pennsylvania
DEPARTMENT OF GENERAL SERVICES

Protocol #13

Rigging and Cranes

DGS Accident and Illness Prevention Program (AIPP)

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A. Policy Statement

The following protocol for rigging and cranes is official policy for the PA Department of General Services (DGS) and its employees. Authority and responsibility for its execution are pursuant to DGS Secretary "Safety Program Policy Statement," PA Management Directive 530.31 Workplace Safety and Health Program, PA Code Title 34 Chapter 129 and "Element C" of the DGS Accident and Illness Prevention Program (AIPP).

This policy includes material that applies directly to DGS operations. It is based on material from the Occupational Safety and Health Administration (OSHA), the National Safety Council and other credible resources in the area of rigging and crane safety.

This policy must be considered together with DGS P-11 (Preoperational Process Review) since most instances of rigging and/or crane operations involve new or altered processes.

B. Application, Purpose and Scope

This protocol applies to situations where rope, chain, wire-rope and/or fabric-straps are used to lift, lower, move or suspend an object. This protocol also applies to cranes operated by DGS employees.

The purpose of this protocol is to protect DGS employees from injury during rigging and crane operations. In addition to following the guidelines included here, employees should observe the fundamentals outlined in all elements and protocols within the DGS AIPP since many operations they cover may occur during rigging and crane operations.

This protocol does not apply to the proper use of forklifts and pallet-jacks when they are used to lift loads, that is covered in DGS AIPP protocols P-26 (Powered Industrial Trucks) and P-25 (Materials Handling and Storage). This protocol does not apply to the proper use of rescue hoists and other equipment related to confined space entry, which is governed by DGS AIPP P-07 (Confined Space). .

Applicable OSHA regulations related to rigging and crane usage should be adhered to, including OSHA 1910.184, Slings and OSHA 1910.179, Overhead and Gantry Cranes.

C. Definitions

Basket hitch – a sling configuration whereby the sling is passed under the load and has both ends, end attachments, eyes or handles on the hook or a single master link.

Breaking strength – the load-weight at which a specific material or object will destabilize, deform or break.

Competent person – someone designated by management as capable of identifying existing and predictable hazards in the surroundings or working conditions which are unsanitary, hazardous or dangerous to employees and who has authorization to take prompt corrective measures to eliminate them, including stopping work until corrective measures are completed.

Crane – a manually operated or powered machine used for lifting and lowering a load and moving it horizontally, with the hoisting mechanism an integral part of the machine.

Load – the total superimposed weight on the load block or hook.

Personal protective equipment (PPE) – specialized clothing or equipment worn by an employee for protection against a hazard.

Rigging – lifting, lowering, moving or suspending objects with rope, chain, wire rope, fabric straps, etc.

Rigging accessories – any devices used to connect a load to rigging equipment that are not part of the load such as wire rope, chain, rope, synthetic fiber slings, hooks, fittings, swivels, shackles, eye bolts, pad eyes, rigging screws, wedge sockets, plate clamps, spreader bars, lifting beams, etc.

Rigging equipment – any tool or piece of equipment, motorized or manual, that is used to lift, move or suspend another object.

Safe working load – the maximum allowable working load established by the manufacturer of any piece of equipment or accessory used in rigging operations.

Safety factor – the ratio of breaking strength to the force to be applied to the rigging equipment.

Safety zone – an area established on a case-by-case basis surrounding a work area to prevent incidental entry by persons not involved in the work.

Shock loading – the rapid application of force causing rigging equipment and accessories to bear much more than just the weight of the load.

Side loading/side pulling – the application of horizontal forces on a crane or rigging, usually occurring when a lift is commenced while the load is not directly beneath a crane's tip sheave, but can also result from operating a crane while off-level.

Sling – an assembly which connects the load to the material handling equipment.

Static loading – the slow, even and gradual application of force so that little more than the weight of the load is ever borne by the rigging equipment and accessories.

Suitable equipment – rigging or cranes that have passed pre-job inspection, are within any applicable expiration date and are rated in writing by their manufacturer or an engineer for the functions they will be used to perform.

Work area – an area encompassing the current position of a load, the load's final position, the path between those two positions, and the areas where employees will need to maneuver to complete the work.

D. Requirements

1. Pre-operational planning according to DGS AIPP P-11(Pre-Operational Process Review) shall be conducted before any new or altered rigging or crane operations begin. The competent person who will be present during the operations shall participate in the pre-operational planning.

2. All rigging equipment and/or accessories and cranes will be operated within their specific safe working load limitations or breaking strength. To prevent the failure of rigging equipment or accessories and cranes, a safety factor of 2 to 1 shall be maintained as a minimum. For example, if a piece of rigging's breaking strength is 1,000 lbs., then it cannot be loaded with more than 500 lbs. The safety factor allows a margin for failure prevention.

3. Cranes shall not be used for side pulls except when specifically authorized by a competent person who has determined that the stability of the crane is not thereby endangered and that various parts of the crane will not be overstressed.

