may set up specific traffic control vehicles with flashing/rotating lights or beacons, sign racks, cone racks, worker platforms, protective railing and impact absorption capabilities, (attenuator trucks).

- The cone truck should be a one-ton flatbed outfitted with two warning beacons visible from all directions and a Type II flashing arrow sign controlled from within the cab
- There should be two platforms on the truck for employees to stand while setting out the cone pattern, one on each side built into the bed frame. These can be a stand-in type cages so that the employee can stand upright while placing or removing the cones. This design will help to ensure the safety of the worker while reducing the possibility of an injury due to excessive bending.
- Fall protection equipment must be provided to the employees if required
- The crash truck should be a five-ton flatbed, outfitted with the same warning devices as the cone truck. Check with local authorities for your area as some require Type I arrow signs on crash trucks
- There will be an approved truck-mounted attenuator attached to the rear of the truck for added protection against vehicle impacts
- There will be two-way communication between all vehicles and the superintendent in charge of traffic control

Flagger Control

- Flaggers are required when:
  - Workers or equipment intermittently block a traffic lane
  - Plans call for one lane to be used for two directions of traffic with a flagger at each end
  - EHS and/or project staff determines there is a need
  - Required by the owner
- Flaggers will be trained in the techniques of flagging traffic (i.e., ATSSA and/or state equivalent) before performing this duty

- They must be far enough away from the work to slow or stop traffic before it enters the work zone
- During daylight hours, all flaggers must wear a reflectorized garment (ANSI/ISEA 107-240 Class II).
- At night all flaggers must wear a reflectorized garment (ANSI/ISEA 107-240 Class III). It is recommended that they also wear reflectorized gloves.
- From sunset to sunrise, flagger stations must be illuminated so the flagger is clearly visible to approaching traffic
- When communicating through radios, a spare battery pack should be readily available
- If communication breaks down between the flaggers, the operation is to be shut down immediately until the situation is remedied

Documentation

- One person should be responsible for documenting traffic control
- The same individual should carry out routine inspections of the traffic control installation
- A traffic control inspection report should be completed and signed every day by the designated traffic control person and included in the documentation
- Further documentation will include a camera for recording any accidents or incidents. These pictures will be in a successive series from advance warning, all the way up to and including termination of the traffic pattern
- Documentation records should include:
  - Starting and ending times of work
  - Location of work
  - Names of crew members
  - Types of equipment used
  - Changes in temporary or permanent regulatory devices
  - Installation, change, and removal of traffic control devices
  - Drawing of working closure to include all devices
- When an inspection requires correction to include maintenance, the documentation should include:
  - A description of the corrections needed, when it was noted and by whom
  - Corrections made or deferred and why
  - Replacements made or deferred and why

- Any other needed actions

Control Warning and Guidance Devices

Effective warning and guidance devices are planned out in advance and should be uniformly placed and well maintained. There are six (6) categories of devices:

- Signs
- Barricades
- Delineators
- High-level warning devices
- Warning lights/illumination
- Flashing arrow/message boards

Utilization of Halo has been determined to be a best practice and is recommended for Skanska projects. All signage and traffic control shall comply with the Federal Manual on Uniform Traffic Control Devices (MUTCD) and can be viewed and downloaded at: http://mutcd.fhwa.dot.gov/

Traffic Signs for Functional Groups

- Construction signs are used only for construction or maintenance work on or adjacent to the roadway
- Warning signs generally apply to a permanent situation but may have some applications on temporary construction sites
- Regulatory signs are used for posting speed limits, are enforced by local law enforcement agencies, and are maintained by the contractor when placed within or adjacent to the work area
- Sign location depends on alignment, grade, location of street intersections and posted speed limits. The signs must face and be visible to oncoming traffic and be mounted to resist displacement
- Advance warning signs are located on the right-hand side of traffic lanes
- On divided highways, supplemental advance warning signs will be placed on the divider
- Messages conveyed during hours of darkness must be on reflectorized or illuminated signs

- Signs will be installed before work begins and will be removed or covered immediately after work has been completed
- If at any time a sign is not required, it will remain covered or be removed

Barricades

- Barricades will be used to mark or block off specific hazard or to channel traffic. They may not be placed in a moving lane of traffic without advance warning, such as high level warning devices (e.g., flashing arrow signs) and appropriate delineators
- When closing off a street, barricades should be placed to prevent vehicles from passing through, except where access is necessary for local traffic or emergency vehicles
- Marking barricade rails is done by alternating orange and white stripes on a downward slant at 45 degrees. The entire area of white and orange must be reflectorized for night time use. The width of the stripes depends on the size of the rails. Rails less than three feet require four inch wide stripes; all other rails require six inch stripes.
- Barricades will have a minimum of 270 square inches of retro-reflective area facing traffic when used on freeways, expressways and other high-speed highways.
- Barricades with stripes that begin in the upper right side and slope downwardly to the lower left are designated right barricades. Barricades with stripes that begin in the upper left side and slope downwardly to the lower right are designated left barricades. Barricades should slope with the direction of traffic.
- On highways or in situations where barricades are susceptible to overturning in the wind, sandbags should provide ballasting. Sandbags may be placed on lower parts of the frame or stays to provide the required ballast but will not be placed on top of any striped rail.

Delineators

- Delineators will be used to aid a driver in determining the location and alignment of the traffic lane
- During daylight hours, maximize delineator effectiveness by evaluating position, spacing, form, texture, size and color
- During night time, maximize effectiveness by evaluating position and visibility
- All delineators used at night must be adequately reflectorized
- Delineators are used for the following instances:

- To channel and divert traffic in advance of work zones
- To define traffic lanes through work zones
- To define a change in the position of the existing lane around work zones
- To define curves and edges of the roadway on detours
- Delineators will be constructed to withstand impact without appreciable damage to the device, the striking vehicle or passing traffic, including damage from knockdown by wind or turbulence from passing vehicles

Minimum Recommended Delineator and Sign Placement				
Traffic Speed	Taper Length (Each Lane)	Delineator (Taper)	Spacing (Tangent)	Sign Spacing (Advance of Taper & Between Signs)
25 MPH	150 Feet	25 Feet	50 Feet	150 Feet
30 MPH	200 Feet	30 Feet	60 Feet	200 Feet
35 MPH	250 Feet	35 Feet	70 Feet	250 Feet
40 MPH	350 Feet	40 Feet	80 Feet	350 Feet
45 MPH	550 Feet	45 Feet	90 Feet	550 Feet
50 MPH	600 Feet	50 Feet	100 Feet	600 Feet
55+MPH	1000 Feet	50 Feet	100 Feet	1000 Feet

Warning Lights/Illumination

- Lights should be used on top of channelizing devices for intermediate and long-term closures especially at tapers, shifts, and turnarounds
- Illumination should be provided in lane closures at night

Flashing Arrow/Message Signs

- Panels with a matrix of electric lights, capable of sequential arrows displays or messages are intended to supplement, not replace, other work area traffic control devices by

providing additional, high level, advance warning of lane closures. They are effective for all lane closures and should be considered for all high-speed situations

- Flashing arrow/message signs will be repaired immediately or taken out of service if:
  - Any of the lamps are out
  - The panel is not dimming properly
  - Lamps are out of alignment

Day Closures

- Devices should be installed in the direction of traffic in the following order:
  - First advance warning sign
  - Advance warning zone
  - Transition zone
  - Buffer zone
  - Work zone
  - Termination zone
- When signs and channelizing devices are installed and removed several times during an operation, a spot should be painted or marked where each sign or device is located to minimize time required to reset the signs or devices
- Flashing vehicle lights should be used to warn the drivers of the presence of workers.
- All aspects of the closure should provide clear, concise direction to all drivers. Be sure of positioning and visibility of all signs, flashing arrow/message signs, barricades and delineators
- Any part of the pattern that has been disturbed should be reset as soon and as quickly as possible

Night Closures

- During night operations, a back-up, shadow or protection vehicle should be used and should be positioned 100 feet or more behind the cone truck as the first signs are placed. This process is to be followed for set-up and teardown.

- All crews working in or around the closure need to be outfitted with personal protective equipment, including bright clothes conforming to ANSI standards, hard hats, safety glasses, gloves and Class III reflectorized vests
- All employees should be visible at a distance of 1,000 feet
- If working together, should wear the same clothing to prevent confusing approaching motorists.
- Other applicable accessories may include retro reflective striping on hard-hats
- Before making night-time closures, all materials and equipment must be inspected and in good working order
    - All message boards and flashing arrow signs will be tested to ensure all lights and switches are functioning properly and that the equipment is fueled and fully charged
    - All inspections and maintenance procedures will be documented daily and/or nightly
- Devices maintained in project inventory will be kept clean, stored properly to avoid marring, and organized to verify that all items are in stock and readily retrievable
- Devices will be inspected when they are returned to inventory
- Any devices that are non-standard or in poor condition will be retired, modified or repaired

Responsibilities

Tasks/Operational Controls	**Person Responsible**	**Documents/Records/Performance Indicators**
Prepare Maintenance of Traffic (MOT) plan	Superintendent	Maintenance of Traffic (MOT) plan
Implement MOT plan	Superintendent	Compliance audits and findings Review of relevant incidents
Required inspections	EH&S Professional	Barricade log
Project MPT coordinator	Superintendent	Enter project specific Document/Records/Performance Indicators
Subcontractor EHS Kick-off Meeting	EH&S Professional	Meeting agenda Agenda sign in sheets

Applicable Training

- ATSSA supervision training
- ATSSA technical training
- ATSSA flagger training

Potential Related Safety, Health and/or Environmental Aspects

Material Handling and Storage

Objective

The purpose of this program is to establish safe procedures for material loading/unloading, storage, use, and disposal. By properly handling materials with mechanical means, safe work practices, and correct storage methods, the risk of injury and illness is reduced.

Legal and Other Requirements

Federal, State, Local Regulations

- OSHA 29 CFR 1926.250
- OSHA 29 CFR 1926.251
- OSHA 29 CFR 1926.1501
- OSHA 29 CFR 1910.178
- DOT 49 CFR Parts 393.100-136
- Federal Motor Carrier Safety Administration 40 CFR 112.7(h)(2) & (3)
- Federal Highway Administration

Skanska/Client Requirements

- The Port Authority of NY/NJ Requirements

Procedure

Loading and Unloading

All employees involved with the loading or unloading of materials will be trained in accordance with the requirements of this program. Exceptions to this program must be approved by the Skanska regional EHS Director.

- Implement measures necessary to prevent unauthorized or unsupervised material handling for loading/unloading operations by competent person
- Designate roles in loading/unloading operations, such as escort, spotter, operator, and competent person who will be involved in any activity involving loading/unloading

- Ensure procedures are reviewed regularly to verify if adequate and adhered to
- Ensure deficiencies in procedures are corrected before subsequent loading/unloading operations are authorized to continue
- Examples of circumstances requiring the review of the loading/unloading program are:
  - Any observed unsafe acts that are against this policy or any other company policy
  - Any observance of an unescorted delivery
  - Any observance of an unsupervised loading/unloading activity
  - The lack of visual devices required as part of the loading/unloading process
  - The occurrence of an injury or near-miss during loading/unloading
  - Employee complaints about the effectiveness of the program

The decals below shall be applied to all Skanska-owned vehicles involved in loading or unloading on jobsites.

<u>Escorting Procedure</u>

Pre-Loading/Unload Procedure

- All deliveries must be scheduled in advance of the anticipated delivery date and time
- A crewmember shall meet and greet delivery driver at project entrance
- Inspect load for movement/shifting during transit prior to accepting delivery
- Any loads that exhibit signs of shifting or movement during transit will not be accepted
- Use a flagger to spot vehicles in designated unloading area
- Loads must remain strapped/chained until in the designated unloading area
- Ensure that the truck or trailer does not move during loading or unloading with any piece of equipment by:
    - Engaging parking brake
    - Chocking the wheels
    - Engaging locking mechanism built onto the dock
- Designated loading and unloading areas shall be:
    - Clear of other traffic, pedestrians and people not involved in loading or unloading of materials
    - Clear of overhead electrical hazards/obstructions
    - Firm level ground

Loading the Truck and Trailer: Before the Tie-Downs Are Applied

The gross vehicle weight rating (GVWR) of a truck and trailer stipulates the maximum cargo weight that the unit may carry. Exceeding the GVWR is dangerous: brakes work less efficiently, tires loose air pressure, and springs may be stressed to the limit.

Proper placement of materials must always be pre-planned. Placing a load too far back on a long trailer may cause fishtailing; placing it too far forward on a trailer can overload the tongue, making steering difficult.

Considerations:

- Vehicles must never be overloaded
- Loading should allow for safe unloading
- Two essential requirements must be satisfied when loading vehicles. The load must be distributed so that:
    - The maximum permitted gross vehicle weight and axle weights are not exceeded
    - The load center of gravity is kept as low as possible to achieve maximum stability when the vehicle is braked, or accelerated or changes direction
- Unauthorized individuals will not be permitted into the loading area

- The designated competent person shall be in place to observe all loading activities
- Ensure the designated loading area is clear of all obstructions
- Ensure vehicle and trailer brakes applied and all stabilizers, wheel chocks and interlocks are in engaged prior to the commencement of loading activities
- Drivers shall not remain in their cabs during loading activities unless required and authorized by project management
- Ensure all vehicle floors and/or decking areas are inspected for debris, broken boarding, etc. prior to the placement of any loads
- Spotter should be in place when opposite side of load is not visible and maintain visual/audible communication with the operator
- Proper personal fall protection equipment shall be in place for all employees who are required to work from heights while loading materials onto trucks
- Proper dunnage/cribbing must be in place prior to landing/placing the materials on the trailer

- Ensure lift plan is developed in the construction work plan
- Taglines are required if load is being moved overhead
- Rope hooks shall not be used to anchor loads
- The material being loaded shall be done so to ensure proper securement of all materials.
- Secure load in place with two straps at a minimum
- Prior to the movement of the loaded vehicle, all applied vehicle and trailer brakes, stabilizers, wheel chocks, and interlocks must be disengaged
- Material handling form used for logging in materials being loaded and unloaded

#	ITEM	CHECK	OK/NA/NG	COMMENT
1	Cargo	Material or equipment is not damaged or leaking		
2	Cargo/Material Distribution	Cargo is evenly distributed and lighter cargo is stacked on top of heavier freight. Is the cargo level and uniformed?		
3	Cargo/ Material	Cargo is blocked, braced, banded or wrapped and on dunnage to prevent movement		
4	Cargo/ Material	Check clearance of cargo to vehicle envelope. Does the cargo need to be flagged in the rear? Is the load wider than the bed? Is a DOT Permit		
5	Surfaces	Check the surface of the deck against the cargo.		
6	Weather	Does the cargo need to be covered by tarps? Can		
7	Chains and binders	Marks, nicks, gouges, cracks, wear, twists, bends, stretching, and distortion		
8	Ratchet binder straps	Edge protectors or softeners in place. Check for holes, tears, cuts, broken stitching in load bearing		
9	Securing points for tie downs	Ensure securing points are not rusted, damaged and of equal or greater break strength ratings		
10	Equipment that is being transported	Brakes are set, wheels are chocked, boom, arm, bucket and turntable locked down. Ensure that stored energy will not cause a release and cause		
11	Inspect during transportation	Driver shall inspect cargo within the first 50 miles of the trip and 3 Hrs or 150 miles. The cargo shall be		
QTY	UNITS	ITEM		TOTAL

DRIVER
DO NOT REMOVE BINDERS

RECEIVER
Do Not begin any offloading until you have reviewed the checklist on rear of card

Unloading

- Unauthorized individuals will not be permitted into the unloading area.
- The designated competent person shall be in place to inspect the load for stability and any shifting that may have taken place during transit and to observe all unloading activities
- Ensure the designated unloading area is clear of all obstructions
- Ensure vehicle and trailer brakes are applied and all stabilizers, wheel chocks and interlocks are in engaged prior to the commencement of unloading operations.
- Drivers shall not remain in their cabs during unloading operations unless required and authorized by project management.
- Spotter should be in place when opposite side of load is not visible and maintain visual/audible communication with the operator.
- Proper personal fall protection equipment shall be in place for all employees who are required to work from heights while unloading materials
- Proper dunnage/cribbing must be in place prior to landing/placing the materials in the designated storage area
- Ensure lift plan is developed in the construction work plan
- Taglines are required if load is being moved overhead
- Rope hooks should not be used to anchor loads. Rope hooks are not subject to construction standards, and so they vary in strength, size and material content and are rarely designed to withstand forces
- The delivered material shall be in a condition to ensure safe unloading
- Fixed jacks may be necessary to support a semitrailer and prevent upending during the loading or unloading when the trailer is not coupled to a tractor

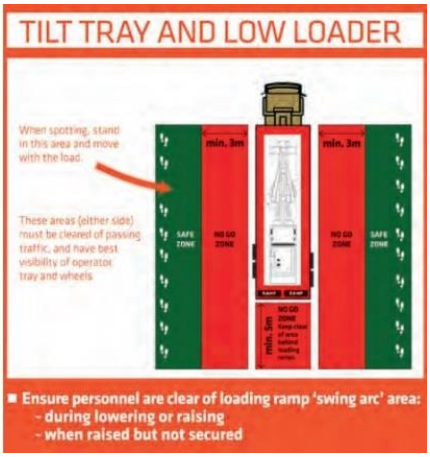
Hazardous material loading/unloading

- Identify and communicate special handling and storage requirements for all hazardous materials prior to loading and unloading

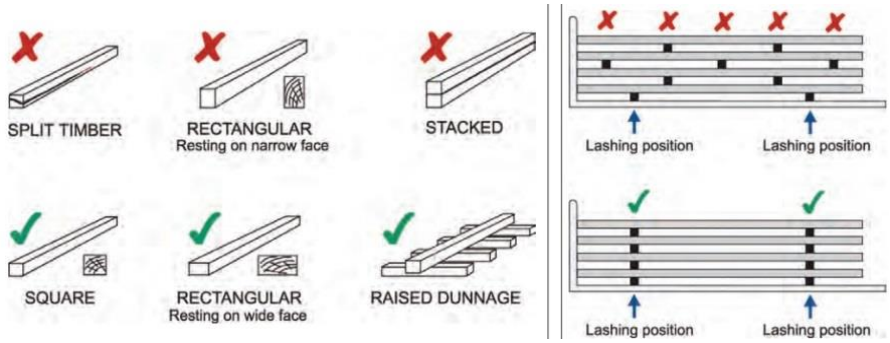
Pocket Guide for Unloading / Loading Trucks

SKANSKA WALSH

DESIGN-BUILD JOINT VENTURE



Dunnage Do's and Don'ts



Load Weights - Calculating

(6)

Materials and Liquids - Pounds / cu. ft.			
Aluminum	165	Iron Casting	450
Asbestos	153	Lead	708
Asphalt	81	Lumber - Fir	32
Brass	524	Lumber - Oak	62
Brick	120	Lumber - RR Ties	50
Bronze	534	Oil, Motor	58
Coal	56	Paper	58
Concrete, Reinf.	150	Portland Cement	94
Crushed Rock	95	River Sand	120
Diesel	52	Rubber	94
Dry Earth, Loose	75	Steel	480
Gasoline	45	Water	63
Glass	162	Zinc	437

Pounds / sq. ft.	
Steel plate	
• 1/8"	5
• 1/4"	10
• 1/2"	20
• 1"	40
Aluminum plate	
• 1/8"	1.75
• 1/4"	3.50
Lumber	
• 3/4" Fir	2
• 3/4" Oak	4

Pounds / gal.	
Gas	6.0
Diesel	7.0
Water	8.3

- 7.5 gallons of liquid to a cubic foot
- 27 cubic feet to a cubic yard
- 2,000 lbs = 1 U.S. ton

Formulas and Information

- H = Height • W = Width • L = Length • d = diameter • r = 1/2 diameter • π = 3.2 (approx.)
- Area of square or rectangle = LW • Vol. of cube = HWL • Area of circle = πr^2 • Circumference = πd
- The area of a circle is approx. 80% of its diameter squared (diameter x diameter)
- Load Weight (to estimate) ___ Volume in cu. ft. x 500 lbs. x density factor .02, .05, .10, .20, .30 etc.