4. Static loading shall be performed in all instances. Shock loading is a common cause of catastrophic rigging failures and must be avoided.

5. Cranes are designed to operate on stable, level surfaces and to lift loads vertically before moving them horizontally. Off-level operations and side loading must be

avoided because they place horizontal forces on cranes that can result in catastrophic failure.

6. Managers in charge of rigging and crane operations shall ensure the following information is available during pre-operational planning for each piece of equipment to be used:

    a. Manufacturer's product manual or other similar documents if they exist, instruction manual if one exists, and/or other documents needed to allow for safe and proper operation.

    b. Load-bearing capacity rating of all equipment and rigging accessories.

    c. Inspection requirements and records.

    d. Up-to-date certificates for any equipment requiring them.

7. If the approved plan is not working as expected, the competent person must stop the work and a new plan of action must be developed. Management will consult with the Fire, Safety and Environmental Division if they need help devising a safe plan.

8. Under no circumstances may a person be underneath a load, on a load, or within the descent path of an object being lowered.

9. Only employees trained and necessary to a rigging and/or crane operation may be present within the safety zone surrounding a load's position, movement path or expected position and any such presence must be carefully controlled by the competent person in-charge. The competent person in-charge shall direct employees to leave the safety zone as soon as their presence is no longer necessary or if risk levels rise to an unacceptable level. The safety zone's dimensions are to be established on a case-by-case basis by the competent person in-charge based upon the characteristics of the job.

10. All employees involved in rigging operations will wear DGS-provided PPE including hardhats, gloves and safety glasses while working or being in the vicinity prior to the job's conclusion.

11. All rigging equipment and/or accessories and cranes shall be inspected prior to each use; items are not suitable for use (not rated or recommended for the loads or techniques anticipated) shall be taken out of service immediately and replaced with suitable equipment. Managers in charge of rigging and crane operations shall ensure

that information from manufacturers or other authoritative sources on the safety and suitability standards for each piece of equipment is available for reference.

12. All equipment shall be used in accordance with manufacturers' instructions. The competent person in-charge shall be familiar with all equipment and the instructions pertaining to each.

13. Applicable OSHA regulations should be adhered to, including OSHA 1910.184, Slings:

    a. Slings shall not be shortened with knots or bolts or other makeshift devices.

    b. Sling legs shall not be kinked.

    c. Slings shall not be loaded in excess of their rates capacities.

    d. Slings in a basket hitch shall have the loads balanced to prevent slippage.

    e. Slings shall be securely attached to their loads.

    f. Slings shall be padded or protected from the sharp edges of their loads.

    g. Body parts shall not be placed between the sling and the load while the sling is being tightened around the load.

    h. A sling shall not be pulled from under a load while the load is resting on the sling.

    i. Slings should be inspected according to OSHA 1910.184(d).

14. Applicable OSHA regulations should be adhered to, including the design, operation and installation of overhead and gantry cranes. such as OSHA 1910.179, Overhead and Gantry Cranes, including:

    a. The rated load of the crane shall be plainly marked on each side of the crane, and if the crane has more than one hoisting unit, each hoist shall have its rated load marked on it or its load block and this marking shall be clearly legible from the ground or floor.

    b. Where passageways or walkways are provided obstructions shall not be placed so that safety of personnel will be jeopardized by movements of the crane.

c. Exposed moving parts such as gears, set screws, projecting keys, chains, chain sprockets, and reciprocating components which might constitute a hazard under normal operating conditions shall be guarded.

d. Prior to initial use all new and altered cranes shall be inspected to ensure compliance with the provisions outlined by OSHA.

e. Cranes should be inspected frequently (daily to monthly intervals) and periodically (one to 12 month intervals); inspection criteria established by OSHA should be adhered to.

f. A preventive maintenance program based on the crane manufacturer's recommendations shall be established.

E. Communication of Hazards

1. Physical barriers, such as portable sawhorses with ropes, shall be set up around the safety zone of any rigging operations so that neither employees nor passersby will incidentally enter the safety zone.

2. Signs warning of hazards such as moving machinery, falling objects, etc. shall be posted along with the physical barriers cordoning off the safety zone.

F. Training

1. Training sufficient to allow for the safe performance of rigging and crane operations shall be arranged by the managers in charge. If a planned rigging or crane operation is unique, training needs shall be determined by the manager in charge during pre-operational planning and delivered prior to the job's commencement.

2. The purposes of pre-job training are to make employees aware of their role(s) in the process and to familiarize them with the proper use and limitations of the rigging equipment, rigging accessories and tools they will use and cranes.

3. Retraining for rigging and/or crane operations is required when a process changes, or if employee rigging and/or a crane operator is observed operating in an unsafe manner.

G. Recordkeeping

1. Manufacturer's product manuals, instruction manuals, and other materials required by this protocol shall be kept on file by the managers, supervisors, or foremen responsible for rigging operations.

2. Training records shall be kept on file by managers, supervisors, or foremen in charge of rigging operations when new training or re-training is required, and a copy of the sign-in sheet shall be provided to the DGS Safety Coordinator.