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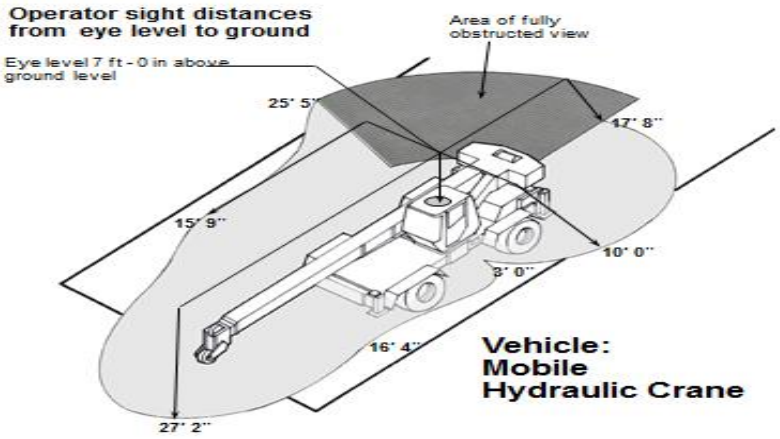
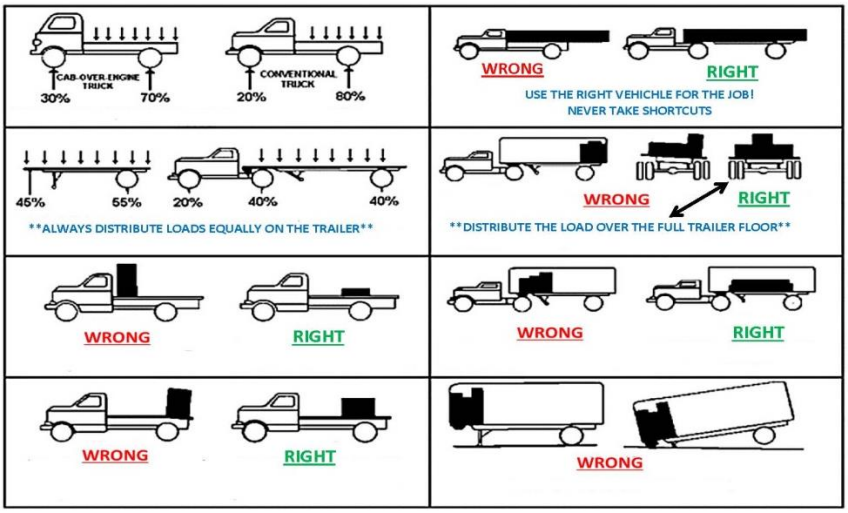
DESIGN-BUILD JOINT VENTURE

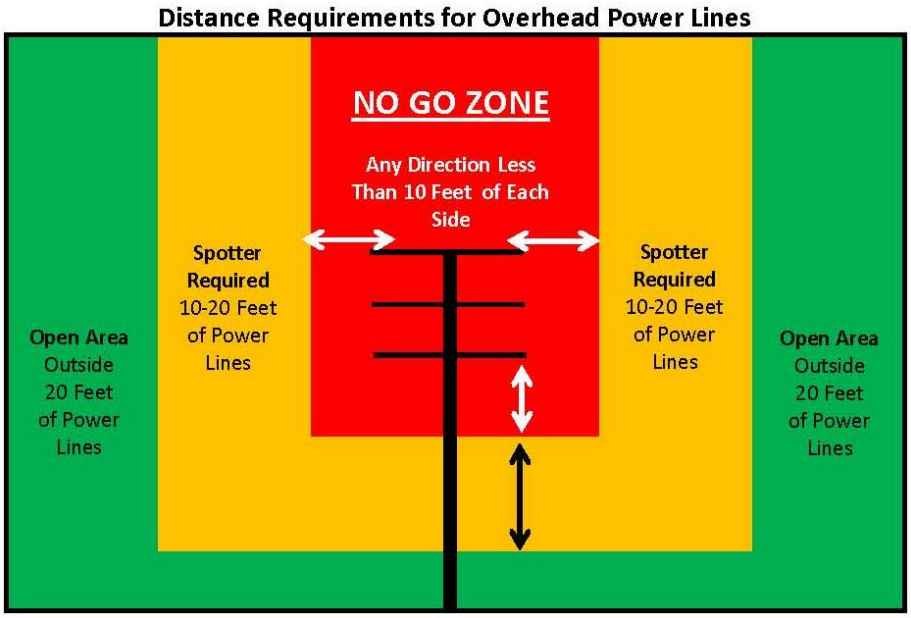


Load Distribution on Trailers




NO GO ZONE During
Unloading Operations


NO GO ZONE
SAFE ZONE



Material Storage

- Plan for accessibility and safe clearances of designated storage space
- Passageways, traffic routes, and rail beds will be identified and not be obstructed
- All storage space will be kept organized and free of debris
- Materials stacked above six (6) feet in height shall be banded or otherwise secured and warning signs posted
- Permanent passageways should be marked to ensure safe access
- Proper drainage must be established before the storage of materials is initiated
- All parts of cranes and material handling equipment, including loads hoisted, should be kept at least 10 feet from energized overhead electrical lines or equipment. Minimum clearance will change according to line voltage in cases where voltage exceeds 50 kV
- Underground utilities must be given sufficient protection from loads imposed by equipment and materials
- Material must be stored in accordance with its compatibility as indicated on the Safety Data Sheet (SDS)
- Materials shall be secured to prevent sliding, falling, or collapsing
- Load limits for the floor or shelf being used for storage must be determined by a qualified person and not exceeded

- Equipment or materials stored inside a building under construction will not be placed within six (6) feet of any hoist way or inside floor openings, nor within 10 feet of an exterior wall that does not extend above the top of the material stored
- Materials will not be stacked above or against the guardrails
- Stacking of materials should be based on the frequency of need. Special bins should be used for odd shapes or fragile material and height limitations should be determined when planning storage space
- Lumber cannot be stacked more than 16 feet high if moved by hand or more than 20 feet high if moved by forklift
- All nails must be removed from used lumber before stacking. Lumber must be stacked and leveled on solid supports and the stacks must be stable and self-supporting
- Stacks of loose bricks cannot be greater than seven (7) feet high. At four (4) feet, the stack will be tapered back two (2) inches for every foot above four (4) feet. At six (6) feet, the stack will be tapered back one-half block for each tier above six (6) feet
- Bags and bundles must be stacked in interlocking rows to remain secure
- Bagged material must be stacked by stepping back the layers and cross-keying the bags at least every 10 layers
- Boxed materials must be banded or held in place with cross-ties or shrink wrap plastic fiber
- Drums, barrels, and kegs must be stacked symmetrical. When stored on their sides, bottom tiers must be blocked to prevent rolling
- If stacking material two (2) or more tiers high, the bottom tier must be choked to prevent shifting in either direction
- When stacked on end, planks or sheets of plywood or pallets must be placed between each tier to provide a flat, firm surface
- Cylindrical materials, bar stock, and structural steel must be blocked or stored in racks
- Racks will not face main aisles or traffic lanes nor create hazards to passersby when supplies are being removed. When racks are not available, material will be stacked and blocked to prevent spreading or tilting
- Large structural steel beams will be placed on solid level ground. They should be braced, especially when the height exceeds the width, to prevent accidental tipping over

Banding

- Hazards associated with steel strapping include shifting or moving loads, loose ends, whipping, improper use of banding as handholds, tripping over banding and cuts from sharp edges
- Banding shall be removed with caution because loads may have shifted during transport and can tumble when tension is released
- When tension is released from removal of banding or breaks caused by incorrect strapping, loose ends will whip away from the package with enough force to cause serious injury. Always use caution when working around bundles strapped under pressure
- Banding is not to be used as a handhold to access the load
- Steel straps shall be disposed of as soon as possible to avoid tripping or cutting hazards
- Banding machines must be kept in good condition and employees using the machine will be properly trained
- When applying or removing banding, leather palm gloves that extend to the wrist are recommended
- Loose fitting clothes are not permitted when working around strapping machines
- Safe removal of banding from bound material will be with tools designed to cut steel banding.
- Claw hammer, crowbar, chisel or anything that applies leverage is prohibited when removing banding
- Employees and/or machinery must be clear of the work area when removing banding
- Two-hand operated strap cutters are recommended because they are designed to cut the strap and absorb the energy released when the strap is cut
- If duck billed shears must be used, place a gloved hand on the strap and make the cut so the un-grasped end is too short to reach the worker. Then, if the strap springs, it will fly away from the cutter's face and body, which should be positioned out of direct line of the strap
- Straps should be cut square and not at an angle

Manually Moving Materials

- Inspect materials for slivers that could splinter off rough or sharp edges
- Determine the weight of the load before applying force to move it
- Identify and walk the intended pathway and ensure it is clear of any hazards

- Use gloves and forearm protection when handling sharp-edge materials
- Get assistance for large and/or heavy loads
- Get assistance when visibility is imposed due to load size
- Use dunnage blocks under raised loads that require manual placement
- Attach handles and holders to loads when possible to reduce pinching or smashing fingers

Manually Operated Mechanisms

- Wheel wells with safety hooks, jibs or other lifting mechanisms should be used when manually lifting material overhead
- Equipment is to be installed as per manufacturer's recommendations
- Lifts are to be reviewed by competent person
- Hoist all loads with tag lines
- When lifting loose materials overhead a boot should be used to prevent materials from slipping out of rigging

Moving Long and/or Bulky Materials

- When carrying more than one long load, materials should be tied together in several places before being carried
- Any material that may carry a wind load requires two or more employees to handle

Mechanically Moving Materials

- Barrels must always be picked with a proper lifting device. Cutting lifting eyes into barrels to move is not acceptable
- Weight, size, and shape of the material must be determined when selecting equipment to move it
- Consult the equipment's rated load chart to determine maximum weight and condition capacity. Rating charts should be posted on the equipment and not exceeded
- Ensure that loads are centered and stable against shifting and induced dynamic loading
- Keep the load in the lowest position possible on the equipment for traveling

- Stacked loads on pallets shall be correctly piled and cross-tiered and secured with banding if necessary
- The water line and weight capacity of scale boxes and skip buckets must be clearly identified
- Scale boxes or skip buckets used for moving material or debris must be permanently rigged with a bolt and pin shackle and may not be loaded above their water line or exceed weight capacity
- Lifting boxes must be proof tested by a qualified person to 125% capacity
- Daily visual inspections must be performed on all lifting boxes

Conveyors

General Requirements

- Employees must never ride on material handling conveyors
- Where the conveyor passes over work areas or aisles, guards must be provided to keep employees from being struck by falling objects
- Crossovers must be guarded to protect employees and either marked with a warning sign or painted a highly visible color
- Screw conveyors must be completely covered except at loading and discharge points

Guards and Emergency Stops

- Guards must be provided at loading and discharge points to protect employees from contacting the moving screw
- Guards are moveable and must be interlocked to prevent conveyor movement when not in place
- Emergency buttons or pull cords designed to stop the conveyor must be installed at the employee workstation or the station must be adequately guarded to positively prevent all injury exposure
- Access points on the conveyor should have an emergency stop cable that extends the entire length of exposed belt or be guarded
- The emergency stop switch must be designed to be reset before the conveyor can be restarted

Disposal of Waste Material

General Requirements

- When materials must be dropped more than 20 feet to any point lying outside the exterior walls of a structure, an enclosed chute of wood or equivalent material will be used as a ramp
- When debris is dropped through holes or openings in the floor without the use of a chute, the area onto which the material is dropped will be completely enclosed with barricades
- Enclosure requirements
  - Barricades must be at least 42 inches high and at least six feet back from the projected edge of the opening above
  - Wind velocity and its potential for carrying materials should be calculated into the disposal plan
  - Signs warning of the hazard of falling materials should be posted at each level
  - A spotter may be posted at the area of retrieval to keep area clear of unnecessary traffic
  - Debris will not be removed from the disposal site until all handling ceases from above
- All scrap lumber, waste material and rubbish should be removed from the immediate work area as the work progresses
- All solvent waste, oily rags, and flammable liquids should be kept in fire resistant covered containers until removed from the jobsite
- Used oil will be recycled

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Required inspections	EH&S Professional	Enter project specific Document/Records/Performance Indicators
Proof testing for lifting boxes	Superintendent	Documentation of proof test
Daily visual rigging inspections with monthly documentation	User/Assigned Competent Person	Documentation of rigging inspections

Develop waste management plan	EH&S Professional	Waste management plan
Maintain hoisting equipment register to record and track all lifting components requiring certification	EH&S Professional	Enter project specific Document/Records/Performance Indicators
Develop and implement an incoming and outgoing delivery system	Superintendent	Delivery schedules Loading/unloading schedules
Identify designated loading/unloading areas	Superintendent	Project drawings
Identify communication systems	Superintendent	Enter project specific Document/Records/Performance Indicators
Equipment inspections	EH&S Professional	Enter project specific Document/Records/Performance Indicators
Installation of signs, barriers and shields	Superintendent	Enter project specific Document/Records/Performance Indicators

Applicable Training

Potential Related Safety, Health and /or Environmental Aspects

Motor Vehicles and Mechanized Equipment

Objective

The purpose of this program is to establish rules and regulations for safe operation of motor vehicles and mechanized equipment.

Legal and Other Requirements

Federal, State, Local Regulations

- OSHA 29 CFR 1910.178
- OSHA 29 CFR 1926.20
- OSHA 29 CFR 1926.600

Skanska/Client Requirements

- The Port Authority of NY/NJ Requirements

Procedure

General Requirements

- Employees must have appropriate license and/or training to operate vehicles and equipment
- Parked equipment 1 ton or greater in capacity shall have a wheel chocked and parking brake set
- No modifications that affect the capacity of safe operation of equipment will be made
- Daily visual inspections and all applicable checklists must be completed prior to use and submitted to supervisor daily
- All safety defects will be corrected before the equipment is used or other controls must be implemented with the approval of supervision
- All equipment with roll over protective structures (ROPS) must have a seat belt that is worn at all times
- Seat belts must be worn in all vehicles

- Construction vehicles greater than a pickup truck must be equipped with an audible reverse signal alarm. In urban areas, a “white noise” alarm may be required
- Equipment left unattended at night next to a highway or active construction area must have lights or reflectors to identify the location of the equipment
- Construction vehicles and equipment that are not equipped with a reverse-signal alarm by the manufacturer are required to be retrofitted with an alarm prior to mobilization and use on site.
    - Where immediate correction is not feasible, these vehicles and/or equipment shall either be removed from service immediately until the reverse signal alarm is repaired or a designated spotter shall be assigned
- All haulage vehicles, loaders, cranes, shovels etc., must have a cab shield and/or canopy
- All rubber-tired equipment will be equipped with fenders when provided by manufacturer
- Tools and equipment must be secured when transported in employee compartment
- Never short across the starter terminals or across the batteries, as this could bypass the engine neutral-start system as well as damage the electrical system
- Prior to starting the engine or beginning to move the equipment, a walk around inspection is required
- Mount and dismount the equipment only where steps and/or handholds are provided
- Passengers are not permitted in equipment cabs unless additional seat, seat belt, and ROPS or falling object protective structure (FOPS) are provided
- Riding in the bed of pick-up trucks is prohibited
- Do not operate equipment above posted speed limits
- Pushing equipment with vehicles or other equipment is strictly prohibited

Backing and Spotters

All backing operations shall be controlled

- Designated Spotters shall be used where the vehicle or equipment has an obstructed view to the rear
- Only a Construction Work Plan specifically identifying the approved controls shall be used in lieu of a spotter.

- A spotter must be used when workers on foot are potentially exposed to backing operations
- If the operator loses visual contact with the spotter, the vehicle shall immediately be brought to a full stop until visual contact with the spotter is reestablished
- Spotters shall be trained and designated prior to being allowed to be a spotter
- Spotters shall be issued a hard hat sticker that shall be placed on the left hand side of their hard hat indicating that they have been trained.
- Designated spotters shall be readily identifiable, such as with a specific color hard hat, vest, etc.
- Designated spotters will be personnel assigned to reverse signaling activities. The designated spotter shall:
- Daytime designated spotter PPE – must have a minimum ANSI approved Class 2 safety vest with retro-reflective material and spotter gloves.
    - Nighttime designated spotter PPE – must have a minimum ANSI Class 3 safety vest with retro-reflective material, and two lighted red traffic wands.
    - During Day or Night operations the designated spotter shall be visible at a minimum distance of 1,000 feet.
- Not engage in any activities that could pose a distraction, other than those related to the vehicle or equipment being signaled
- Always maintain visual contact with the operator of the vehicle or equipment and do not cross behind in close proximity while it is operating in reverse
- Maintain a safe working distance from the vehicle or equipment
- Light duty vehicles, which Do NOT have a reverse signal alarm and Do NOT have an obstructed view to the rear, are required to do the following.
    - Make every attempt to back the vehicle into a parking space when you arrive, or pull through to eliminate the need to back out of a parking space or work area.
    - If backing is necessary, perform a 360 degree walk around inspection and sound the horn with 2 short blasts; then wait two seconds before proceeding in reverse
- Construction equipment, heavy and light duty vehicles equipped with video or proximity sensor technology are NOT exempt from the use of a spotter if they have an obstructed view to the rear.

Maintenance

- Implement an equipment maintenance program
- Heavy equipment that is suspended or held aloft by use of slings, hoists, or jacks will be substantially blocked or cribbed to prevent falling and shifting. Safety tire rack cage or equivalent protection will be provided and used when changing tires with split rims or rims equipped with locking rings
- Trucks with dump bodies will be equipped with permanent positive protection capable of being locked to prevent accidental lowering of the body when maintenance or inspection work is done
- All equipment is required to be locked and tagged out prior to maintenance operations
- Replace all damaged or worn parts prior to use

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Review and approve Construction Work Plan	Project Manager, Superintendent, EHS Professional	Signed Construction Work Plans
Conduct crew reviews	Superintendent	Crew reviews
Required inspections	User/Assigned Competent Person	Enter project specific Document/Records/Performance Indicators
Verification of training/license	EH&S Professional	Training records
Routine maintenance	Superintendent	Maintenance records
Waste storage/disposal from maintenance operations	Superintendent	Enter project specific Document/Records/Performance Indicators

Applicable Training

Potential Related Safety, Health and/or Environmental Aspects

Pile Driving

Objective

The purpose of this program is to establish a safe operating procedure for the use of pile drivers and pile driving equipment.

Legal and Other Requirements

Federal, State, Local Regulations

- OSHA 29 CFR 1926.603
- American Society of Mechanical Engineers, Pressure Vessels Codes Section VIII

Skanska/Client Requirements

- The Port Authority of NY/NJ Requirements

Procedure

General Requirements

- Identify potential risks pertaining to driving and cutting piles of any type (overhead power lines, underground utility vaults, unstable ground, existing utilities, etc.)
- No pile driving work will occur until it is verified that no underground utilities exist where piles will be driven or existing underground utility locations have been verified by hand or vacuum excavation
- Ensure adequate manpower is provided allowing for safe execution of all pile driving activities including pile cutting
- Ensure that the geologic bearing strata profiles are identified prior to executing pile driving activities
- Ensure the appropriate pile lengths have been procured and placed in relation to the geologic bearing profiles limiting need to cut excessive pile lengths above grade
- Loading and offloading of piles or sheets from trucks with beds over six (6) feet high requires fall protection

- All employees conducting pile operations above six feet will use 100 percent fall protection, including while in aerial work platforms (AWP)
- All employees will be kept clear when piling is being hoisted into the leads
- Outriggers and rubber-tired equipment must be in position to provide maximum stability when in use
- In cuts, fills or other areas where soil may be unstable, mats and substantial cribbing should be used for supports
- Mechanical pile-threaders and remote release shackles that are operated from the ground are the first choice when planning operations
- Steam or air supply lines must have shut off valves within easy reach of operators
- When piles are being driven in an excavated pit, appropriate support of excavation (SOE) will be used
- When steel pipe piles are being "blown out" employees will be kept well beyond the range of falling materials
- A tag line will be attached to the blow pipe for steadying during operations
- Precautions will be taken to prevent exposure to items falling from above such as cushion blocks, auger spoils, pile chips, and steel debris
- No personnel involved with the pile driving operation will stand in front of the leads while driving piles
- When the top worker is guiding a pile into position in the leads, they should be cautioned against putting their arms or hands between the pile and the inside guide, or on top of the pile
- Blocking will be provided on top of booms to prevent damage to lacings from hoist line whipping
- A strong ladder, securely fastened, should extend the height of the rig, and should be maintained in good condition at all times
- Stop-blocks will be provided for the leads to prevent the hammer from being raised against the head-block
- A blocking device, capable of safely supporting the weight of the hammer, will be provided for placement in the leads under the hammer while employees are working under the hammer
- Guards will be provided across the top of the head-block to prevent the cable from jumping out of the sheaves
- When the leads must be inclined in the driving of batter piles, provisions will be made to stabilize the leads

- Fixed leads will be provided with a ladder and adequate rings and a ladder safety climbing device
- If the leads are provided with platforms, they will be protected by standard guardrails
- Hoisting of all piling will be done by use of a closed shackle or other positive means of attachment that will prevent accidental disengagement
- Riding the ball, hook, or loads is prohibited
- A boatswain's chair is not allowed during any pile driving activity
- If piling cannot be pulled without exceeding the load rating of equipment, a pile extractor will be used
- Dogs on pile driver hoist drums that automatically disengage either by relieving the load or rotating the drum will be prohibited
- Pile hammers will be lowered to the bottom of leads while pile driver is being moved
- Safe access to the top of the crane and any attached power units will be provided
- All signaling will be performed by a certified and/or qualified signal person
- Access into a pile driving area will require coordination with the pile driving foreman
- Hose connections will be secured by at least one and a quarter inch diameter chain or equivalent wire rope to prevent whipping
- Stirrups will be provided on sheet piling to aid in guiding the pile in place
- For pile other than sheet piles, a driving head or bonnet is required to bell the head
- Stop blocks are required for the leads to prevent the hammer from striking the head block
- Pits or excavations that piles are being driven into will be properly braced, sheet-piled or sloped, and barricades will be provided
- When driving jacked piles, the pits will be provided with access ladders and curbs to prevent material from falling into the pit
- Engineered design solutions specific to the pile type/dimensions including support tab patterns allowing for safe removal of pile sections must be followed
- Review plumb of pile prior to cutting determining potential for eccentric loading risk
- Pile sections more than five feet above grade must be secured and removed by appropriate mechanical means (e.g., loader, excavator, pile driving rig, crane, etc.). The cut pile section should then be lowered by mechanical means
- Pile sections less than five feet may be manually displaced using tab utilization process in conjunction with safe working practices detailed in Construction Work Plan
- When pile tops are cut, a controlled access zone shall be established two and a half times the length of the longest pile that is to be cut

- Ensure that no pile driving activity is taking place within the controlled access zone

Personal Protective Equipment (PPE)

- Adequate hearing protection must be provided based on occupational noise monitoring
- Use caution if driving creosoted wood piles, as the hammer impact may spray creosote, injuring the eyes, skin, and lungs. Double eye protection, Tyvek® suits, and respiratory protection may be required

Inspection and Maintenance of Pile Driving Equipment

- The use of metal-armored hoses is recommended to be used when possible
- Air hammer, steam or air hoses will be securely fastened to the hammer with an adequate length of at least one and a quarter inch diameter chain or cable to prevent whipping or spraying of steam or air
- Defective air or steam hoses shall be replaced or repaired in accordance with the manufacturer's recommendations before reuse
- All moving parts in the lead must be lubricated in accordance with manufacturer's recommendations
- Whip checks, or equivalent means, must be provided for each hose connection to prevent the line from thrashing around in case the coupling becomes disconnected
- Hooks, slings, leads and all other connections must be checked for damage and cracking prior to mobilization and periodically during use
- When shutting down rigs, all pressure must be relieved from lines
- When not in use, hammer must be lowered to the base of the leads and blocked
- All equipment is required to be locked and tagged out prior to maintenance operations. Consider steam and/or air pressure

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Develop pile driving location plan	Superintendent	Enter project specific Document/Records/Performance Indicators

Equipment inspections	User/Assigned Competent Person	Inspection records
Compliance audits	EH&S Professional	Compliance audits and findings
Evaluate ground conditions, including geologic data	Superintendent	Enter project specific Document/Records/Performance Indicators
Identify existing utilities (Call before you dig)	Superintendent	Enter project specific Document/Records/Performance Indicators
Implement maintenance program	Superintendent	Enter project specific Document/Records/Performance Indicators
Develop lifting plan	Superintendent	Enter project specific Document/Records/Performance Indicators
Occupational noise monitoring	EH&S Professional	Enter project specific Document/Records/Performance Indicators
Noise and vibration monitoring	EH&S Professional	Enter project specific Document/Records/Performance Indicators

Applicable Training

Potential Related Safety, Health and/or Environmental Aspects

Rigging

Objective

The following policy and procedures support the safe use, maintenance, and inspection of rigging equipment and associated gear on all projects.

Legal and Other Requirements

Federal, State, Local Regulations

- OSHA 29 CFR 1926.32

Skanska/Client Requirements

- The Port Authority of NY/NJ Requirements

Procedure

Rigging Plan

A detailed rigging plan must be attached to the construction work plan (CWP) for all categories of lifts. The rigging plan must be completed by a qualified person and documented on the rigging plan form.

General Requirements

- A designated person shall inspect all new rigging equipment before it is placed into service
- Visual inspection for damage will be performed by the user or other designated person prior to each use. Written records are not required for these inspections.
- A documented monthly inspection of all rigging must be completed by a designated person. RFID technology may be used to document monthly inspections.
- Chains will not be used for rigging purposes
- Enter project-specific procedure

Lifting Devices

- Any purchased lifting device must be stamped with the maximum working load limit, date of manufacture, and manufacturer's name
- A lifting device may be engineered by a qualified person and fabricated. Before use, the lifting device must be sent out to a professional testing service and the lifting device must be tested to five times the intended lifting load weight
- The lifting device must be tagged with the date of test and the working load limit
- All testing documentation must be kept on file at the jobsite

Storage

- All rigging must be properly stored at the end of each shift
- Rigging will not be stored in the immediate work area
- All rigging will be stored in an area where it will not be subjected to mechanical damage, corrosive action, moisture, direct sunlight, extreme temperatures, or kinking
- When possible a storage box will be supplied and designated for rigging storage

Synthetic, Round, and Wire Rope Slings

Proper use:

- Synthetic slings will not be shortened with knots, bolts, or other makeshift devices
- Sling legs will not be kinked
- Slings will not be loaded in excess of their rated capacities
- Slings used in a basket hitch will have the loads balanced to prevent slippage
- Slings will be securely attached to their loads
- Slings will be padded or protected from the sharp edges of their loads
- Shock loading is prohibited
- All loads will be placed on dunnage so the load is not resting on the sling
- A competent person will inspect slings and attachments before and after each lift.
- All damaged equipment will be taken out of service and destroyed to prevent future use

Removal criteria for synthetic web/round slings:

- Acid or caustic burns

- Melting or charring of any part of the sling surface
- Snags, punctures, tears or cuts
- Broken or worn stitches or distortion of fittings
- Missing or illegible identification tags
- Holes, tears, cuts, abrasive wear, or snags that expose the core yarns
- Discoloration, brittle, or stiff areas on any part of the sling that may indicate damage
- Other conditions that cause doubt as to the continued use of the sling

Removal criteria for wire rope sling:

- Ten randomly distributed broken wires in one rope lay, or five broken wires in one strand in one rope lay
- Wear or scraping of one-third the original diameter of outside individual wires
- Kinking, crushing, bird caging or any other damage resulting in distortion of the wire rope structure
- Evidence of heat damage
- Missing or illegible identification tags

<u>Hardware</u>

Proper Use:

- Only American-made hardware that is incompliance with ANSI requirements (Crosby shackles) will be permitted
- For long-term installations, bolt type shackles will be used; if screw pin type shackles are used, the pin will be secured from rotation or loosening
- The screw pin will be fully engaged and in contact with the shackle body
- If a shackle is designed for a cotter pin, it will be used and maintained in good working condition
- The load applied to the shackle will be centered in the bow of the shackle to prevent side loading
- Multiple sling legs will not be applied to the shackle pin
- Multiple slings in the body of a shackle will not exceed 120 degrees in angle

- If the shackle is to be side loaded, the rated load will be reduced according to the recommendations of the manufacturer or a qualified person
- The screw pin shackle will not be rigged in a manner that would cause the pin to unscrew
- When a shackle is used in a choker hitch, the pin will be connected to the choking eye of the sling

Hardware Removal Criteria

- Missing or illegible manufacturer's name or trademark and/or rated load identification (or size as required)
- A 10 percent or more reduction of the original dimension
- Bent, twisted, distorted, stretched, elongated, cracked or broken load bearing components, excessive nicks, gouges, pitting and corrosion
- Indications of heat damage including weld spatter or arc strikes
- Loose or missing nuts, bolts, cotter pins, snap rings or other fasteners and retaining devices
- Use of unauthorized replacement components
- Other visible conditions that cause doubt as to the continued use of the hardware

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Develop rigging plan	Superintendent	Rigging plan
Rigging inspections	EH&S Professional	Inspection records
Engineering and proof testing	Superintendent	Engineered drawings Proof testing results
Identify rigging storage locations	Superintendent	Enter project specific Document/Records/Performance Indicators

Applicable Training

- Rigging training

Potential Related Safety, Health and/or Environmental Aspects

Scaffolds

Objective

The purpose of this program is to establish guidelines for working on or around scaffolding. This program will inform employees about the hazards of working with scaffolding, the proper terminology, different types of scaffolds and tagging systems.

Legal and Other Requirements

Federal, State, Local Regulations

- OSHA 29 CFR 1910.145
- OSHA 29 CFR 1926.200
- OSHA 29 CFR 1926.450 Subpart L
- OSHA 29 CFR 1926.451
- OSHA 29 CFR 1926.454
- American Lumber Standards

Skanska/Client Requirements

- PA NY/NJ

Procedure

General Requirements

- Workers who use and construct scaffolding will be trained in the following:
  - Types of scaffolding hazards: electrical, fall and falling objects
  - Correct procedures for erecting and maintaining scaffolding
  - Maximum intended load and intended use of the scaffold
- Scaffolds will be securely anchored, set plumb, and capable of carrying the maximum intended load without settling or displacement
- Identify and label the maximum working load for each scaffold

  - The maximum intended load is the total load of all persons, equipment, tools, materials, transmitted loads and other anticipated loads to be applied to a scaffold or scaffold component at any one time
- All scaffolds must be capable of supporting at least four times the maximum intended load
- Unstable objects, such as barrels, boxes, loose brick or concrete blocks, may not be used to support scaffolds or planks
- The use of shore or lean-to scaffolding is prohibited
- No scaffold may be erected, dismantled, or altered except under the supervision of competent persons
- Any scaffold component, including braces, brackets, trusses, screw legs, ladders, etc., that has been damaged or weakened in any way must be immediately repaired or replaced
- An access ladder or equivalent safe access to the scaffold must be provided
- Diagonal bracing and scaffold rungs are not to be used to access the scaffold unless their design incorporates an approved ladder
- When employees must work underneath a scaffold, an 18-gauge screen, a half inch wire mesh or equivalent protection must be placed between the toe board and the guardrail
- All wooden load-carrying components of scaffold framing must be a minimum of 1,500 fiber construction grade lumber
- All dimensions are nominal sizes as provided in the American Lumber Standards
- Scaffold tagging procedures must be followed at all times
  - Scaffolding will be tagged appropriately during erecting, use, and dismantling
  - All scaffolds will have a daily documented inspection by job superintendent or designated competent person before use
  - Tags will be located at each access point and kept current

Scaffolding Tag Identification Code

- Red Tag = DO NOT USE
  - Prohibits use of scaffolding
- Yellow Tag = NOT ERECTED TO CODE
  - Indicates restriction or special use conditions of scaffold, i.e. a requirement for fall protection
- Green Tag = APPROVED FOR USE

- Indicates scaffold is erected to all safety standards and company policies and is ready for use

Planking

- All planking will be two (2) inches by 10 inches scaffold-grade or equivalent, as recognized by approved grading rules for species of wood used
- Laminated planking that provides the equivalent strength of scaffold grade planking is also permitted
- The maximum permissible span for two (2) inches by 10 inches or wider planks of full thickness undressed lumber is:
  - 10 feet with a working load of 25 per square foot (psf)
  - 8 feet with a working load of 50 psf
  - 6 feet with a working load of 75 psf
- The maximum permissible spans for two (2) inches by 10 inches or wider planks of nominal thickness lumber (not recommended for heavy use) are:
  - 8 feet with a working load of 25 psf
  - 6 feet with a working load of 50 psf
- All planking must overlap by a minimum of 12 inches, or be secured from movement
- Scaffold planks must extend over their end supports at least six inches but no more than twelve inches (unless cleated to prevent slipping)
- All working levels on scaffolds will be fully planked

Guardrails and Toe boards

- Guardrails and toe boards must be installed on all open sides and ends of platforms more than six feet above the ground or floor, except needle beam scaffolds and float scaffolds
- Guardrails must be 42 inches high with a three (3) inch tolerance and a mid-rail. Supports must be at intervals not to exceed eight (8) feet
- Toe boards must be at least one (1) inch by four (4) inches lumber or equivalent

Tubular Welded Frame Scaffolds

- Cross bracing and/or diagonal bracing is required to secure vertical members laterally

- Cross bracing must square and align vertical member to keep scaffolding plumb at all times
- All bracing connections must be secure
- Legs must be set on adjustable bases, mud sills, or other foundations adequate to support the maximum load
- Frames will be placed on top of another using coupling or stacking pins for vertical alignment
- Panels will be locked together vertically by pins or other equivalent suitable means to prevent uplifting
- Scaffolding will be secured to a structure at intervals no greater than 30 feet horizontally or 26 feet vertically
- Drawings and specifications for all frame scaffolds over 125 feet above the base plates must be designed by a registered professional engineer
- Upon receipt of shipment of tubular scaffolds, always inspect all components

Manually Propelled Ladder Stands and Scaffolds

The design and construction of mobile work platforms (ladder stands) and rolling (mobile) scaffolds (towers) will conform to the following:

- The designed working load of ladder stands must be calculated on the basis of one or more individuals weighing 200 pounds with 50 pounds of equipment per person
- Light duty scaffolds must be designed and constructed to carry a working load of 25 pounds per square foot
- Medium duty scaffolds must be designed and constructed to carry a working load of 50 pounds per square foot
- Heavy duty scaffolds must be designed and constructed to carry a working load of 75 pounds per square foot
- All ladder stands and scaffolds must be capable of supporting at least four times the designed working load
- The height of rolling scaffolds will not exceed four times the minimum base dimension
- The material selected must be strong enough to meet test requirements and must be protected against corrosion and deterioration

- The materials used must meet manufacturer's standards, including strength, dimension and weight specifications, and they must safely support the working load
- Nails, bolts and other fasteners used in the construction of ladders, scaffolds and towers must be of adequate size and in sufficient number to develop the designed strength of the unit
- Nails must be driven full length
- Steps must be fabricated from slip-resistant treads
- Leveling of elevated work platforms, screw jacks or other suitable means for adjusting the height must be provided in the base section of each unit
- No one will ride rolling scaffolds when they are being moved
- Rolling scaffolds will only be used on level surfaces
- Caster brakes must be locked when the scaffold is in use or not in motion
- Loose material and equipment will be secured or removed before moving scaffold
- Any exposed surface must be free of sharp edges, burrs, or other hazards

Suspended Scaffolds (Swing Stage Scaffold)

- Suspended scaffolds will not be less than 20 inches nor more than 36 inches wide
- Wire, synthetic or fiber rope used for scaffold suspension must support at least six times the maximum intended load
- Non-conducting, insulated material will be placed over scaffold suspension cables if there is any chance of contact with an electrical arc
- Employees working from a two-point suspended scaffold must wear a full body harness and be tied off to an independent lifeline
- Multi-stage scaffolds require additional safety suspension lines and fall protection devices
- Ropes will be protected from burning or welding operations

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Daily inspections	User/assigned competent person	Inspection records Scaffold tags

Ensure that there is a competent person onsite at all times when scaffolding is being used	EH&S Professional	Enter project specific Document/Records/Performance Indicators
Supervise the erection and use of scaffolding systems	Superintendent	Scaffold erection permit
Scaffold design	Project Engineer	Engineered drawings and calculations Scaffold maximum working load
Enter project-specific information here	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance Indicators

Applicable Training

- Scaffold user training
- Scaffold erector training
- 4 Hour user cards
- 32 hour scaffold erector/dismantled card

Potential Related Safety, Health and/or Environmental Aspects

Signs, Signals and Barricades

Objective

The purpose of this program is to establish safe working guidelines for using signs, signals and barricades as part of a hazard warning system.

Legal and Other Requirements

- OSHA 29CFR 1926.200
- ANSI D6.1-1971
- ANSI Z53.1-1967

Federal, State, Local Regulations

Skanska Requirements/Client Requirements

PA NY/NJ requirements

Procedure

General Requirements

- The project shall have a consistent means of identifying local or general hazards. A Hazard Warning System must be understandable by all employees, subcontractors and visitors.
- When signs are used on the project, they must be consistently the same throughout the project

Signs/Signals

- Signs when required shall be visible at all times when work is being performed, and shall be removed promptly when the purpose for them no longer exist.
- Danger signs shall be used only where an immediate hazard exists and have red as the predominating color for the upper panel; black out line on the borders; and a white lower panel for additional sign wording.

- Caution signs shall be used only to warn against potential hazards and have yellow as the predominate color; black upper panel and borders; yellow lettering of "caution" on the black panel; and the lower yellow panel for additional sign wording. Black lettering shall be used for additional wording.
- Exit signs, when required, shall be lettered in legible red letters, not less than six (6) inches high, on a white field and the principal stroke of the letters shall be at least three-fourths inch in width.
- Safety instruction signs, shall be white with green upper panel with white letters to convey the principal message. Any additional wording on the sign shall be black letters on the white background.
- Directional signs, other than automotive traffic signs, shall be white with a black panel and a white directional symbol. Any additional wording on the sign shall be black letters on the white background.
- Construction areas shall be posted with legible traffic signs at points of hazard.
- All traffic control signs or signals shall be normal highway signs or signals.
- Accident prevention tags shall be used as a temporary means of warning employees of an existing hazard, such as defective tools, equipment etc. They shall not be used in place of, or as a substitute for, accident prevention signs.

Barricades

- Barricades shall be visible at all times when work is being performed, and shall be removed promptly when the hazard no longer exist.
- Yellow and red chain/rope shall be the preferred material in lieu of tape.
- Barricade tape, when used, shall be a minimum of two (2) inches wide and be colored red and black for "danger" and yellow and black for "caution". If timber barricade is used it should be painted with the same colors as barricade tape or the appropriate tape should be affixed to it.
- Red and black barricade tape shall be used to designate an area of danger. Only the individual(s) who establishes a "danger area" may allow employees to enter. All others shall go around.
- Yellow and black barricade tape shall be used to designate an area of caution.
- If barricade tape is to be used, it shall only be "re-enforced" barricade tape.
- All barricades shall be signed designating the hazard that the barricade is protecting
- Employees shall be allowed to move through an area marked with the caution tape but only with knowledge of why the area is marked.
- Employees are not allowed to enter a red barricaded area without permission from the supervisor responsible for the hazard in that area.

- Signs shall be placed with the barricade tape to identify the hazards and the person identifying the hazard.

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Evaluate work area for the need to use signs/signals/barricades	Superintendent	Enter project specific Document/Records/Performance Indicators
Required inspections	EH&S Professional	Enter project specific Document/Records/Performance Indicators

Applicable Training

Potential Related Safety, Health and/or Environmental Aspects

Stairways and Ladders

Objective

The purpose of this program is to establish rules regarding the proper design and the safe use of stairways and ladders on our projects.

Legal and Other Requirements

Federal, State, Local Regulations

- OSHA 29 CFR 1926.1050
- OSHA 29 CFR 1926.1051

- OSHA 29 CFR 1926.1052
- OSHA 29 CFR 1926.1053
- OSHA 29 CFR 1926.1060

Skanska/Client Requirements

- PA NY/NJ requirements

Ladders Last

Prior to beginning work, the crew will evaluate all tasks that require individuals to work at elevated heights. It is the expectation that these tasks will be performed using methods other than a ladder. Use of portable scaffold devices, scissor lifts, scaffold towers, podium/platform ladders (acceptable only with the top rail at least 30 inches above the platform), lift pods, etc. will be the preferred method to perform work at heights.

Ladder use will be allowed only when it has been determined by the crew in conjunction with Skanska project management that it is not feasible to use all other options to complete the task. If it is determined that a ladder must be used the need will be documented and acknowledged in the Construction Work Plan:

Procedure

General Requirements

- When there is only one point of access between levels, it must be kept clear to permit free passage by workers
- Where there is a break in access elevation of 19 inches or more a stair/step must be installed
- Workers must maintain three points of contact at all times when climbing or descending from a ladder
- When feet are at or above the sixth rung from the bottom, 100 percent fall protection is required
- A double-cleated ladder or two or more ladders must be provided when ladders are the only means of access for 25 or more employees, or when a ladder serves simultaneous two-way traffic
- Manufactured ladders are not to be modified without manufacturer’s consent

- Ladder rungs, cleats, and steps must be parallel, level and uniformly spaced
- Ladders must not be tied or fastened together to create longer sections unless they are specifically designed for such use. If splicing is necessary, a competent person will design the splice
- During pit excavations, a job-built ladder will be built to accommodate the adding of additional rungs as the depth of the excavation increases
- Two or more separate ladders used to reach an elevated work area must be offset with a platform or landing between the ladders
- Wooden ladders will not be painted, except for identification or warning labels placed only on one face of a side rail
- Metal ladders are prohibited on all job sites
- Ladders will not be used in a horizontal position for use as platforms, runways, or scaffolds
- The minimum clear distance between side rails for all portable ladders is 11 and a half inches
- All stepladders must have a metal spreader or locking device
- Stepladders may not be used in any configuration other than completely open, locked in place and sitting on firm, level ground
- Where access is required for elevation difference of 30 feet or greater ladders are not permitted
- All ladders must be used per the manufacturer's requirements
- Self-supporting portable ladders and non-supporting portable ladders must be capable of supporting at least four times the maximum intended load, except Type 1A (Extra Heavy Duty), which must sustain 3.3 times the maximum intended load

Ladder Safety Practices

Set-up and Use

- When ladders are used to access an upper landing, the side rails must extend at least three feet above the upper landing so an employee can walk through the ladder by gripping the side rails while stepping onto the landing
- When an extension is not possible, the ladder must be secured at the top to a rigid support that will not deflect and a grasping device, such as a grab rail, will be provided to assist employees in accessing the ladder

- The grasping device must be close enough for an employee to reach without stooping or stretching
- Under no circumstance may the extension cause the ladder to deflect under a load or slip off its support
- Non self-supporting ladders must be angled so that the horizontal distance from the top support to the toe of the ladder is approximately one-quarter the working length of the ladder
- Ladders must be maintained free of oil, grease and other slipping hazards
- Ladders must not be loaded beyond the maximum intended load or beyond the manufacturer's rated capacity
- Ladders must be used only for the purpose for which they were designed
- Ladders must be used only on stable and level surfaces unless secured to prevent accidental displacement
- They must not be used on slippery surfaces unless secured or provided with slip-resistant feet to prevent accidental displacement
- Slip-resistant feet must not be used as a substitute for care in placing, lashing or holding a ladder that is used upon slippery surfaces including, but not limited to, flat metal or concrete surfaces that may become slippery
- Ladders placed in passageways, doorways or driveways, must be barricaded to keep the activities or traffic away from the ladder
- The area around the top and bottom of ladders must be kept clear of debris and obstructions that would present a tripping hazard or otherwise obstruct employees ascending or descending the ladder
- The top of a non-self-supporting ladder must be placed with the two rails supported equally unless it is equipped with a single support attachment
- Ladders must not be moved, shifted or extended while occupied
- The top or top step of a stepladder must not be used as a work platform
- Cross-bracing on the rear section of stepladders must not be used for climbing unless the ladders are designed for and provided with steps for climbing on both front and rear sections
- Single-rail ladders must not be used
- Ladders will be tied, blocked or otherwise secured to prevent displacement

Housekeeping

- Electrical cords, air hoses, welding leads and other obstructions will not impede access at the top or bottom of access
- Should the ladder be located in an area susceptible to mud, water or snow, it will be inspected prior to use and relocated as needed
- In areas where muddy conditions are present, crushed stone and/or grating will be located at the bottom to prevent slipping while climbing

Ladder Inspection and Repair

- A competent person will inspect ladders each shift for visible defects and after any situation that may have affected their safe use
- Portable and fixed ladders with structural defects, such as, but not limited to, broken or missing rungs, cleats or steps, broken or split rails, corroded components or other faulty or defective components, must be withdrawn from service by either immediately marking the ladder in a manner that readily identifies it as defective, or tagging it with "Do Not Use" or similar notices
- A ladder can also be removed from service by blocking it with plywood or other attachment that spans several rungs
- A system to label ladders that verify inspections will be used for all ladders. Inspections must be documented on tags a minimum of once per week

<u>Job Made Ladders</u>

- A competent person who has been designated by the job superintendent will build job-made ladders
- Job-built ladder repairs must restore the ladder to a condition meeting its original design criteria before the ladder is returned to service
- Single cleat ladders, for use by 24 or fewer employees, will not exceed 30 feet in length
  - Width will be 15 to 20 inches at the top, side rails will be parallel or flared top to bottom not more than ¼ inch for each two feet of length

  - Two (2) inch by four (4) inch lumber will be used for side rails up to 16 feet long; two (2) inch by six (6) inch lumber will be used for ladders 16 to 30 feet long
- Double cleat ladders, for use by 25 or more employees or for two-way traffic; will not exceed 24 feet in length
  - Side and middle rails will be two (2) inch by four (4) inch lumber up to 12 feet in length; two (2) inch by six (6) inch lumber from 12 to 24 feet in length
- Cleats will:
  - Be set into the edges of the side rails half-inch, or have filler blocks placed between them
  - Be secured with three 10d common wire nails (or equivalent). Double headed nails will not be used
  - Be spaced 12 inches top to top
  - When using three-quarter inch thick cleats, the width will be determined by the length of the cleat as shown below:

Length of Cleat (inches)	Width (inches)
Up to and including 20 inches	Three and an half
Over 10 inches and up to and including 30 inches	Three and three-quarters

Wood materials acceptable for three-quarter inch thick cleats		
Oregon Ash	Hackberry	Red Oak
Pumpkin Ash	Hickory	White Oak
White Ash	Holly	Pecan
Beach	Western Larch	Persimmon
Birch	Locust	Southern Yellow Pine
Rock Elm	Hard Maple	Tamarack
Soft Elm	Red Maple	

- Enter project-specific procedure

Fixed Ladder Requirements

- Fixed ladders are those placed at 90 degree angle (vertically). Typical applications are utility towers, stacks, and buildings
- There will be a seven (7) inch clearance between the ladder rung and any obstruction behind the ladder to allow for proper footing
- There will be 30 inch of clearance between the centerline of the fixed ladder and any obstruction on the climbing side of the ladder. If an obstruction is encountered the tolerance can be reduced to 24 inches, provided that a deflection device is installed to guide employees around the obstruction.
- When stepping from a fixed ladder onto a ladder, the step-across distance will be between seven (7) to 12 inches. If the distance is greater than 12 inches, a platform must be installed to provide safe access.
- Fixed ladders will be provided with cages, wells, ladder safety devices or self-retracting lifeline where the length of climb is less than 24 feet but the top of the ladder is at a distance greater than 24 feet above lower levels
- Fixed ladders must support at least 500 pounds between any two connection points
    - Each rung will be capable of supporting a single concentrated load of 250 pounds applied in the middle of the rung

Ladder Safety Devices

Where the total length of the climb equals or exceeds 24 feet, fixed ladders will be equipped with one of the following:

- Self-retracting lifelines (SRLs) and rest platforms at intervals not to exceed 150 feet
- A cage or well, and multiple ladder sections not to exceed 50 feet in length
- Ladder sections will be offset from adjacent sections and landing platforms will be provided at maximum intervals of 50 feet
- Cages will be clean of projections on the inside of the cage
- The bottom of a cage will be at a level seven (7) to eight (8) feet above the point of access or landing
- The top of the cage will be a minimum of 42 inches above the top of the platform

- Ladder safety climb devices will be capable of withstanding an 18 foot drop of a 500 pound weight
- When ascending or descending a fixed ladder, a hands-free climbing device is required
- Ladder safety climb devices will be activated within two feet after a fall occurs. The connection between the ladder safety climb device and the point of attachment to the harness will not exceed nine (9) inches in length
- A qualified person will inspect all existing fixed ladders provided by the owner prior to use

Stairways

Design, Construction and Maintenance

- Stairways that will not be a permanent part of the structure on which construction work is being performed must have landings at every 12 feet or less of vertical rise
- Each landing must measure at least 30 inches long by 22 inches wide
- Stairs must be installed at an angle between 30 degrees and 50 degrees from horizontal
- Riser height and tread depth must be uniform within each flight of stairs, including any foundation structure used as one or more treads of the stair. In any stairway system, variations in riser height or tread depth must not be more than one and a quarter inch.
- All parts of stairways must be free of hazardous objects, such as protruding nails and slippery conditions on stairways must be eliminated
- Metal pan stairs shall not be used until the pans are filled to prevent a tripping hazard

Stair Rails and Handrails

- Stairways having four or more risers or rising more than 30 inches, whichever is less, will be equipped with at least one handrail and one stair rail along each unprotected side or edge
- Design and construction specification will be as follows:
  - Stair rails must be at least 36 inches high; handrails will be between 30 and 37 inches
  - When the top edge of a stair rail also serves as a handrail, its height cannot be more than 37 inches nor less than 36 inches

- For all such height provisions, measure from the support surface of the stair rail to the surface of the tread in line with the face of the riser at the forward edge of the tread
- Stair rails must include mid-rails, screens, mesh, intermediate vertical members or equivalent intermediate structural members between the top rail and the stair steps
- Mid-rails must be located halfway between the top edge of the stair rail and the stair steps. Screens or mesh must be extended from the top rail to the stair step and along the entire opening between top rail supports. Intermediate vertical members and other equivalent structural members must be not more than 19 inches apart.
- Handrails and the top stair rail must withstand a force of at least 200 pounds applied within two inches of the top edge, in any downward or outward direction
- Handrails that will not be a permanent part of a structure must have a minimum clearance of three inches between the handrail and walls, stair rail and other objects
- Handrails and stair rails must be smooth surfaced to prevent injury from punctures or lacerations and from snagging clothes.
- No duplex nails permitted in stairway construction.

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Review requirements of Ladders Last program	EH&S Professional	Ladder Authorization Permits Ladder Authorization Log
Required inspections	User/assigned competent person	Inspection records/Tags on ladders

Applicable Training

- Competent person training
- General awareness training

Potential Related Safety, Health and/or Environmental Aspects

Steel Erection

Objective

The purpose of this program is to establish safe working practices for all employees associated with steel erection activities.

Legal and Other Requirements

OSHA 29 CFR 1926 Subpart R
OSHA 29 CFR 1926 Subpart M
ANSI Z359-1-2007

Federal, State, Local Regulations

Skanska/Client Requirements

- PA NY/NJ requirements

Procedure

General Requirements

- A written steel erection plan must be developed and approved and Skanska's Notice to Commence Steel Erection form must be completed prior to work commencing
- All steel deliveries will be coordinated with the Skanska project team to ensure pedestrian/vehicular traffic around the project is controlled.
- No deliveries shall be unbound until inspected and deemed secure by a qualified person.
- Check loads to make sure there are no sharp edges that will cut into lifting slings. Use softeners where applicable

- Workers engaged in steel erection activities, including but not limited to connecting, decking, and bolt up, are not exempt from Skanska's 100 percent fall protection requirements when working from heights of six feet or greater (except where local requirements are more stringent, for example, the four foot requirement in Washington state)
- Establish controlled access zones when necessary
- Safety signs will be posted where necessary to keep people out of danger areas (i.e., Workers Overhead)
- Projecting or protruding reinforcing rods that create tripping or falling hazards will be bent or covered
- Commercially available rebar caps or job-built protection devices significant enough to provide impalement protection will be used
- Before cutting any large or heavy structural steel member, the member will be secured or supported by ropes, cables or other means to prevent dropping or uncontrolled swinging
- A tag line will be attached to all loads
- All openings in floors, temporary or permanent, will be securely planked over or guarded
- Keep working area in orderly condition with necessary equipment and materials safely arranged. Unused material should be properly stored at all times
- Lateral lines for perimeter guarding and anchorage for personal fall arrest systems should be installed on the ground, before the lift.
- A safety railing of five-sixteenths of an inch wire rope or equal will be installed, approximately 42 inches high (not less than 39 inches nor more than 45 inches), around the perimeter of all temporary-planked or temporary metal-decked floors during structural steel assembly.
- Bright colored flagging should be tied to the railing at not more that 6-foot intervals to increase visibility.

<u>Steel Assembly</u>

- Power sources will be secured and hose lines will be bled off before disconnecting tools or hose sections
- Whip checks and positive protection shall be installed on all airline hose connections/fittings

- When plumbing-up a building, related equipment shall be placed so that connection points are accessible
- Equipment used in plumbing-up shall be properly secured at all times
- Turn buckles shall be secured to prevent unwinding under stress
- During the placement of any solid web structural members, the load will not be released from the hoisting line until the members are secured with no less than two bolts, or the equivalent at each connection and drawn up wrench tight
- Containers will be provided for storing or carrying bolts, nuts and drift pins, and secured against accidental displacement when aloft
- When bolts or drift pins are being knocked out, means will be provided to keep them from falling
- Impact wrenches will be provided with a locking device for retaining the socket

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Develop/review steel erection plan	Project Manager	Steel erection plan Engineered drawings Lift and rigging plans Bolt-up and plumb-up plans
Required inspections	EH&S Professional	Enter project specific Document/Records/Performance Indicators
Complete Notice to Commence Steel Erection form	Superintendent	Enter project specific Document/Records/Performance Indicators

Applicable Training

Potential Related Safety, Health and/or Environmental Aspects

Temporary Works

Objective

The purpose of this program is to ensure that all “temporary works” or “false works,” such as temporary shoring, platforms, walkways, or scaffolds, required for the construction of the “permanent works” are identified and the appropriate criteria are executed.

Legal and Other Requirements

Federal, State, Local Regulations

- OSHA 1926 Subpart L
- OSHA 1926 Subpart P
- OSHA 1926 Subpart Q

Skanska/Client Requirements

- PA NY/NJ requirements

Procedure

- Operations shall take steps to ensure that all temporary works are adequately deployed and maintained for their intended use
- Fit for purpose review must take place prior to installing temporary works systems
- Review must include the application requirements with design engineers for task-specific design and review of manufacturer’s specifications for proprietary systems
- The documented design of the temporary works by a competent engineer or manufacturer including working drawings and specifications must be maintained on site and available for review
- Temporary works shall be identified on project schedules as part of the project look-ahead and risk assessment process
- Temporary works shall be assembled by qualified persons per the engineer’s or manufacturer’s designed criteria
- Temporary works shall be inspected daily by a competent person prior to use and tagged at all access points

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Inspections of temporary works and installation of inspection tags	User/assigned competent person	Completed inspection tags Inspection records
Identify temporary works on project	EH&S Professional	
Risk analysis of proposed systems and alternate solution review	Superintendent	Enter project specific Document/Records/Performance Indicators
Temporary works are engineered	Project Engineer	Engineering data/manufacturer's requirements
Adequate resources are allocated for design review prior to installation	Project Manager	Enter project specific Document/Records/Performance Indicators
Working drawings and specifications are available onsite	Superintendent	Drawings and specifications
Subcontractor EHS Kick-off Meeting	EH&S Professional	Meeting agenda Agenda sign in sheets

Applicable Training

- Temporary works general awareness
- Qualified persons training
- Manufacturer recommended training

Potential Related Safety, Health, and/or Environmental Aspects

Tools – Hand and Power

Objective

The purpose of this program is to establish safe work practices for the proper use and maintenance of hand and power tools.

Legal and Other Requirements

Federal, State, Local Regulations

- OSHA 29 CFR 1910.242
- OSHA 29 CFR 1910.243
- OSHA 29 CFR 1926.300

Skanska/Client Requirements

- PA NY/NJ requirements

Procedure

General Requirements

- Maintain all hand and power tools in a safe condition
- Power tools equipped with belts, gears, shafts, pulleys, sprockets, spindles, drums, fly wheels, chains or other reciprocating, rotating or moving parts of equipment will be properly guarded
- Impact tools, such as drift pins, wedges, and chisels will be kept free of mushroomed heads
- The wooden handles of tools will be kept free of splinters or cracks and will be kept tight in the tool
- All tools should be visually inspected prior to use

Power Operated Hand Tools

- Refer to the manufacturer's instruction manual prior to using all power operated tools
- Electric power operated tools will either be the approved double-insulated type or grounded
- Comply with assured grounding program/ground fault circuit interrupter (GFCI) use
- Electric power operated tools will have free-spinning clutches designed to protect against wrist injuries.
- Do not use a power tool with broken or defective insulation on the cord, defective plugs, or loose or broken switches.
- The use of electric cords for hoisting or lowering tools is not permitted
- Power tools with secondary handles must be used according to the manufacturer's requirements
- All components on the tool must be compatible per the manufacturer's requirements
- Before changing out wheels/blades or bits, disconnect the power cords or remove the battery power pack
- If using a gas powered tool considerations should be made for exhaust in enclosed working spaces

Powder Actuated Tools

Loading

- Tools will not be loaded until just prior to the intended firing time
- The tool will be tested each day before loading to see that the safety devices are in proper working condition. The method of testing will be in accordance with the manufacturer's recommended procedure.

Use

- Only trained individuals are permitted to use powder actuated tools and proof of training must be carried on the individual at all times
- The lowest velocity on the tool shall be used at all times
- Any tool found not in proper working order, or that develops a defect during use, will be immediately removed from service, tagged out and not used until properly repaired or replaced
- Neither loaded nor empty tools are to be pointed at any employees

- Keep hands clear of the open barrel end
- Loaded powder actuated tools shall never be left unattended
- Fasteners will not be driven into very hard or brittle materials including, but not limited to, cast iron, glazed tile, surface-hardened steel, glass block, face brick or hollow tile
- Sufficient backing must be in place to prevent the pin or fastener from passing completely through the surface
- No fastener will be driven into a spalled area
- The operator will never fasten closer than three inches from the edge of masonry work
- Ensure that the masonry work be at least three times as thick as the fastener penetration
- Tools will not be used in an explosive or flammable atmosphere
- All tools will be used with the correct shield, guard or attachment recommended by the manufacturer
- Safety glasses and face shields are required when using powder actuated tools

Charge Storage

- Live loads/cartridges must be stored in an approved, locked storage cabinet
- Unfired loads shall be disposed of per manufacturer's recommendations
- Explosive charges shall not be disposed of in trash containers or left unattended

Pneumatic/Hydraulic Tools

- Ensure that all couplings are installed properly.
- All hose-connections shall be inspected before each use and periodically throughout the operation
- All hoses shall be inspected prior to each use by looking for bends, kinks, or swelled areas.
- Worn out hoses shall be removed from service. Duct tape is not to be used for repairs.
- Hoses under pressure must be a reinforced wire braided type.
- Couplings under pressure shall not be disconnected unless specifically designed
- Hoses that are not in service shall be stored properly
- Hoses will not be placed in access ways or across ladder passage. Where this is unavoidable, lines should be rerouted, blocked over, or otherwise protected

- Hoses placed across vehicle roadways will be protected by means of modular hose protectors, manmade jobsite ramps, protection boards such as wood blocking (two (2) inches by four (4) inches, four (4) inches by four (4) inches) engineered to withstand a minimum of 10 tons per wheel
- Whip checks will be used on all hoses and tools to prevent against the hazards when uncoupling occurs.
- Whip checks will be properly positioned on the hose based on the maximum working pressure not exceeding 200 pounds per square inch (PSI)
  - Hoses up to one and a half inches in diameter require a three-sixteenths whip check
  - Hoses up to three inches in diameter require a one-quarter inch whip check
  - Hoses four inches in diameter require a three-eighths inch whip check
- If the hose diameter is larger than four inches or the pressure is greater than 200 PSI, consult the manufacturer and/or jobsite engineering department for proper protection.
- All hose clamps must be crimped into place. Double band clamps can be used per the manufacturer's recommendations.
- Hoses with worn gear clamps shall be tagged and taken out of service
- Ensure safety clips or other wire–type retainers are used at the fittings and the flanges are lined up properly.

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Tool inspections	User/assigned competent person	Visual inspections
Implement assured grounding program/GFCI use	EH&S Professional	Weekly Compliance Sheets

Applicable Training

- Powder-actuated tool training

Potential Related Safety, Health and/or Environmental Aspects

Welding and Cutting (Hot Work)

Objective

The purpose of this program is to establish guidelines to protect employees from the hazards of welding and cutting and the compressed gases used in these operations.

Legal and Other Requirements

Federal, State, Local Regulations

- OSHA 29 CFR 1910.251
- OSHA 29 CFR 1926.252
- OSHA 29 CFR 1926.134
- OSHA 29 CFR 1926.350 Subpart J
- FDNY Rules and Regualtions

Skanska/Client Requirements

- PA NY/NJ requirements

Procedure

Compressed Gas Cylinders Handling, Storage and Use

- Keep valve protection cap in place at all times when a cylinder is not in use
- Cylinders will be moved by tilting and rolling them on their bottom edges. They will not be intentionally dropped, struck, or permitted to strike each other violently
- Valve protection caps will not be used for lifting cylinders from one vertical position to another. Bars will not be used under valves or valve protection caps to pry cylinders loose when frozen.
- Secure cylinders in an upright position, use carriers or carts and isolate them from welding and cutting operations
- Cylinders, when transported by vehicle, will be transported in an upright position
- When hoisting cylinders, they will be secured on a basket or specific means to ensure they are fully secure. They will not be hoisted or transported by means of magnets or choker slings.

- Do not hoist individual cylinders with a chain or a choker sling
- Compressed gas cylinders must be stored at a minimum of 20 feet from fuel gases or separated by a noncombustible barrier wall at least five feet high with a half hour, noncombustible rating (one-quarter inch steel plate minimum). Storage must be in a well-ventilated area with a minimum distance of five feet from other materials.
- Inside of buildings, cylinders will be stored in a well-protected, well-ventilated, dry location, at least 20 feet (6.1 m) from highly combustible materials such as oil
- Cylinders should be stored in designated areas away from elevators, stairs or gangways
- Storage areas will be located where cylinders will not be knocked over or damaged by unauthorized persons
- Cylinders will not be kept in unventilated enclosures
- Storage of propane inside a building is prohibited
- Gas hose will not be stored in an unventilated Connex or Knack® box
- Carts will have half-hour fire-resistant wall between cylinders
- Fuel gas and oxygen manifolds must be located in well-ventilated areas
- Do not take oxygen, acetylene or other gas cylinders into a confined space
- Reverse flow check valves will be installed at the torch end
- Flashback arrestors will be installed at both the torch end and the regulator (most are manufactured this way)
- Inspect hoses and fittings daily and replace damaged hoses to prevent leaking gases
    - When the fuel gas cylinder is opened and a leak is found the valve will be closed and the gland nut tightened
    - If this action does not stop the leak, the use of the cylinder will be discontinued and it will be properly tagged and removed from the work area
    - If a regulator attached to a cylinder valve will effectively stop a leak through the valve seat, the cylinder need not be removed from the work area
- Keep hoses, cables and other equipment clear of passageways, ladders, and stairs
- Place cylinders away from the work, so that sparks, hot slag, or flame cannot reach them
- Use only approved regulators, gauges, and torches
- Use only friction lighters, “strikers,” to ignite torches
- “Crack” (open and close quickly) all cylinder valves to remove any dirt or dust, prior to connecting a regulator
- Keep all hose, regulators, cylinders, valve protection caps, couplings, apparatus and torch connections free of grease and oil
- Do not weld or cut on any containers that have contained toxic or flammable materials

- Do not place anything on or near a manifold or cylinder top that may interfere with prompt shutoff in case of an emergency
- When shutting down a system make sure to shut off regulators and bleed lines
- Do not use oxygen for cleaning off surfaces, ventilation, or blowing dust from clothing

Arc Welding and Cutting Safe Practices and Procedures

- A welding hood must be properly attached to a hard hat and in place before striking an arc and during welding
- Wear safety glasses under the hood or shield
- When leaving electrode holders unattended, remove the electrode and place the holder in a place so that the electrical contact will not occur
- The welding machine should be shut off when not in use or if it is being moved
- Use noncombustible or flameproof screens to protect employees and others from arc flash whenever practical
- Rod stubs shall be placed in a container
- Do not use cables with repairs or splices within 10 feet of the holder unless the insulation is valued equivalent to the original
- Do not weld on any drum or container that has contained gasoline, oils or other flammable liquids
- Use appropriate earmuffs or earplugs when performing plasma arc welding or cutting

Ventilation

- Ventilation must be sufficient to supply respirable air to the welder and to passersby
- Mechanical ventilation must be provided when welding or cutting on metals in a space less than 10,000 cubic feet per welder, in a room having a ceiling height less than 16 feet, or in a confined space
- Such ventilation will be a minimum of 2,000 cubic feet per minute per welder, except where local exhaust hoods, booths, or airline respirators are provided
- Natural ventilation is considered sufficient when the above restrictions are not present

Respiratory Protection

- Welding and gas cutting generate carbon monoxide, carbon dioxide and nitrous gases. When these potentially hazardous materials are present in amounts that exceed OSHA's personal exposure limits, and engineering controls are not sufficient to eliminate the hazard, respirators will be provided.
- Respiratory protection procedures will correspond to their section in this EHS Manual
- The safety data sheet (SDS) must be consulted on the material being welded, the welding rods being used or the flux required to determine what toxic materials the process may emit

Eye Protection

- Welders and their helpers shall wear filter lenses to protect their eyes against infrared and ultraviolet light.
- Unless a welding arc is behind a screen or barrier, not only the welder but also employees within 30 feet will need eye protection
- The guide below shows shade numbers of filter lenses and their application:

Welding Operation	Shade Number
Shielded metal-arc welding 1/16, 3/32, 1/8, 5/32 inch diameter electrodes	10
Gas-shielded arc welding (non-ferrous) 1/16, 3/32, 1/8, 5/32-inch diameter electrodes	11
Gas-shielded arc welding (ferrous) 1/16, 3/32, 1/8, 5/32-inch diameter electrodes	12
Shielded metal-arc welding 3/16, 7/32, ¼ inch diameter electrodes	12
5/16, 3/8-inch diameter electrodes	14
Atomic hydrogen welding	10-14

Carbon arc welding	14
Soldering	14
Torch brazing	3 or 4
Light cutting, up to one inch	3 or 4
Medium cutting, 1 inch to 6 inches	4 or 5
Heavy cutting, over 6 inches	5 or 6
Gas welding (light), up to 1/8 inch	4 or 5
Gas welding (medium), 1/8 inch to ½ inch	5 or 6
Gas welding (heavy), over ½ inch	6 or 8

Fire Protection

- Prior to commencing any welding operation, workers must thoroughly inspect area to make sure that there are no combustible materials nearby. Clear and maintain a 25 foot radius
- Institute a hot work permit
- Workers will keep a fire extinguisher within 30 feet of their work area
- A thorough visual inspection of the work area should be made after each shift (one half hour) to make sure that combustible material is not smoldering and that all equipment has been shut down and properly secured
- A fire watch will be assigned and stationed with a fire extinguisher

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Required inspections	User/assigned competent	Fill out daily hot work permit for

	person	all spark creating tools.
Identify/maintain gas cylinder storage locations	EH&S Professional	Enter project specific Document/Records/Performance Indicators
Maintain Safety Data Sheets (SDS)	EH&S Professional	SDS records SiteHawk®
Fill out PA hot work permit 24 hours prior to the start of any welding or burning operations.	Superintendent	PA hot work permit for burning and cutting operations

Applicable Training

- COF Fire Guard
- COF Torch/Welding use

Potential Related Safety, Health and/or Environmental Aspects

Environmental

Potential and Unforeseen Upset Conditions (e.g., Spills/Leaks)

Objective

To exercise caution when utilizing hazardous and non-hazardous material substances in our operations which has the potential to cause a negative environmental impact when released on land, into the atmosphere or in the water.

Target

- To have zero environmental impacts related to our construction operations.
  .

Legal and Other Requirements

Federal, State, Local Regulations

- Section 311(j)(l)(c) Clean Water Act
- Oil Pollution Act
- 40 CFR 112 – SPCC Regulations
- CERCLA
- RCRA
- SARA Title III
- Hazardous Waste Operations and Emergency Response Standard (HAZWOPER)1910.120(a)(l)(i-v) and 1926.65(a)(l)(i-v)
- http://www.cicacenter.org/swift.html
- Enter Project-specific requirements

Skanska/Client Requirements

- Environmental Compliance Program
- Emergency Action Plan

- Equipment Maintenance Program
- Skanska AB Spill Reporting Protocol

Enter project-specific requirements

Procedure

Each project team shall develop project-specific environmental programs related to potential spills and leaks, to include, at a minimum:

- Daily/weekly/quarterly inspections
- Equipment maintenance reports/repairs
- Waste storage inspections
- Waste disposal /manifesting reports
- Training requirements
- Spill kits and fire extinguishers
- Environmental incident reports
- Corrective and preventive action plans and closure reports
- Method to monitor and measure the adequacy of controls
- Actions to be taken if controls are found to be inadequate

Enter project-specific performance indicators/records

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Identify and develop required plans	Enter project-specific roles and responsibilities	Emergency action plan Environmental compliance plan Spill prevention countermeasures and controls Equipment maintenance plan
Communication with all impacted stakeholders	Enter project-specific roles and responsibilities	Community meetings Newsletters
Implementation of programs	Enter project-specific roles and responsibilities	Emergency action plan Environmental compliance plan Spill prevention countermeasures and controls

		Equipment maintenance plan Incident reports Compliance audits and results
Permit identification and procurement	Enter project-specific roles and responsibilities	Permit requirements Signage and barricades
Required daily/weekly/quarterly inspections	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance Indicators
Provide appropriate spill kits	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance Indicators
Emergency response plan and scheduled drills	Enter project-specific roles and responsibilities	Emergency response plan Documentation of drills
Storage area selection and construction	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance Indicators
Certified storage area inspector for RCRA hazardous waste	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance Indicators
Environmental compliance audits	Enter project-specific roles and responsibilities	Compliance audits and findings
Waste disposal tracking	Enter project-specific roles and responsibilities	Waste manifests
Enter project-specific information here	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance Indicators

Applicable Training

- Spill response training
- Fueling procedures training
- Equipment Inspection training

Potential Related Safety, Health and/or Environmental Aspects

- Excavation and Trenching, motor vehicles and mechanized equipment.

Archaeological, Cultural and Historic

Objective

To prevent any negative impacts to and preserve all significant archaeological, cultural, and historical sensitive areas on our projects while conducting construction-related activities.

Target

- To have zero impacts involving all existing archaeological, cultural and historical aspects of the project.

Legal and Other Requirements

Federal, State, Local Regulations

- 30 CFR Part 800 – Protection of Historic Properties
- National Historic Preservation Act (NHPA) of 1996
- Archaeology and Historic Preservation Act of 1974
- Archaeology Resource Protection Act of 1979

Enter project-specific regulations

Skanska/Client Requirements

- NY/NJ Port Authority Requirements

Procedure

Each project team shall develop project-specific environmental programs related to the potential impact of archeological, cultural and historical sites or elements associated with the scope of work.

- Review project specifications and drawings to determine if there are any archaeological, cultural and historically sensitive operations.
- Perform preconstruction surveys of archeological, cultural and historical sites associated with the project inclusive of engineering controls and site logistics

- Ensure pre-construction photographic documentation of sensitive areas have been conducted
- Assess permit requirements and procure as necessary
- Communicate archaeological, cultural and historically sensitive areas and requirements to stakeholders
- Ensure all elements of the project archaeological, cultural and historical work plan are implemented, monitored and documented

  Enter project-specific performance indicators/records

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Preconstruction surveys	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance Indicators
Stakeholder communication	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance Indicators
Implementation of archaeological, cultural and historical work plan	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance Indicators
Required daily/weekly/quarterly inspections	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance Indicators
Environmental compliance audits	Enter project-specific roles and responsibilities	Compliance audits and findings
Enter project-specific information here	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance Indicators

Applicable Training

- Regulatory training

- General Awareness training regarding Archaelogical Sensistive areas and requirements

Potential Related Safety, Health and/or Environmental Aspects

- **Demolition**

Community Impacts: Transportation, Traffic Circulation and Economic

Objective

The project team will perform the necessary evaluation of construction-related activities in order to develop programs that will mitigate negative impacts to the local transportation systems, traffic patterns and the economic viability of the communities where we build.

Target

- To have zero vehicle/equipment/pedestrian incidents as a result of our MPT throughout Port Authority airport property and the surrounding community streets.

Legal and Other Requirements

Federal, State, Local Regulations

- National Environmental Policy Act (NEPA)
- Environmental Impact Statement (EIS)
- Environmental Permits
- Preconstruction Traffic Studies
- Department of Transportation Permits

Skanska/Client Requirements

- Environmental Compliance Program
- NY/NJ Port Authority Requirements

Procedure

Each project team shall develop project-specific environmental programs to mitigate potential impacts on the community associated with transportation, traffic circulation and the economy as it relates to the scope of work.

- Review project specifications and drawings to determine if there are any operations that will impact the transportation, traffic circulation or economy of the surrounding area

- Conduct preconstruction traffic surveys
- Ensure that all impacts on transportation, traffic circulation or economy of the surrounding areas are communicated to project stakeholders
- Ensure required traffic and environmental plans are developed, implemented and maintained
- Procure required regulatory permits
- Periodically review the effectiveness of plans and programs

Enter project-specific performance indicators/records

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Review/conduct preconstruction traffic surveys	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance Indicators
Identify and develop required plans	Enter project-specific roles and responsibilities	Traffic Control Plan Parking and Mass Transit access relocation Plans
Communication with all impacted stakeholders	Enter project-specific roles and responsibilities	Community meetings Newsletters
Implementation of transportation, traffic circulation work plan	Enter project-specific roles and responsibilities	Incident reports Community complaints Compliance audits and results
Permit identification and procurement	Enter project-specific roles and responsibilities	Permit requirements Signage and barricades
Required daily/weekly/quarterly inspections	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance Indicators
Click here to enter text.	Enter project-specific roles and responsibilities	Enter project-specific operational controls/documents

Applicable Training

- Regulatory inspection requirements
- Task-specific EHS training
- General awareness regarding this significant aspect

Potential Related Safety, Health and/or Environmental Aspects

- **MPT, Motor Vehicles and mechanized equipment**

Community Impacts: Utilities

Objective

To ensure that we perform the necessary evaluation of construction-related activities in order to develop programs that will mitigate negative impacts to utility services, (e.g., water, power, sewage and fiber optics) and disruptions to the community throughout the duration of the project.

Target

- To have zero impacts involving utilities related to our construction activities.

Legal and Other Requirements

Federal, State, Local Regulations

- Department of Transportation permits
- Utility locates/Call before you dig
  Enter project-specific regulations

Skanska/Client Requirements

- Community Action Plan
- Preconstruction survey
- Emergency Action Plan
- NY/NJ Port Authority Requirements

Procedure

Each project team shall develop project-specific environmental programs to mitigate potential impacts on the community associated with the disruption of vital utilities and services associated with gas, water, steam and sewer as it relates to the scope of work.

- Review project specifications and drawings to determine if there are any operations that potentially impact the utilities of the surrounding area
- Conduct preconstruction utility surveys

- Ensure that all potential impacts on utilities of the surrounding areas are communicated to project stakeholders
- Ensure required plans are developed and implemented and maintained
- Identify and procure required regulatory permits
- Periodically review the effectiveness of plans and programs

Enter project-specific performance indicators/records

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Conduct preconstruction utility surveys	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance Indicators
Identify and develop required plans	Enter project-specific roles and responsibilities	Utility relocation plans
Permit identification and procurement	Enter project-specific roles and responsibilities	Permit requirements Signage and barricades
Company community liaison	Enter project-specific roles and responsibilities	Community meetings Newsletters
Communication with all impacted stakeholders	Enter project-specific roles and responsibilities	Community meetings Newsletters
Utility locates/Call before you dig	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance Indicators
Implementation of plans and programs	Enter project-specific roles and responsibilities	Incident reports Community complaints Compliance audits and results
Required daily/weekly/quarterly inspections	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance Indicators
Enter project-specific information here	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance

		Indicators
Click here to enter text.	Enter project-specific roles and responsibilities	Enter project-specific operational controls/documents

Applicable Training

- Gneral Awareness Training specific to this significant aspect

Potential Related Safety, Health and/or Environmental Aspects

- Excavation and Trenching

Flora, Fauna, Wetlands, and Habitat Areas

Objective

Ensure that we perform the necessary evaluation of construction-related activities that have the potential to negatively impact wetland areas, plant and animal species and the habitats in which they exist on our projects.

Target

To have zero negative impacts on animal/plant life or wetlands related to our construction operations.

Legal and Other Requirements

Federal, State, Local Regulations

- Clean Water Act –Section 404
- 33 CFR Ch. II (7–1–13 Edition)
- National Environmental Policy Act
- Environmental Impact Statement (EIS)
- Environmental Assessment (EA)
- Endangered Species Act
- National Historic Preservation Act

  Enter project-specific regulations

Skanska/Client Requirements

- Project specifications
- Green strategic indicators
- NY/NJ Port Authority Requirements

Procedure

Each project team shall develop project-specific environmental programs to mitigate potential negative impacts to flora, fauna, wetlands and the associated habitats as it relates to the scope of work.

- Review project specifications and drawings to determine if there are any operations that may impact flora, fauna, wetlands and their associated habitats
- Conduct preconstruction surveys
- Ensure that all potential impacts associated with flora, fauna, wetlands and the associated habitats are properly identified and protected
- Ensure required plans are developed, implemented and maintained
- Identify and procure required regulatory permits
- Perform any necessary sampling as defined in permit
- Periodically review the effectiveness of plans and programs
- Ensure all monitoring equipment is properly calibrated and maintained
- Enter in additional project requirements

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Identify protected flora, fauna and habitat areas (wetlands)	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance Indicators
Identify and develop required plans	Enter project-specific roles and responsibilities	Storm Water Pollution Prevention Plan (CWPPP) Spill Prevention Countermeasures Control Plans (SPCC) Soil Erosion and Sediment Control Plan (SESC) Required daily/weekly/quarterly inspections Wetland Disturbance Programs Engineered drawings Environmental Compliance plan
Permit identification and procurement	Enter project-specific roles and responsibilities	Permit requirements §404 permit,– Discharge of Dredged Materials

Company community liaison	Enter project-specific roles and responsibilities	Community meetings Newsletters
Communication with all impacted stakeholders	Enter project-specific roles and responsibilities	Community meetings Newsletters
Required daily/weekly/quarterly inspections	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance Indicators
Water quality management - Periodic Sampling	Enter project-specific roles and responsibilities	Analytical results
Sampling/monitoring equipment calibration	Enter project-specific roles and responsibilities	Calibration records
	Enter project-specific roles and responsibilities	Enter project-specific operational controls/documents

Applicable Training

- Regulatory inspection requirements (CWPPP, RCRA, etc.)
- General Awareness training specific to this significant aspect

Potential Related Safety, Health and/or Environmental Aspects

- Enter project-specific health and environmental impacts

Hazardous Materials and Waste Management

Objective

Ensure that we perform the necessary assessment of construction-related activities and institute work practices that minimizes the amount of hazardous materials used or hazardous waste generated on our projects. This includes specific programs that address the proper storage, handling and disposing of materials/waste that when not addressed may negatively impact the environment.

Target

To Reduce the amount of hazardous waste generated on our projects by 5% annually and to properly store hazardous chemicals in double containment, to properly clean up spills and to manage resultant waste as per regulatory guidelines.

Legal and Other Requirements

Federal, State, Local Regulations

- SARA Title 3 – Right to know
- RCRA
- CERCLA
- 29 CFT 1910.120/1926.65
- Hazardous Waste Operations and Emergency Response Standard (HAZWOPER)1910.120(a)(l)(i-v) and 1926.65 (a)(l)(i-v)
- 49 CFR 172
- USDOT HM 126F/181

Enter project-specific regulations

Skanska/Client Requirements

- Environmental Compliance Program
- Emergency Action Plan
- Material Specific Management/Abatement Programs (i.e. Heavy Metal, PCB'S, VOC/Semi-VOC HASP's, Hazardous Chemical Plan)

- Waste Reports
- Enter project-specific requirements

Procedure

Each project team shall develop project-specific environmental programs to mitigate potential positive and negative impacts associated with hazardous waste and materials as it relates to the scope of work.

- Review project specifications and drawings to determine if there are any operations that may generate hazardous waste or utilize hazardous materials
- Conduct preconstruction surveys
- Ensure that all potential impacts associated with hazardous waste or hazardous materials are properly identified and managed
- Ensure required plans are developed, implemented and maintained
- Identify and procure required regulatory permits
- Perform any necessary sampling as defined in any permit
- Periodically review the effectiveness of plans and programs
- Ensure all monitoring equipment is properly calibrated and maintained
- Educate the employees via monthly toolbox talks regarding hazardous waste and waste management on the project site

  Enter project-specific performance indicators/records

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Identify operations associated with hazardous waste or hazardous materials	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance Indicators
Identify waste minimization programs	Enter project-specific roles and responsibilities	Hazardous waste minimization program Potential on-site treatment systems
Identify and develop required plans	Enter project-specific roles and responsibilities	Emergency Action Plan Spill Prevention Countermeasures

		Control Plans (SPCC) Environmental Compliance plan
Permit identification and procurement	Enter project-specific roles and responsibilities	Permit requirements
Company community liaison	Enter project-specific roles and responsibilities	Community meetings Owner Progress Meetings Newsletters
Communication with all impacted stakeholders	Enter project-specific roles and responsibilities	Community meetings Newsletters
Required daily/weekly/quarterly inspections	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance Indicators
Management of hazardous waste disposal program	Enter project-specific roles and responsibilities	Environmental Compliance Plan Waste disposal logs Area/personal occupational exposure monitoring/associated reports/confirmation of employee communication
Emergency response drills/activities	Enter project-specific roles and responsibilities	Emergency Action Plan Response Drill Evaluations
Coordinate site familiarization tours with local authorities and or Emergency Responders	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance Indicators
Characterize waste and coordinate disposal	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance Indicators
Management of waste/material storage areas	Enter project-specific roles and responsibilities	Environmental Compliance Plan Storage area inspections Inventory lists for each storage area Waste disposal logs
Maintain SDS/Right to know station – SiteHawk® project	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance

online SDS program		Indicators
Subcontractor's EHS meetings	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance Indicators
Sampling/monitoring equipment calibration	Enter project-specific roles and responsibilities	Calibration records
Click here to enter text.	Enter project-specific roles and responsibilities	Enter project-specific operational controls/documents

Applicable Training

- Regulatory inspection requirements (e.g. RCRA waste management)
- HAZWOPER response/technician/supervisor
- Spill response training
- General awareness training specific to this environmental aspect

Potential Related Safety, Health and/or Environmental Aspects

- Housekeeping, material handling and storage, Heavy metals, PCB's

Indoor Air Quality

Objective

Perform the necessary assessment of construction-related activities and ensure that measures are implemented to preserve indoor environmental air quality during construction and into occupancy phase. Measures will be of proper magnitude to ensure that workers, adjacent contractors, and members of the public are not exposed to airborne contaminants as a result of construction.

Target

Establish a construction IAQ monitoring schedule for construction operations which have the ability to impact indoor air quality. Verify conformance to the IAQ monitoring schedule.

Legal and Other Requirements

Federal, State, Local Regulations

- Enter project-specific requirements

Skanska/Client Requirements

- Green Strategic indicators/LEED
- Envision
- Port Authority NY/NJ requirements

Procedure

Each project team shall develop project-specific environmental programs to mitigate potential negative impacts associated with indoor air quality as it relates to the scope of work.

- Review project specifications and drawings to determine if there are any operations that may impact indoor air quality
- Identify and comply with client/project requirements, such as infection control programs
- Ensure required plans are developed and implemented and maintained

- Perform any necessary sampling as defined in the plan
- Ensure all monitoring equipment is properly calibrated and maintained
- Periodically review the effectiveness of plans and programs
- Educate the employees via monthly toolbox talks regarding indoor air quality program requirements

  Enter project-specific performance indicators/records

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Identify and develop indoor air quality plans	Enter project-specific roles and responsibilities	Indoor air quality plan
Communication with all impacted stakeholders	Enter project-specific roles and responsibilities	Enter project-specific operational controls/documents
Conduct air monitoring	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance Indicators
Required daily/weekly/quarterly inspections	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance Indicators
Click here to enter text.	Enter project-specific roles and responsibilities	Enter project-specific operational controls/documents

Applicable Training

- General awareness training specific to this environmental aspect.

Potential Health and/or Environmental Impacts

- Housekeeping, Material handling and storage, concrete and masonry, welding and cutting.

Materials and Waste Management

Objective

Construction-related activities will be assessed by the project team for the potential to reduce the upfront demand on materials placed into our projects and minimize the amount of solid waste generated on site through our activities. The reuse of materials will be evaluated and where reuse is not feasible it is intended that all waste materials that can be diverted from landfills will be.

Target

Achieve greater than 98% waste diverswion from landfills. Skanska

Legal and Other Requirements

Federal, State, Local Regulations

Enter project-specific regulations

Skanska/Client Requirements

- Project specifications
- Construction Waste Management Plan
- LEED/Envision
- Green Strategic indicator – materials
- Port Authority NY/NJ requiremetns

Procedure

Each project team shall develop project-specific waste management programs to ensure effective materials management and promote the diversion of recyclable materials from landfills as it relates to the scope of work.

- Review project specifications and drawings to determine if there are any operations that may present opportunities to reduce, reuse or recycle materials

- Identify and comply with client/project requirements, such as material reuse and substitution
- Ensure required plans are developed and implemented and maintained
- Periodically review the effectiveness of plans and programs
- Educate the employees via monthly toolbox talks regarding materials and waste management

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Implement waste management plan	Enter project-specific roles and responsibilities	Waste logs
Communication of plan requirements	Enter project-specific roles and responsibilities	Toolbox talks
Document required waste tracking	Enter project-specific roles and responsibilities	Skanska monthly/quarterly reports
Storage area inspections	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance Indicators
Click here to enter text.	Enter project-specific roles and responsibilities	Enter project-specific operational controls/documents

Applicable Training

- Environmental Managemet Plan training

Potential Related Safety, Health and/or Environmental Aspects

- Material handling and storage, Housekeeping.

Noise and/or Vibration

Objective

To ensure all construction-related activities that have the potential to generate noise or vibration are properly planned for and controls are implemented to mitigate any negative impacts to surrounding communities.

Target

Track and investigate each community complaint related to noise and/or vibration.

Legal and Other Requirements

Federal, State, Local Regulations

- Local noise ordinances
- Work hour restrictions

Skanska/Client Requirements

- Project specifications
- Work hour restrictions
- PA NY/NJ requirements

Procedure

Each project team shall develop project-specific noise and vibration programs to mitigate negative impacts as it relates to the scope of work.

- Review project specifications and drawings to determine if there are any operations that may create any noise or vibration risk
- Conduct preconstruction ambient noise and vibration monitoring
- Identify and comply with client/project requirements, such as truck routes and work hour restrictions
- Ensure required plans are developed, implemented and maintained

Periodically review the effectiveness of plans and programs

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Conduct preconstruction noise and vibration assessments	EH&S Professional	Noise and vibration surveys
Identification of alternative construction means and methods to mitigate impacts	Superintendent	Alternative noise and vibration generating equipment. Alternative project material delivery and haul routes
Installation of noise meters	EH&S Professional	Quantitative noise monitoring results
Installation of vibration monitoring equipment	EH&S Professional	Quantitative vibration monitoring results
Company community liaison	Project Manager	Community meetings
Communication with all impacted stakeholders	Project Manager	Community meeting minutes Community complaints Noise requirements
Conduct crew reviews	EH&S Professional	Executed Crew reviews
Noise and vibration monitoring	EH&S Professional	Noise and vibration monitoring results
Sampling/monitoring equipment calibration	EH&S Professional	Calibration records

Applicable Training

Environmental Management Plan training

Potential Related Safety, Health and/or Environmental Aspects

Demolition, Pile Driving

Outdoor Air Quality

Objective

The goal of this program is to ensure our construction activities do not negatively affect the air quality in the communities surrounding our project sites.

Target

Track 100% of non-road diesel powered equipment to ensure equipment is equipped with best available technology (BAT) for controlling air emissions .

Legal and Other Requirements

Federal, State, Local Regulations

- National Ambient Air Quality Standards (NAAQS)
- Clean Air Act
- National Emission Standards for Hazardous Air Pollutants (NESHAP)
- 40CFR part 63, Subpart C- List of Hazardous Air Pollutants

Skanska/Client Requirements

- LEED
- Envision
- Project specifications
- Material/equipment specific management programs
- PA NY/NJ requirements

Procedure

Each project team shall develop project-specific environmental programs to mitigate potential negative impacts associated with outdoor air quality as it relates to the scope of work.

- Review project specifications and drawings to determine if there are any operations that may contribute to negative outdoor air quality

- Conduct preconstruction surveys assessing equipment particulate, dust caused by wind erosion, and pollutants, inclusive of listed Hazardous Air Pollutants
- Ensure that all potential impacts associated with outdoor air quality are properly identified and managed
- Ensure required plans are developed, implemented and maintained
- Identify and procure required regulatory permits
- Perform any necessary sampling as defined in permit
- Periodically review the effectiveness of plans and programs
- Ensure all monitoring equipment is properly calibrated and maintained

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Identify and develop required plans	EH&S Professional	Soil Erosion and Sediment Control Plan (SESC) Dust mitigation plan Community Air Monitoring Program (CAMP)
Permit identification and procurement	EH&S Professional	Permit requirements
Install required monitoring stations	EH&S Professional	Enter project specific Document/Records/Performance Indicators
Procure/rent/install equipment (i.e. diesel particulate filters, stack air scrubbers)	Superintendent	Enter project specific Document/Records/Performance Indicators
Implementation of emission/dust mitigation plans	EH&S Professional	Inspection records
Daily/weekly inspections of fugitive emission sources	EH&S Professional	Enter project specific Document/Records/Performance Indicators
Monitoring equipment calibration	EH&S Professional	Calibration records

Applicable Training

- Monitoring equipment use and calibration training

Potential Health and/or Environmental Impacts

Water Impacts

Objective

Perform the necessary evaluation of construction-related activities and identify where effluent from operations such as dewatering can be utilized for site dust control or where contaminated water/surface runoff could potentially leave the site and negatively impact the environment.

Target

- Discharge water within the required limits as specified on our dewatering permit.

Legal and Other Requirements

- Federal, State, Local
- Clean Water Act
- 33 CFR Ch. II(7-1-13 Edition)
- National Pollution Discharge Elimination System (NPDES)
- National Environmental Policy Act (NEPA)

Enter project-specific regulations

<u>Skanska/Client Requirements</u>

- Green strategic indicators– Consumption of Potable Water
- Environmental compliance plan
- Port Authority of NY/NJ requirements

Procedure

Each project team shall develop project-specific environmental programs to mitigate potential negative impacts on the environment as it relates to the scope of work. The project team will assess the reuse of effluent in operations where potable water is not required during construction (i.e., dust control).

- Review project specifications and drawings to determine if there are any operations that require dewatering.

- Assess the opportunities to utilize effluent generated from dewatering to reduce potable water consumption
- Conduct preconstruction surveys
- Ensure that all potential impacts to water bodies are properly identified
- Ensure required plans are developed and implemented and maintained
- Identify and procure required regulatory permits
- Perform necessary effluent sampling as defined in permit
- Periodically review the effectiveness of plans and programs

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Management of geotechnical and environmental boring program	EH&S Professional	Geotechnical and environmental borings reports
Identify potential reuse opportunities	EH&S Professional	Reuse logs
Design and procure dewatering system	Superintendent	Engineered drawings and calculations Surveys, designs, utility drawings (retention/detention basins, well/treatment system design and discharge connections)
Develop dewatering system location plan	Superintendent	Enter project specific Document/Records/Performance Indicators
Permit identification and procurement	EH&S Professional	NPDES Combined stormwater and sanitary discharge permit Well permits
Identify and develop required plans	EH&S Professional	Storm Water Pollution Prevention Plan (CWPPP) Spill Prevention Countermeasures

		Control Plans (SPCC) Soil Erosion and Sediment Control Plan (SESC) Required daily/weekly/quarterly inspections Wetland Disturbance Programs Environmental compliance Program (ECP)
Company community liaison	Project Manager	Community meetings Newsletters
Coordinate meetings with regulatory agencies as needed	Project Manager Company community liaison	Meeting agendas and sign-in sheets
Call Before You Dig	Superintendent	Call sheet record acknowledging call took place.
Implementation of Dewatering Plans	EH&S Professional	Required Best Management Practices inspections Dewatering logs, including sediment monitoring, piezometer readings, TSS readings and site treatment methods
Conduct crew reviews	EH&S Professional	Executed Crew reviews
Water quality management - Periodic sampling of effluent discharge	EH&S Professional	Analytical results
Sampling/monitoring equipment calibration	EH&S Professional	Calibration records
Click here to enter text.	Enter project-specific roles and responsibilities	Enter project-specific operational controls/documents

Applicable Training

- Regulatory inspection requirements

Environmental Management Plan training.

Potential Related Safety, Health and/or Environmental Aspects

Health

Asbestos, Inclusive of Naturally Occurring Asbestos

Objective

The purpose of this program is to ensure that all employees are safeguarded from the occupational health and safety risks associated with asbestos.

Legal and Other Requirements

Federal, State, Local Regulations

- NESHAPS 40 CFR Part 61
- EPA 600/4-80-005
- OSHA 29 CFR 1926.1101
- OSHA 29 CFR 1910.134
- EPA 40 CFR 260-265
- OSHA 29 CFR 1910.1001
- Enter project-specific requirements

Skanska/Client Requirements

- Port Authority of NY/NJ Requirements

Procedure

General Requirements:

- Prior to commencing work, a survey of existing conditions must occur to identify naturally occurring asbestos (NOA) and asbestos-containing building materials that may be disturbed by project activities.
- Communicate the location of asbestos to all employees whose work activities may contact asbestos containing material (ACM), presumed asbestos containing material (PACM), or NOA

- Only properly certified employees and licensed contractors are permitted to disturb ACM or PACM
- Area monitoring and/or personal exposure monitoring will be reviewed and used to communicate to employees working in adjacent areas that they are free from any potential occupational exposure to asbestos.
- Communicate the locations of and authorized entrant requirements pertaining to regulated areas.
- Ensure that signs and labels (see below for sample) identify all ACM and/or PACM that may be disturbed during construction

Enter project-specific performance indicators/records

Identification/Disturbance of Naturally Occurring Asbestos:

- Prior to engaging in any geo-technical or sub-surface investigative work (e.g., drilling, pile driving, test pitting, mechanical breaking of rock, etc.) refer to the project's geo-technical survey. If the project has not conducted a survey and it is possible to collect a sample of the rock, the rock is to be analyzed by a certified laboratory to determine the presence of NOA.
- In lieu of documented confirmation the project shall consult the U.S. Geological Survey (USGS) to locate NOA areas in your region. The project team may also contact a certified state geologist until a sample can be collected.
- If NOA exists on the project and will be disturbed, the project team must create, implement, and maintain an Asbestos Control Plan detailing the approach to mitigate inhalation exposures and reduce/limit the amount of fibers from the rock being released into the atmosphere. The topics of the plan may include the following;
  - Introduction/scope of work
  - Associated construction work plan
  - Dust control plan

- Employee exposure plan
  - Worksite specific respiratory plan
  - Administrative controls (limit dust generating activities, design change, equipment change)
  - Engineering controls (cover, capping, surfactants, suppressants)
- Material handling
- Personal protective equipment
- Personal hygiene
- Waste management
- Analytical results
- Logistics map/contract documents or drawings

Enter project-specific performance indicators/records

Asbestos-Containing Building Materials:

- Prior to any renovation or demolition activities, an asbestos survey must be completed for all potentially impacted materials
- The asbestos survey must be completed by a certified building inspector
- The asbestos survey report must be shared with all personnel on site and a copy must be kept on site for reference
- Materials not sampled shall be assumed to be asbestos-containing until proven otherwise
- If additional suspect materials are identified during the project all work must stop immediately and the materials must be sampled for asbestos by a certified inspector
- Only a licensed contractor will remove, repair, or clean up asbestos-containing building materials
- An emergency response plan must be prepared in the event that ACM is disturbed by anyone other than a licensed contractor

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Identify all operations that may impact asbestos	DJV Abatement designer and EHS	Construction and Demolition specifications
Conduct asbestos survey	DJV Asbestos project	Asbestos survey report

	designer	Geological surveys
Asbestos awareness training	EHS Department	Training records
Ensure applicable permits are in place	SWJV Project Management and abatement contractor	EPA and NYSDOL Notification letters.
Ensure proper identification and labeling of ACM and PACM	EHS and DJV	Hazardous Materials survey
If required, identify and facilitate occupational exposure monitoring	3rd Party Asbestos monitoring company and EHS	Air monitoring results Calibration records
Applicable daily/weekly inspections of asbestos work areas	3rd Party Asbestos monitoring company and EHS	Asbestos abatement logs
If required, development of Asbestos Control Programs	DJV and EHS	Asbestos Control Program
Conduct area monitoring	3rd Party Asbestos monitoring company and EHS	Air monitoring results Calibration records
Prepare emergency response plan to address accidental asbestos disturbances	EHS	Emergency response plan
Click here to enter text.	Enter project-specific roles and responsibilities	Enter project-specific operational controls/documents

Applicable Training

- Asbestos awareness training
- Abatement worker
- Abatement supervisor
- Abatement project designer
- Certified building inspector

Potential Related Safety, Health and/or Environmental Aspects

- Hazardous Materials and Asbestos

First Aid/Emergency Services/Bloodborne Pathogens

Objective

The purpose of this program is to ensure that all employees are safeguarded from the occupational health and safety risks associated with bloodborne pathogens and provided proper medical treatment.

Legal and Other Requirements

Federal, State, Local Regulations

- OSHA 29 CFR 1910 1030
- OSHA 29 CFR 1910.1020
- OSHA 29 CFR 1910.1904
- Enter project-specific requirements

Skanska/Client Requirements

- Emergency Action Plan
- Bloodborne Pathogen Control Plan

Procedure

First Aid Attendant Requirements:

- Skanska and each sub-contractor shall have, at all times, a minimum of one employee per shift trained in first aid/CPR/AED and bloodborne pathogens
- Employees shall not be considered as first aid providers until they have completed and received certification for the required programs pursuant to 29 CFR 1926.50(c)
- At the commencement of each project, provisions shall be made in the Emergency Action Plan (EAP) for prompt medical attention in case of injury or illness. This shall include, but not be limited to:
  - Contact details and maps to the nearest clinic or hospital
  - Communication systems in the event of a first aid emergency

- Telephone numbers shall be posted on all sites for physicians, hospitals or ambulances

First Aid Station:

Eating, drinking, smoking, applying cosmetics or lip balm, and handling contact lenses is prohibited at the First Aid Station.

- A fully stocked first aid kit in accordance with ANSI-Z308.1-1978 must include:
  - An eye-wash station capable of at least a 15-minute flush
  - Running water, hot (if feasible) and cold
  - CPR resuscitation masks and non-latex gloves as PPE for first aid providers

First Aid Supplies:

- Each site shall have at least one first aid kit. An evaluation of the workplace shall take place to determine the need for further kits according to location, size, number of employees, etc. This evaluation should also determine any additional types and quantities of first aid equipment and supplies in the first aid kits
- Contents of the first aid kit shall be checked prior to initial use and thereafter on a weekly basis to ensure that any expended items are replaced
- The contents of the first aid kit shall be placed in a weatherproof container with individual sealed packages for each type of item
- Each site will have access to an AED
- Enter additional project requirements

Bloodborne Pathogens:

Consuming food or drink, smoking, handling contact lenses or applying cosmetics inside the affected area is prohibited.

Employees who work at job sites that have the following conditions have the potential for exposure to bloodborne pathogens:

- Effluent waste in Waste Water Pollution Control Plants
- Effluent drained on ground when plumbers hook up to sewer systems.

- Contaminants in restrooms when plumbers complete hook ups.
- Exposure to contaminants in portable toilets.
- Exposures to following as a result of an injury:
  - Human blood components
  - Body fluid visibly contaminated with blood
  - Any unfixed tissue or organ (other than intact skin)
- Enter additional project requirements

Bloodborne Pathogen Control Plan:

- The exposure control plan shall be maintained on the project site. The plan consists of four parts:
  - Exposure determination - identification and documentation of all job classifications with occupational exposure, without regard to the use of personal protective equipment
  - The procedure for evaluation of circumstances surrounding an exposure incident
  - The process for disinfecting of manageable contaminated surface areas: no more than 4 square feet
  - Larger contaminated areas requiring decontamination will be contracted out to a firm specializing in such matters

Site Preparation and Engineering Controls

- All employees involved in the decontamination procedures must receive training according to 29 CFR 1910.1030
- Warning signs posted – Highly visible warning signs should be posted at the entrance of the contaminated area
- Work control practices – Personal protective equipment should be donned at all times within the contaminated work area
  - Eye protection, such as splash goggles, safety glasses with solid side shields, or full-face shields,
  - Rubber utility gloves (preferred) or disposable gloves (single use),
  - Rubber boots or boot covers,
  - Protective outer clothing, such as impervious coveralls, bibs or aprons,
  - Respiratory protection

- Personnel decontamination – Clean up personnel should wash hands with soap and running water after removing personal protective equipment. Antiseptic hand wipes or gels may be used in the absence of hand washing facilities or water
- Cross-contamination control –All infectious waste materials should be sealed in double-bagged, heavy-duty trash bags and tagged or marked as hazardous materials prior to removal from the contaminated area

Hard Surface Cleaning and Disinfection

- Remove excessive contamination—Liquid blood or fluids should be removed by blotting with absorbent pads, paper towels, or absorbent materials, such as kitty litter or diatomaceous earth powder
- Thoroughly clean – Affected areas should be thoroughly cleaned with a disinfectant solution
- Disinfect – Apply enough disinfectant to the pre-cleaned surface to allow it to remain wet for at least 10 minutes, followed by wiping dry or air-drying
- Refuse decontamination –All infectious materials, including cleaning supplies or materials contaminated with blood or body fluids should be decontaminated by wetting thoroughly with disinfectant prior to being placed in biohazard bags for disposal

Regulated Waste Disposal

- Materials soiled with blood or bodily fluids, such as paper towels, cloths, sponges, and mop heads, should be placed in double-bagged trash bags, sealed with tape, labeled and disposed of as hazardous materials in accordance with local and state regulations
- Enter project-specific procedure

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Identify operations that may include exposures to bloodborne pathogens	EHS and Project operations	Construction Work Plans
Manage bloodborne pathogen control program development	EHS and Onsite Medial Team	Written Bloodborne Pathogen Control Program

Ensure the development of emergency action plan	EHS	Emergency Action Plan
Ensure adequate first aid supplies are available	EHS, Onsite Medical Team	Inventory of Medical and first aid supplies and equipment
Project site coordination tours with First Responders	EHS	Attendence sheets, Meeting minutes
Conduct incident investigations and maintain all records associated with exposures to bloodborne pathogens	EHS	Incident Investigation reports
Management of infectious waste disposal	EHS	Medical Waste manifests
Click here to enter text.	Enter project-specific roles and responsibilities	

Applicable Training

- First aid/CPR/AED Training

Enter project-specific training

Potential Related Safety, Health and/or Environmental Aspects

- Port Authority of NY/NJ Requirements

Hazard Communication

Objective

The purpose of this program is to communicate the hazards associated with chemicals on the jobsite to all affected employees.

Legal and Other Requirements

Federal, State, Local Regulations

- OSHA 29 CFR 1926.59
- OSHA 29 CFR 1910.1200

Skanska/Client Requirements

- Port Authority of NY/NJ Requirements

Procedure

- All employees must be trained on the proper use, storage, labeling, and disposal of chemicals in the work place
- All chemicals must be properly labeled
- All information contained on labels must comply with Federal, State and local laws and/or regulations and include the identity of the chemical products or substances in the container, hazard warnings and names and addresses of the manufacturer or the responsible parties
- All containers of chemical products, including laboratory bottles, solvent cans, and dispensers will be labeled. Container labels will not be removed and will be replaced if illegible
- Only those chemicals that can be classified “For Immediate Use” (this means the chemicals are under the control of and used only by the person who transfers it from the labeled container and only for the duration of the shift during which it is transferred) are exempted from the stated labeling procedures

- In storage areas where similar chemical products are stored, signs or placards to identify the material may be posted in lieu of container labels
- If any hazardous materials are transferred from a storage tank or container through a pipeline, labels with the required information will be affixed to the line at the discharge point (valve)
- If a chemical product other than that specified on the container label is placed in a container, the container will be re-labeled to accurately reflect the hazards of the current contents
- All employees must have access to safety data sheets (SDS) for chemicals in the work place
- All contractors must maintain a master chemical inventory list for chemicals brought on site

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Evaluate chemicals before purchase and explore the use of less hazardous substitutes	Procurement/Sustainability	Project data sheets, Purchasing records, DS
Conduct Hazard Communication training, at least annually	EHS	Training records
Ensure that an SDS has been obtained for all hazardous chemicals	Project operations, EHS	Subcontractor submittals
Keep an inventory of all hazardous chemicals and make available to all employees	EHS	SiteHawk®
Review SDS, as part of the Construction Plan	EHS, Project Operations	Construction Work Plans
Ensure all chemical containers are properly labeled	EHS	Inspection reports
Click here to enter text.	Enter project-specific roles and responsibilities	Enter project specific Document/Records/Performance

		Indicators

Applicable Training

- Hazard Communication training, at least annually
- Site Specific SDS Training

Potential Related Safety, Health and/or Environmental Aspects

- Hazardous Materials, Hazard Communication

Heat and Cold Related Illness

Objective

The purpose of this program is to establish safe working guidelines when employees are working in hot or cold weather that could result in an injury or illness.

Legal and Other Requirements

Federal, State, Local Regulations

- OSHA 29 CFR 1910.132(d)
- OSHA 29 CFR 1915.152
- OSHA 29 CFR 1917.95
- OSHA 29 CFR 1926.28
- OSHA 29 CFR 1904.7(b)(5)
- OSHA 29 CFR 1910.141
- OSHA 29 CFR 1926.50
- OSHA 29 CFR 1926.21
  Enter project-specific regulations

Skanska/Client Requirements

- Port Authority of NY/NJ Requirements

Procedure

General Requirements

- Weather conditions shall be evaluated to identify exposure to hot or cold conditions
- All employees shall be acclimatized to the ambient temperatures prior to working a full 40hr per week work schedule
- Employees shall be trained in the recognition of a heat/cold related illness and have means to initiate emergency response
- Potable water shall be accessible to all employees
- Winter hard hat liners/gloves shall be provided during times of cold weather

- When temperatures reach 95 degrees or above, employees shall take a minimum ten minute net preventative cool-down rest period every two hours
- Employees must be reminded to drink plenty of water throughout the work shift
- Enter project-specific procedure

Hot Weather

- Shade shall be present when the outdoor temperature exceeds 85 degrees Fahrenheit
- Shades should be accessible for employees in their work area
- Structures such as bridges, false work, etc. can be utilized as shaded areas
- All employees shall be closely observed by a supervisor or designee during a heat wave. For purposes of this section only, "heat wave" means any day in which the predicted high temperature for the day will be at least 85 degrees Fahrenheit and at least ten degrees Fahrenheit higher than the average high daily temperature in the preceding five days
- An employee who has been newly assigned to a high heat area shall be closely observed by a supervisor or designee for the first 14 days of the employee's employment
- Enter project-specific procedure

Cold Weather

- Employees shall wear layered clothing
- Areas where employees can warm up shall be established
- Employees shall be closely observed to identify signs of frost bite and or hypothermia
- Employees shall wear insulated gloves (water resistant if necessary) to protect the hands
- Project teams shall monitor the weather conditions during a winter storm and have a reliable means of communicating with workers and being able to stop work or evacuate when necessary
- Enter project-specific procedure

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Evaluate weather conditions	EHS/ Superintendents	Construction Work Plans
Evaluate workers for signs of heat or cold related illness	EHS, On site Medical Team	Medic notes, EHS reports

Identify ambient temperatures are being monitored and communicated	Superintendents,	Daily Reports
Ensure that shaded areas are available in high heat	Project operations team	Construction work plan operational controls
Ensure that employees can warm up if needed	Project operations	Construction Work Plans operational controls
Provide potable water	Foreman	EHS inspections
Prepare emergency response plan	EHS	Emergency Action Plan
Click here to enter text.	Enter project-specific roles and responsibilities	Enter project-specific operational controls/documents

Applicable Training

- Heat and cold illness awareness training
- Project EHS Orientation

Potential Related Safety, Health and/or Environmental Aspects

- Heat and Cold Illness

Heavy Metals (Lead, Arsenic, Cadmium, Hexavalent Chromium)

Objective

This program is to prevent employee, public and community exposures to heavy metals produced by and associated with construction activities. This program is designed to minimize the risk of exposure to heavy metals and subsequent impact to the environment

Legal and Other Requirements

Federal, State, Local Regulations

- OSHA 29 CFR 1926.62 - Lead
- OSHA 29 CFR 1910.1025 - Lead.
- OSHA 29 CFR 1926.1118 – Inorganic Arsenic
- OSHA 29 CFR 1910.1018– Inorganic Arsenic
- OSHA 29 CFR 1926.1127 - Cadmium
- OSHA 29 CFR 1910.1027- Cadmium
- OSHA 29 CFR 1926.1126 Chromium (VI)
- OSHA 29 CFR 1910.1026 - Chromium (VI)
- OSHA 29 CFR 1910.134 - Respiratory Protection

Skanska/Client Requirements

- Port Authority of NY/NJ Requirements

Procedure

Exposure Assessment

Initial Determination

- Before work begins, each project will determine whether there is any risk of employee exposure to heavy metals

- Owner specifications will be reviewed to determine if heavy metals are present on the project. If necessary, a survey will be completed to identify additional sources of heavy metals
- If the initial determination for heavy metals or materials suspected of containing metals is positive, the project team may collect bulk samples and send them to a laboratory for determination of the content
- Sources of heavy metals which produce potential exposures:

    - Excavation of soils that are contaminated with heavy metals
    - Demolition or salvage of structures where heavy metals are present
    - Removal or encapsulation of materials containing heavy metals
    - New construction, alteration, excavation, repair or renovation of structures, substrates, or portions that contain heavy metals
    - Certain welding activities
    - Installation of products containing heavy metals
    - Heavy metals contamination/emergency cleanup
    - Transportation, disposal, storage of materials contaminated with heavy metals on the site
    - Maintenance operations associated with any of the above

- Enter in additional project requirements

Exposure Monitoring

If the presence of heavy metals has been identified or is suspected, the competent person will collect personal air samples to establish baseline readings for all workers with potential exposures. Samples will be representative of a full shift including at least one sample for each job classification in each work area for either each shift, or, preferably the shift with the highest potential exposure level. These samples must be representative of the monitored employee's regular daily exposure to heavy metals.

- Follow-up air monitoring shall be performed as listed below:
    - If baseline sampling results demonstrate that the employee is below the action level further air monitoring is not required. If a change of equipment, process, control, personnel or a new task has been initiated that may result in exposure to heavy metals at or above the action level, then additional monitoring will be conducted
    - If baseline sampling results demonstrate exposure is above the action level and below the PEL, then two samples, taken at least seven days apart, will be required at

least every six months until two consecutive samples demonstrate the exposure is below the action level

- If baseline sampling results demonstrate exposure is at or above the PEL, then two samples, taken at least seven days apart, will be required at least every three months until two consecutive samples demonstrate the exposure is below the PEL. Consideration will be taken to the levels of the two consecutive samples. If results are below the PEL, but above the action level, sampling will resume as per the paragraph above. If results are below the action level, then sampling will be conducted as per the first paragraph

- Follow-up air monitoring shall also be performed whenever an employee exhibits symptoms that may be caused by exposure to heavy metals.
- All employees being monitored or in the area must be outfitted with the appropriate respiratory protection.

Recordkeeping and Notification Requirements

- Baseline and additional sampling results will be recorded and stored at the jobsite and at the B.U. / Regional EHS Department
- Air sampling worksheets will be kept with all sampling results as per the respiratory program
- Within five days of receipt of sample results, employees will be notified by letter of the results of the exposure monitoring. These letters will either be given to the employee by hand, if at the jobsite, or by certified letter delivery. If the employee receives the letter by hand, he/she will be required to sign off on the air monitoring results to show that they received the notification

Permissible Exposure Limit (PEL)

- No one shall be exposed to heavy metals concentrations greater than the PEL, averaged over an eight-hour day, without proper protection:
  - Lead PEL = 50 µg/m^3 8hr TWA
  - Arsenic PEL = 10 µg/m^3 8hr TWA
  - Cadmium PEL = 5 µg/m^3 8hr TWA
  - Hexavalent Chromium PEL = 5 µg/m^3 8hr TWA
- If exposure to heavy metals exceeds eight hours per day, then the maximum time weighted average (TWA) exposure limit in µg/$m^3$of air is divided by hours of exposure during that day

Engineering and Work-Practice Controls

- Engineering and work practice controls, including administrative controls, shall be used to reduce and maintain employee exposure to less than the PEL
- Where engineering and work practice controls are not able to reduce the exposure to below 50 percent of the applicable OSHA PEL, respiratory protection shall be worn to supplement the engineering and work practice controls
- Engineering controls shall include, but not be limited to:
  - HEPA (High Efficiency Particulate Air) vacuum shrouded scalers and grinders
  - HEPA vacuum blasters
  - Chemical paint stripping
  - Dust collection/ventilation
  - Removal of paint before burning or welding;
  - Cleaning with HEPA filter vacuums
  - Utilizing wet methods to reduce dust
  - Use of long cutting torches to keep workers further away from fumes
  - Use of mechanical ventilation to move fumes and dust away from employees
  - Dust control
  - Positioning workers upwind or otherwise outside of visible fume or dust clouds

Heavy Metals Program

This written program shall be considered the governing compliance program. This will be further supplemented by site-specific programs, such as the Worksite Specific Respiratory Program for heavy metals, which details overall site controls for heavy metals.

Where work involving heavy metals is subcontracted out, the subcontractor will be responsible for providing a Site Specific Compliance Program. This program shall be approved by the regional EHS department lead, prior to the commencing work

- Protective clothing will be provided for all employees exposed to heavy metals in excess of 50 percent of the PEL in air
- Protective clothing may include coveralls, disposable suits, gloves, hats, shoe coverlets, face shields or goggles

- This clothing shall be replaced daily unless the exposure to heavy metals is minimal, such as when exposed to heavy metals less than 15 minutes per day or when welding on "pre-cleaned" steel
- Damaged protective clothing shall be replaced as needed to maintain effectiveness
- Contaminated protective clothing shall be removed at the completion of a work shift only in the designated change areas. Employees are not permitted to move to other work areas, offices, trailers etc. without removing affected clothing
- Commercial laundries that launder protective clothing or equipment shall be notified, in writing, of the potentially harmful effects of exposure to the specific metals involved
- Contaminated clothing that is to be cleaned or disposed of shall be kept in a closed container, such as a heavy-duty plastic trash bag
- Seal each bag with a tie when it becomes full. All trash cans and bags that contain contaminated clothing shall be marked with this warning – "Caution – Clothing contaminated with heavy metals. Do not remove contaminants by blowing or shaking. Dispose of contaminated wash water in accordance with local, state and federal regulations"
- Heavy metals must not be removed from protective clothing or equipment by blowing, shaking or any other means that could disperse contaminants into the air
- Work boots shall be vacuumed or cleaned with water before being worn off the project site

Respirators/Respirator Selection

- Respirators shall be used and worn in accordance with the Respiratory Protection section of this EHS manual

    - Respiratory protection will be instituted at 50 percent of OSHA's PEL
    - Each subsequent upgrade in respirator use will be done so when personal monitoring indicates a potential for 50 percent of the maximum use concentration for each.

- Dust masks and or filtering face pieces are not allowed on Skanska projects at any time.
- Respirators are not considered an engineering control – they are used to provide protection while engineering controls are being implemented; and

- Respirators shall be worn at the commencement of the operation, and thereafter until air monitoring results demonstrate that engineering and administrative controls are sufficient in the control of exposure to heavy metals.
- Fit testing must be conducted per the established Respiratory Program in this manual

Respiratory Protection for Heavy Metals

Airborne Concentration of Heavy Metals or Condition of Use	**Required Respirator ***	**Activity Initial Respiratory Requirements**
50% of PEL < 5 times the PEL	½ half or Full-Face Air-Purifying Respirator (APR) equipped with HEPA filters. **	Manual scraping, Manual sanding, Manual demolition of structures (e.g., dry wall), Chemical Paint Removal Earthwork/excavation/dust control All other activities require baseline exposure monitoring to be conducted to determine if a ½ face respirator can be used.
>5 times the PEL to < than 25 times the PEL	Full-face Air-Purifying Respirator equipped with HEPA filters. or Power Air Purifying Respirator (PAPR) equipped with HEPA filters.	Heat gun applications, and Power tool cleaning with dust collection systems Abrasive blasting Welding

		Brazing Lancing Cutting Grinding Torch burning.
> 25 times the PEL to < 500 times the PEL	Power Air Purifying Respirator (PAPR) equipped with HEPA filters. or Any supplied air respirator operated in a continuous flow, pressure-demand or other positive-pressure mode.	Activities determined by baseline exposure monitoring
> 500 times the PEL or when concentrations are unknown in an emergency response situation.	Any self-contained breathing apparatus that has a full face piece and is a pressure-demand or other positive-pressure mode.	

***** Respirators specified for high concentrations can be used at lower concentrations of heavy metals

** A HEPA filter is at least 99.97 percent efficient against particles that are 0.3 micron in diameter

Training and Respiratory Usage

- All employees who will potentially be exposed to heavy metals shall be properly trained before that exposure begins.
- Training shall be repeated annually and will cover the following items:

  - The content of applicable state and federal regulations
  - A list of specific operations (burning, welding, etc.) that can result in exposure

- The purpose, proper selection, fitting, use and limitations of respirators;
- The purpose and a description of the medical surveillance and medical removal protection programs
- Information on the health problems associated with excessive heavy metals exposure. Particular emphasis should be placed on topics such as reproductive problems that heavy metals can cause in both men and women
- Engineering controls and work practices that will be used to control heavy metals exposure

- Skanska or subcontractor will also provide a copy of the regulations pertaining to heavy metals to all affected employees
- The project's designated Respiratory Coordinator will ensure that when respirators are chosen that require fit testing, all employees have been properly fit-tested per the established Respiratory Program and all controls are implemented
- Employee representatives should be notified that facial hair may prevent a proper fit;
- Whenever a filter respirator is selected, the employee will be permitted to change the filter elements when an increase in breathing resistance is detected. Filters do not have an expiration date or mechanical detector for signifying expiration. The only adequate means of assessing filter life is breathing resistance
- Employees wearing respirators will be allowed to leave work areas to wash their face and respirator when necessary to prevent skin irritation

Housekeeping

- All surfaces shall be kept as free as practical of heavy metal accumulations;
- Compressed air shall not be used for cleaning
- Vacuuming is the preferred choice for cleaning, however, wet methods such as washing, wet sweeping, wet shoveling, and wet brushing may be used when vacuuming is not practical
- Vacuums will be equipped with HEPA filters and shall be emptied in a manner that minimizes the release of heavy metals into the air

Hygiene Facilities and Practices

Change Areas

- Clean change areas to remove contaminated clothing will be provided for employees exposed above the PEL and as protection during initial monitoring
- Change areas will be equipped with separate storage facilities for protective work clothing and equipment and for street clothes to prevent cross-contamination
- Employees will not be allowed to leave the job wearing any protective clothing or equipment

Showers

- The project will provide shower facilities, where feasible, for use by employees whose airborne exposure to heavy metals is above the PEL
- If a project does provide shower facilities, use will be mandatory at the end of the work shift. Cleaning agents and towels will be provided

Eating Facilities

- Lunchroom facilities will be provided for employees exposed over the PEL
- This facility will be as free as practicable from heavy metal contamination
- Before using the facilities, employees will wash their hands and face
- Employees should not enter the facility with their protective clothing unless the surface dust has been removed by vacuuming or similar means
- Periodic wipe testing should be considered to prove the effectiveness of the program

Hand Washing Facilities

- The project will provide adequate hand washing facilities for use by employees exposed to heavy metals
- When showers are not provided, the project will assure all employees wash their hands and face at each break and the end of the work shift
- Portable hand wash facilities with filtration devices should be considered

Warning Signs

The following warning signs shall be posted in each work area with potential exposures above the PEL:

WARNING – HAZARD

SKANSKA WALSH
DESIGN-BUILD JOINT VENTURE

<Enter Specific Contaminant> WORK AREA

AUTHORIZED EMPLOYEES ONLY BEYOND THIS POINT

NO SMOKING, EATING OR DRINKING

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Identify operations that may be impacted by heavy metals	Project Operations and EHS	Soil sampling results, hazardous materials surveys
Obtain applicable permits	Project Operations, Subcontractors	Hazardous materials abatement notification
Identify potential environmental impacts associated with heavy metals	Project Operations, EHS	Construction Work Plans
Establish and maintain authorized work zones	Project operations	Logistic plans
Establish and maintain waste storage areas	EHS	Site maps
Conduct occupational exposure monitoring	EHS	Sampling results
If required, facilitate biological monitoring/medical surveillance programs	EHS	Monitoring results
Communicate results of occupational exposure monitoring to affected employees	EHS	Exposure notification
If required, development of heavy metal specific control programs	EHS, Subcontractor management	Written exposure control programs

Manage monitoring equipment, calibration, recordkeeping	EHS	Calibration records
Click here to enter text.	Enter project-specific roles and responsibilities	Enter project-specific operational controls/documents

Applicable Training

- Hazard Communication Training
- HAZWOPER Training
- Respiratory Protection

Potential Related Safety, Health and/or Environmental Aspects

- Hazardous Materials

Noise Exposure

Objective

The purpose of this program is to ensure that all employees are safeguarded from the occupational health and safety risks associated with noise.

Legal and Other Requirements

Federal, State, Local Regulations

- OSHA 29 CFR 1926.52
- OSHA 29 CFR 1926.101
- ANSI S3.19
- NYCDEP Noise Mitigation Requirements

Skanska/Client Requirements

- Port Authority of NY/NJ Requirements

Procedure

General

- Workplace noise levels shall be identified and monitored using a calibrated sound level meter in the course of day-to-day work, and whenever there is a change in production processes, equipment, or controls
- Determine if employees in specific areas have exposure to noise that exceeds OSHA regulations (table below)
- It is Skanska USA Inc. policy that all employees exposed to sound levels greater than 85dBA/8-Hour Time Weighted Average (TWA) shall use hearing protection complying with ANSI S3.19
- Controlling noise at the source utilizing engineering controls must be considered first before any other measures are implemented
- Warning signs will be posted in conspicuous locations at worksites near the high noise level areas to notify employees if hearing protection is required

- When the following tasks are being performed, hearing protection is mandatory and exposure to impulsive or impact noise should not exceed 140 dB peak sound pressure level:
  - Pile driving
  - Jack hammering
  - Chipping concrete or steel with power tools
  - Operating gasoline chain or cut-off saws
  - Arc gouging
  - Hoe ram operating

  OSHA Permissible Noise Exposure (A-scale readings on sound level meter at slow response)

Duration per Day (Hours)	Sound Level dBA Slow Response
8	90
6	92
4	95
3	97
2	100
1.5	102
1	105
.5	110
.25 or less	115

- Enter in additional project requirements

Hearing Protection

- The project shall provide a variety of adequate hearing protection devices for employees. All employees subject to work in high noise areas must be provided with appropriate hearing protection devices as determined by a competent person
- Employees are required to wear company-provided hearing protection and at no time may an employee tamper with or modify any hearing protection equipment
- Damaged or defective equipment must be discarded and replaced immediately
- Failure to follow hearing conservation program and rules set forth by the company may result in disciplinary action up to and including retraining and/or termination
- Enter in additional project requirements

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Ensure applicable noise mitigation plans are in place	Project Operations and EHS	Noise Mitigation Plans
Establish and maintain authorized work zones	Project Operations	Logistic Plans
Perform area sound level and/or dosimetry monitoring	EHS	Monitoring data Calibration records
If required, development of Hearing Conservation Program	EHS, Subcontractor competent person	Written hearing conservation program, noise dosimeter readings, audiometric testing
Click here to enter text.	Enter project-specific roles and responsibilities	Enter project-specific operational controls/documents

Applicable Training

- Environmental Management Plan training
- Hearing Conservation training

Potential Health and/or Environmental Impacts

- Noise and Vibration

Polychlorinated Biphenyls (PCBs)

Objective

The purpose of this program is to ensure that all employees are safeguarded from the occupational health and safety risks associated with exposures to polychlorinated biphenyls (PCBs)

Legal and Other Requirements

Federal, State, Local Regulations

- OSHA 29 CFR 1910.1000 Table Z-1.
- OSHA 29 CFR 1910.120
- OSHA 29 CFR 1910.134
- EPA TSCA

Skanska/Client Requirements

- Port Authority Of NY/NJ Requirements

Procedure

General Requirements

- Develop Worksite Specific Respiratory Plan as defined in the Respiratory Protection section of this manual
- Provide training to employees who are potentially exposed to PCB hazards
- Implement all feasible engineering controls to reduce PCB exposures. When engineering controls are exhausted implement administrative/work practice controls
- Respirators will only be used when the above mentioned controls fail to reduce exposure levels below the 8-hour time weighted average (TWA) permissible exposure limit (PEL):
  - 100µg/m³ for Aroclor 1242
  - 50µg/m³ for Aroclor 1254
- Develop project-specific PCB Management Program

Enter project-specific performance indicators/records

Activities that may result in PCB exposure

- Work on electrical installations and/or equipment where PCBs may have been used as an insulator or coolant, including demolition or salvage
- Work on pipes or equipment painted with PCB containing coatings
- Removal/handling of PCB contaminated soils

Initial Determination/ Exposure Assessment

- Each project shall determine whether the potential for PCB exposure exists prior to the start of work
  - Potential sources of PCB exposure may be identified in the owner specification or related documents.
  - If the initial determination establishes that PCBs may be present in coatings or paints, paint chip samples shall be collected and forwarded to an accredited laboratory for analysis
  - If detectable levels of PCBs are identified exposure monitoring must be performed
- Prior to work commencing, all PCB sources must be identified in the work area
- An ongoing assessment must be conducted as surfaces or equipment not visible at the start of a project may become apparent as work progresses
- Enter in additional project requirements

Controls

If occupational monitoring identifies potential PCB exposures, engineering and administrative controls shall be used.

- Engineering controls include, but are not limited to:
  - Chemical/mechanical paint stripping
  - Removal of paint before burning
  - Use of long cutting torches
  - Use of local exhaust ventilation equipped with HEPA filtration at the point of fume generation
  - Use of mechanical ventilation

  - Positioning employees upwind or otherwise outside of visible fume or dust clouds
- Enter additional project requirements

- Administrative controls include, but are not limited to:
  - Signs and barricades will be placed allowing only authorized employees to enter an area where operations are taking place that may create exposure to PCBs. The sign shall read:

    WARNING
    HAZARD
    PCB WORK AREA
    AUTHORIZED EMPLOYEES ONLY BEYOND THIS POINT
    NO SMOKING, EATING OR DRINKING ALLOWED BEYOND THIS POINT

- Enter additional project requirements

Respiratory Protection

Respiratory protection shall be used as the last line of defense in the protection against exposure to PCBs and shall never be used as the sole means of limiting employee exposure.

- Respiratory protection shall be required at the beginning of each identified activity until air sampling results demonstrate that the exposure is below the action level
- Respirators will be selected based on the criteria identified in the Respiratory Protection section of this manual and according to the Worksite Specific Respiratory Plan

Personal Hygiene

- Food and drink is not permitted to be present or consumed in the work area
- Tobacco products are not permitted to be present or consumed in the work area
- A wash station will be available for employees to use as they exit the work area

Protective Work Clothing and Equipment

- If there is a potential for an employee to come into physical contact with PCBs they must wear employer-provided protective equipment/clothing

- Enter additional project requirements

Medical Surveillance

Employers shall make medical surveillance available at no cost to the employee and at a reasonable time and place, where employees:

- Are or may be exposed to PCBs at or above the permissible exposure limit for 30 days or more in a calendar year
- Wear a respirator for 30 days or more a calendar year or as required by 29 CFR 1910.134
- Are experiencing signs or symptoms of adverse health effects associated with PCB exposure; or are exposed in an emergency

Frequency of Medical Surveillance

- Within 30 days of initial assignment, unless the employee has received a PCB-related medical exam within the past 12 months
- Within 30 days after a licensed healthcare provider provides a written medical opinion recommending an additional examination
- Whenever an employee shows signs or symptoms of adverse health effects associated with PCB exposure
- Within 30 days after exposure during an emergency which results in an uncontrolled release of PCB
- At the termination of employment, unless the last examination that meets the requirement of the standard was less than 6 months prior to the date of termination

Contents of Examination

- Medical and work history emphasizing:
  - Past, present and anticipated future exposure to PCBs
  - Any history of respiratory dysfunction
  - Any history of asthma, dermatitis, skin ulceration or nasal septum perforation
  - Smoking status and history
  - A physical examination of the skin and respiratory tract; and
  - Any tests deemed necessary by the examining healthcare provider

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Identify operations that may impact PCB containing materials/equipment	Project operations and EHS	Construciton Work plans
Designate Jobsite Respiratory Program Administrator	Enter project-specific roles and responsibilities	Enter project-specific operational controls/documents
Permit identification	Enter project-specific roles and responsibilities	Enter project-specific operational controls/documents
Manage operational control program development	Subcontractor Competent person	PCB Management program
Implement the Worksite Specific Respiratory Program	Enter project-specific roles and responsibilities	Enter project-specific operational controls/documents
Establish and maintain authorized work zones	Subcontractor Competent person, EHS	PCB Management Plan
If required, identify and facilitate occupational exposure monitoring	Enter project-specific roles and responsibilities	Enter project-specific operational controls/documents
If required, implement a medical surveillance program	Enter project-specific roles and responsibilities	Enter project-specific operational controls/documents
Communicate results of occupational exposure monitoring to affected employees	Enter project-specific roles and responsibilities	Enter project-specific operational controls/documents
If required, develop PCB Control Programs	Subcontrctor competent person	PCB abatement plan
Conduct applicable inspections of PCB work areas/waste storage areas.	EHS	Inspection records
Manage monitoring equipment, calibration, recordkeeping	Enter project-specific roles and responsibilities	Enter project-specific operational controls/documents

Click here to enter text.	Enter project-specific roles and responsibilities	Enter project-specific operational controls/documents

Applicable Training

- PCB Awareness Training

Potential Related Safety, Health and/or Environmental Aspects

Enter project-specific health and environmental impacts

Radiation

Objective

The purpose of this program is to ensure that all employees are safeguarded from the occupational health and safety risks associated with ionizing and non-ionizing radiation produced by x-rays, lasers, and naturally occurring radioactive material.

Legal and Other Requirements

Federal, State, Local Regulations

- OSHA 29 CFR 1926.53
- OSHA 29 CFR 1926.54
- OSHA 29 CFR 1910.1096
- OSHA 29 CFR 1910.97 (a)(3)

Skanska/Client Requirements

- Port Authority of NY/NJ requirements

Procedure

General Requirements:

- Perform an evaluation of the radiation hazards specific to the production, use, release, disposal, or presence of radioactive materials or other sources of radiation
- When appropriate, such evaluation shall include a physical survey of the location of materials and equipment and measurements of radiation levels or concentrations of radioactive material present
- Emergency signals shall be defined in the project's Emergency Action Plan
- All employees shall be made familiar with the actual sound of the signal

Ionizing Radiation:

- Employer shall supply appropriate personnel monitoring equipment, such as film badges, pocket chambers, pocket dosimeters, film rings, etc. for the following:

  - Each employee who enters a restricted area under such circumstances that employee receives, or is likely to receive a dose in any calendar quarter in excess of 25 percent of the applicable value specified in Table G-18 located in OSHA 29 CFR 1910.1096
  - Each employee under 18 years of age who enters a restricted area under such circumstances that the employee receives, or is likely to receive, a dose in any calendar quarter in excess of 5 percent of the applicable value specified in Table G-18
  - Each employee who enters a high radiation area (which means any area, accessible to personnel, in which there exists radiation at such levels that a major portion of the body could receive in any one hour a dose in excess of 100 millirem)
- Signage shall be posted using the conventional radiation caution colors (magenta or purple on yellow background) and shall be conspicuously posted. The symbol shall be the conventional three-bladed design and shall include the words: "CAUTION – RADIATION AREA"

Non-Ionizing Radiation

- Precautions will be taken to ensure all workers that use lasers are trained in proper use and the hazards associated with lasers

- No worker will install, adjust, or operate any laser equipment without a valid qualification card, which the worker must have on their person
- Standard laser warning signs will be placed around the perimeter of the area where the laser is being used
- No laser equipment will be used that does not contain a label indicating make, maximum output, and beam spread
- Whenever a laser is not in use, shutters or caps will be used and the laser turned off
- When performing internal alignment, lasers will only be guided by mechanical or electronic means
- No laser beam will be directed at any worker
- When environmental conditions exist such as rain, fog, snow, or extremely dusty conditions, use of lasers will not be permitted.
- Workers using lasers will use appropriate eye protection.

Responsibilities

Tasks/Operational Controls	**Person Responsible**	**Documents/Records/Performance Indicators**
Identify operations that may be impacted by radiation	Superintendent	Construction Work plans
Manage operational control program development	Superintendent	Construction Work plans
Establish and maintain authorized work zones	EH&S Professional	Inspections
If required, develop Radiation Control Programs	EH&S Professional	Construction Work plans, training records, Radiation Safety program
If required, identify and facilitate occupational exposure monitoring	EH&S Professional	Occupational exposure monitoring records, Leak testing reports on equipment
Communicate results of occupational exposure monitoring to affected	EH&S Professional	Records from Contractors

employees		
Manage monitoring equipment, calibration, recordkeeping	EH&S Professional	Enter project-specific operational controls/documents

Applicable Training

Radiation Safety Training

Potential Related Safety, Health and/or Environmental Aspects

Hazardous Materials

Respiratory Protection

Objective

The purpose of this program is to establish, implement and maintain an appropriate respiratory protection program to protect employees from respiratory hazards on our jobsites.

Legal and Other Requirements

Federal, State, Local Regulations

- OSHA 29 CFR 1910.134
- OSHA 29 CFR 1926.103
-

Skanska/Client Requirements

- Port Authority of NY/NJ Requirements

Procedure

Medical Evaluation:

- Persons shall not be assigned to tasks requiring the use of respirators unless it has been determined that they are physically able to perform the work and use the equipment
- Prior to respirator use, each employee shall complete a Medical Evaluation Questionnaire (MEQ) in accordance with CFR 1910.134, which shall be sent to a licensed healthcare provider for approval
- The licensed healthcare provider will evaluate the MEQ and certify clearance for respirator use
- This clearance will be forwarded to the employer for processing and recordkeeping.
- Additional medical evaluations shall be provided when:
  - An employee has any change in medical status
  - An employee reports medical signs or symptoms that are related to ability to use a respirator
  - The licensed healthcare provider states that the employee needs to be re-evaluated

Fit Test Procedure:

- Full-face respirators require quantitative fit tests to achieve OSHA protection factors
- A qualitative fit test may be used for half face air purifying respirators

- Fit tests will be done:
  - Before using the respirator in the field
  - At least annually
  - When a different type or brand of respirator is worn
  - When there is a significant physical difference in the employee such as body weight changes, facial scarring, or dentures
- Fit testing shall not be conducted if there is any hair growth between the skin and the face piece seal surface
- If an employee exhibits difficulty in breathing during the tests, she or he shall be referred to a licensed healthcare provider
- If the employee does not pass a fit test, they will be provided with another make, model or size of the required respirator and a fit test will be performed immediately
- A summary of all fit test results shall be maintained for three years. The summary shall, at a minimum, include:
  - The name of the individual tested
  - The date of the test
  - The name of the individual who administered the test
  - The fit factors obtained from quantitative tests, if performed
  - The manufacturer, model, and size of respirator

Selection of Respirators

- Filtering face pieces/dust masks are not permitted for use on any project under any circumstances
- The respirator furnished shall provide adequate respiratory protection against the particular hazard for which it is designed
- Respirators shall be chosen according to an assigned protection factor (APF)
- Skanska requires the use of a respirator at 50 percent of the permissible exposure limit
- To determine which respirator is adequate to protect against the contaminant, the following calculation shall be used:

- OSHA PEL* or NIOSH REL** x APF = Maximum Use Concentration/2***
  * PEL = Permissible Exposure Limit
  **REL = Recommended Exposure Limit
  ***Skanska's safety factor of two

- Once the Maximum Use Concentration is known, utilize the following table to select the proper respirator for the operation:

Type of Respirator	**Assigned Protection Factor[2]**			
	Half Face	Full Face	Helmet / Hood	Loose-Fitting Face piece
Air Purifying Respirator (APR)	10	50	-	-
Powered Air-Purifying Respirator (PAPR)	50	1,000	25 / 1,000[1]	25
Supplied-Air Respirator (SAR) or Airline Respirator				
▪ Demand Mode	10	50	-	-
▪ Continuous Flow Mode	50	1,000	25 / 1,000[1]	25
▪ Pressure-demand or other positive pressure mode	50	1,000	-	-
Self-Contained Breathing Apparatus (SCBA)				
▪ Demand Mode	10	50	50	-
▪ Pressure-Demand or other positive-pressure mode (e.g., open/closed circuit)	-	10,000	10,000	-

[1] Evidence must be provided by the respirator manufacturer that testing of these respirators demonstrates performance at a level of protection of 1,000 or greater to receive an APF of 1,000. Absence of such testing, all other PAPRs and SARs with helmets/hoods are to be treated as loose-fitting face piece respirators, and receive an APF of 25.
[2] These APFs do not apply to respirators used solely for escape. Escape respirators for other IDLH atmospheres are specified by 29 CFR 1910.134 (d) (2) (ii).

- Respirators will be selected based on the specific hazard involved and shall be selected in accordance with the manufacturer's instructions or other related requirements (OSHA, ANSI, NIOSH, etc.). The criteria specified in the following table shall be used:

Hazard	Respirator*
Oxygen Deficiency	Self-contained breathing apparatus. Combination airline respirator with auxiliary self-contained air supply or an air-storage receiver with alarm.
Gas & Vapor (Contaminants immediately dangerous to life and health)	Self-contained breathing apparatus. Air purifying full-face piece respirator with chemical canister (gas mask). Combination airline respirator with auxiliary self-contained air supply or an air-storage receiver with alarm.
Gas & Vapor (Contaminants NOT immediately dangerous to life and health)	Airline respirator. Air purifying half-face respirator with chemical cartridge.
Particulate Contaminants (Contaminants immediately dangerous to life and health)	Self-contained breathing apparatus. Air purifying full-face piece respirator with chemical canister (gas mask). Combination airline respirator with auxiliary self-contained air supply or an air-storage receiver with alarm.
Particulate Contaminants (Contaminants NOT immediately dangerous to life and health)	Air-purifying half- with filter pad or cartridge. Airline respirator.
Combination Gas, Vapor & Particulate (Contaminants immediately dangerous to life and health)	Self-contained breathing apparatus. Air purifying full-face piece respirator with chemical canister (gas mask with filter). Combination airline respirator with auxiliary self-contained air supply or an air-storage receiver with alarm.
Combination Gas, Vapor & Particulate (Contaminants NOT immediately dangerous to life and health)	Airline respirator. Air purifying half-face respirator with chemical cartridge and appropriate filter.

Use of Respirators

- The correct respirator shall be specified in the Construction Work Plan
- Each employee will be assigned his or her own respirator. Sharing respirators is not permitted
- Prior to the use of any negative pressure air-purifying respirators a fit check will be performed by the wearer

- When a self-contained breathing apparatus (SCBA) is used in atmospheres immediately dangerous to life or health (IDLH), standby personnel must be present with suitable rescue equipment
- Any work performed in an IDLH situation will require the buddy system
- Respirators shall not be removed while inside a work area that requires respiratory protection
- Employees shall be permitted to leave the work area to maintain, clean, change filters, replace parts, or to inspect their respirator if it is impeding their ability to work or if the respirator stops functioning as intended
- Employees shall notify supervisor of when leaving the work area
- The competent person shall monitor work area conditions to assure continuing respirator effectiveness
- If hair growth or apparel interferes with a profit fit, they must be removed to eliminate interference (clean-shaven)
- Employees requiring corrective vision for full-face respirators will be provided with manufacturer approved optical inserts
- Optical inserts shall be fitted by qualified individuals
- Contact lenses shall not be used with full-face respirators

Filter/Cartridge Selection

- Each cartridge is color coded as indicated in the table below

ATMOSPHERIC CONTAMINANT(S)	ASSIGNED COLOR(S)
Acid gases	WHITE
Hydrocyanic acid gas	WHITE with a 1/2 inch GREEN stripe completely around the canister near the bottom
Chlorine gas	WHITE with a 1/2 inch YELLOW stripe completely around the canister near the bottom
Organic vapors	BLACK
Ammonia gas	GREEN
Acid gases and ammonia gas	GREEN with 1/2 inch WHITE stripe completely around the canister near the bottom
Carbon monoxide	BLUE
Acid gases and organic vapors	YELLOW
Hydrocyanic acid gas and chloropicrin vapor	YELLOW with 1/2 inch BLUE strip completely around the canister near the bottom
Acid gases, organic vapors, and ammonia gases	BROWN
Particulates (dusts, fumes, mists, fogs, or smokes) Radioactive materials, (except tritium and noble gases)	PURPLE (Magenta) – High Efficiency Particulate Filter (HEPA)*
Particulates (dusts, fumes, mists, fogs, or smokes) in combination with any of the gases or vapors	Canister color for contaminant as designated above, with 1/2 inch GRAY stripe completely around the canister near the top
All of the above atmospheric contaminants	RED with 1/2 inch GRAY stripe completely around the canister near the top

* Only P-100 Series HEPA filters are permitted

Air Quality/Requirements for In-Line Respiratory Systems

- Cylinders of purchased breathing air shall meet at least the requirements of the specification for Type 1 – Grade D breathing air as described in Compressed Gas Association Commodity Specifications G-7.1-1989
- Breathing air may be supplied to respirators from cylinders or air compressors
- Cylinders of purchased breathing air should have certificate of analysis from the supplier that the breathing air meets the requirements of Type 1 – Grade D air
- Supplied air compressors shall be equipped with the necessary safety and standby devices
- Compressors shall be situated to prevent contaminated air from entering the system and suitable inline air purifying absorbent beds and filters installed to further assure breathing air quality
- All filter panels must have a tag indicating the last absorbent bed and filter change out signed by the authorized person
- An emergency escape bottle of sufficient capacity to enable the employee to evacuate the contaminated atmosphere in the event of compressor failure
- Equipment must have alarms to indicate compressor failure and overheating;
- If an oil lubricated compressor is used, it shall have a high-temperature and carbon monoxide alarm
- Carbon monoxide levels must be maintained below 10 ppm
- Respirator hose length shall not exceed 300 linear feet

Cleaning and Disinfecting

- Respirators shall be cleaned and disinfected daily
- Respirator wipes are intended for the cleaning/sanitizing prior to each use throughout the shift and shall not be used in lieu of the daily cleaning requirements
- The following procedure is recommended for cleaning and disinfecting respirators:
  - Remove filters, cartridges or canisters
  - Wash face piece in cleaner-disinfectant or detergent solution (see following paragraphs). Use a hand brush to facilitate removal of dirt
  - Rinse completely in clean, warm water
  - Air dry in a clean area
  - Clean other respirator parts as recommended by manufacturer
  - Inspect valves, head straps and other parts, replace with new parts if defective
  - Insert new filters, cartridges or canisters, make sure seal is tight

Storage

- After inspection, cleaning and necessary repair, respirators shall be stored to protect against dust, sunlight, heat, extreme cold, excessive moisture or damaging chemicals
- Respirators shall be stored in a plastic bag or other container in a sanitary location
- Respirators should not be stored in such places as lockers or toolboxes unless they are in carrying cases or cartons
- Emergency use respirators will be placed at stations and work areas as required.
- Emergency use respirators shall be immediately accessible at all times
- Emergency use respirators shall be stored in clearly marked compartments built for the purpose and in accordance with the manufacturer's recommendations
- Instructions for the use and storage of emergency use respirators must be mounted inside the carrying case lid.

Inspections

- When in use, employees must document the daily inspection of their respirator
- Emergency use respirators shall be inspected after each use, monthly, and per the manufacturer's recommendations
- A record shall be kept of inspection dates and findings for emergency use respirators
- Rubber or elastomeric parts shall be inspected for pliability and signs of deterioration
- Only designated individuals with NIOSH approved parts designed for the respirator shall perform repairs
    - No attempt shall be made to replace components or make adjustments or repairs beyond the manufacturer's recommendations
- Reducing or admission valves or regulators shall be returned to the manufacturer or to a trained technician for adjustment or repair
- Respirators that have failed inspection will be taken out of service.
- Self-contained breathing apparatuses (SCBAs) shall be inspected monthly
    - Cylinders shall be fully charged according to the manufacturer's instructions
    - Regulator and warning devices shall function properly
    - Respirator inspection shall include a check of the tightness of connections and the condition of the face piece, headband, valves, connecting tube and canisters
- SCBA tanks shall be inspected annually

Air Sampling Procedure:

- Personal air sampling shall be the only method to determine actual employee exposure. Area monitoring shall be used to supplement personal air sampling but shall not be the only method of determining exposure
- Baseline occupational monitoring shall be performed at the beginning of each activity that has been identified as a potential airborne exposure. Each task associated with the activity shall be monitored separately
- Historical data from similar operations can be used as baseline to determine initial PPE and engineering controls to be used
- Air sampling will be representative of daily exposures
- An air monitoring worksheet shall be completed for each sample taken. If several different samples are taken on the same day then one air monitoring worksheet can be filled out providing the conditions for each employee are the same, otherwise a separate worksheet is required
- A chain of custody will be completed for each batch of samples that are to be sent to the laboratory for analysis, along with the air monitoring worksheet. Both these documents are to remain with analysis received back from the laboratory

Air Sampling Frequency

- Results below the action level, monitoring shall:
  - Continue until sampling shows no exposure on at least three consecutive measurements taken at least seven days apart
- Results above the action level, but below the permissible exposure limit, monitoring shall:
  - Be repeated at least every six months
  - Continue until at least two consecutive measurements, taken at least seven days apart, are below the action level, at which time the monitoring for that employee or operation may be discontinued
- Results above the permissible exposure limit, monitoring shall:
  - Be repeated quarterly
  - Continue until at least two consecutive measurements, taken at least seven days apart, are below the permissible exposure level, at which time the monitoring for that employee or operation may be discontinued

- Additional monitoring may be required when there has been a production, process, control or personnel change which may result in new or additional exposure to any contaminant, or whenever there is reason to suspect a change which may result in new or additional exposures
- Air monitoring results and exposure assessment shall be supervised by the qualified person

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Develop contaminant specific Worksite Specific Respiratory program(s)	EHS	Respiratory protection program
Designate a project Respiratory Protection Coordinator	EHS	Exposure assessments, fit test records
Ensure that Worksite Respiratory Program(s) are reviewed on an annual basis or when changes occur in the standard or operations on the project changes	EHS	Compliance audits
Respirator training	EHS	Training records
Ensure employees complete medical evaluation questionnaires and fit tests	EHS, Medical Department	Medical clearance records
Evaluate work activities for the presence of respiratory hazards	EHS	Exposure assessments, compliance audits
Facilitate area/occupational exposure monitoring	EHS	Monitoring results
Evaluate and communicate results of area/occupational exposure monitoring to affected employees	EHS, Medical Department	Employee personal monitoring reports

Manage monitoring equipment, calibration, recordkeeping	EHS	Calibration records
Ensure daily respirator inspections are being performed	Foreman	Compliance audits
Click here to enter text.	Enter project-specific roles and responsibilities	Enter project-specific operational controls/documents

Applicable Training

- Respiratory protection training
- Hazard Specific training
- HAZWOPER Training

Potential Related Safety, Health and/or Environmental Aspects

- Indoor Air Quality
- Outdoor Air Quality
- Hazardous Materials

Sanitation

Objective

The purpose of this program is to ensure all workers are provided with a sanitary work environment inclusive of drinking water, adequate facilities, and an area free of vermin.

Legal and Other Requirements

Federal, State, Local Regulations

- OSHA 29 CFR 1926.51

Enter project-specific regulations

Skanska/Client Requirements

- Port Authority of NY/NJ Requirements

Procedure

Drinking Water

- Clean drinking water shall be available at all times
- Containers used to dispense drinking water shall be cleaned daily using soap and water, clearly marked, and equipped with a tap and tight fitting lid
- Water shall not be dipped and/or scooped from containers
- Use of a drinking cup by more than one person is not acceptable
- A ready supply of drinking cups shall be provided at water stations
- A sanitary container for unused cups and a trash can for used cups shall be provided
- Water containers and outlets that are not suitable for drinking shall be clearly marked
- Non-potable water shall be so labeled

Toilets

- Toilets shall be available at the worksite. This does not apply to mobile crews that have transportation available to nearby toilet facilities
- Separate locked toilets shall be provided for females and keys or combinations given to females
- Toilets shall be serviced and cleaned as often as necessary to maintain sanitary conditions
- Toilets in poor repair shall be removed or repaired as soon as possible
- The minimum amount of toilets that shall be provided at each jobsite will be as follows:

Number of Employees	Minimum Facilities
Less than 20	1 toilet seat
20 or more	1 toilet seat and 1 urinal for each 40 workers
200 or more	1 toilet seat and 1 urinal for each 50 workers

Washing Facilities

- Washing facilities shall be provided near the worksite. Cleaning agents and towels or similar products shall be provided. Hand wipers are an alternative that can be considered

Change Rooms

- Change rooms complete with storage for street clothes and separate storage for protective clothing shall be provided when employees must wear protective clothing to handle toxic materials

Eating and Drinking

- Eating and drinking shall not be allowed in areas exposed to toxic materials

Vermin Control

- Enclosed workplaces, buildings, storage trailers, etc., shall be constructed, maintained, cleaned and organized to prevent the entrance and harborage of rats, mice, insects and other vermin. Extermination measures shall be used when their presence is detected

Insect Control

- Establish operational controls to protect animal life and prevent vermin infestation
- Reduce areas of standing water to prevent mosquitoes breeding. Where standing water cannot be removed treat with larvicides as per the manufacturer's instructions. If these controls are ineffective an industrial-style pesticide will be used as per EPA guidelines. Insect repellant containing DEET ® (N,N-Diethyl-meta-toluamide) will be provided for employees
- Minimize mosquito breeding grounds to prevent nuisance and reduce the risk of communicable diseases
- Make sure wheelbarrows, buckets, and other containers are turned upside down when not in use so they do not collect standing water

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Ensure adequate Sanitation facilities and drinking water throughout project site.	Foreman, Superintendents	Construction Work plans, Compliance audits

Applicable Training

- Enter project-specific training

Potential Related Safety, Health and/or Environmental Aspects

- Sanitation

Silica

Objective

The purpose of this program is to ensure that all employees are safeguarded from the occupational health and safety risks associated with exposures to silica.

Legal and Other Requirements

Federal, State, Local Regulations

- OSHA 29 CFR 1910.1020
- OSHA 29 CFR 1926.20
- OSHA 29 CFR 1926.21
- OSHA 29 CFR 1926.55
- OSHA 29 CFR 1926.57, Appendix A
- OSHA 29 CFR 1926.59
- OSHA 29 CFR 1926.103
- OSHA 29 CFR 1910.134
- OSHA 26 CFR 1926.1153 New Silica Standard

Skanska/Client Requirements

- The Port Authority of NY/NJ Requirements

Procedure

A Worksite Specific Respiratory Plan shall be created for all activities that may potentially disturb crystalline silica.

Baseline occupational monitoring and area sampling shall commence at the beginning of each operation which is identified as potentially involving silica exposure. Historical data from similar operations that has been collected within the past 12 months can be used as baseline to establish PPE and engineering controls.

- Activities that may disturb crystalline silica-containing materials include, but are not limited to:
  - Jack hammering and chipping
  - Grinding concrete
  - Tunneling
  - Sandblasting
  - Dry sweeping or blowing concrete debris, sand or rock dust
  - Demolition of concrete/masonry structures
  - Drilling rock or concrete
  - Crushing, loading, dumping rock or concrete
  - Saw cutting concrete or rock

Controls

In operations where there is a potential for silica exposure, engineering controls shall be used as the first line of defense. These may include, but are not limited to:

- Use of dust collection systems
- Wetting down surfaces with a fine mist sprayer
- During saw cutting, use equipment that provides water to the blade
- During rock drilling, use water through the drill stem to reduce the amount of dust in the air
- During abrasive blasting use abrasives with a low silica or no silica content
- Use local exhaust ventilation to prevent dust from being released into the air

Where engineering controls cannot be utilized, or are not effective to sufficiently reduce exposure to respirable silica, administrative controls will be used to reduce the time of exposure for employees. These may include, but are not limited to:

- Job rotation
- Activity rescheduling to off hours
- Shift change
- Reassignment to a work area away from silica generating activities

- Where exposure limits are at or above the action level, respirators and protective clothing shall be given to each affected employee.

- Where protective clothing is provided, trash bins will be available at the exit to each area to allow employees to discard such items.
- Signs and barricades will be placed allowing for only authorized employees entering an area where operations are taking place that may create exposure to crystalline silica. The sign shall read:
  Warning
  Hazard
  Silica work area
  Authorized employees only beyond this point
  No smoking, eating or drinking allowed beyond this point

Respiratory Protection

- Respiratory protection shall be used as the last line of defense in the protection against exposure to silica
- Respirators will be selected based on the criteria identified in the Respiratory Protection section of this manual and according to the Worksite Specific Respiratory Plan

Personal Hygiene

- Food and drink are not permitted to be present or consumed in the work area
- Tobacco products are not permitted to be present or consumed in the work area
- A wash station will be available for employees to use so that they can wash up following work in designated silica work areas

Responsibilities

Tasks/Operational Controls	Person Responsible	Documents/Records/Performance Indicators
Identify operations that may potentially expose employees to silica	Superintendent	Construction Work Plans
Designate jobsite Respiratory Program Administrator;	EH&S Professional or assigned competent person	Respiratory Protection Program
Facilitate area/occupational	EH&S Professional	Air sampling logs, worksheets

exposure monitoring		
Implement the Worksite Specific Respiratory Work Plan	Superintendent	Construction work plans, crew reviews, compliance inspections
Establish and maintain authorized work zones	Superintendent	Inspection logs, project photos
Evaluate and communicate results of area/occupational exposure monitoring to affected employees	EH&S Professional	Air monitoring reports
Manage monitoring equipment, calibration, recordkeeping	EH&S Professional	Calibration logs
Ensure daily respirator inspections are being performed	User/Competent Person	Compliance audits

Applicable Training

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Respiratory protection training

Hazard specific training

HAZWOPER Training

Potential Related Safety, Health and/or Environmental Aspects