

Protocol #14

Cranes

DGS Accident and Illness Prevention Program (AIPP)

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Appendix A: P-14 Training Sign-In Sheet

References

- Element A of the DGS AIPP (Secretary’s “Safety Program Policy Statement”)
- PA Management Directive 530.31 Amended
- PA Code Title 34 Chapter 129
- Element C of the DGS AIPP
- Protocol 13 (Rigging) of the DGS AIPP
- CFR 29 1910.179

A. Policy Statement

The following protocol for crane use is official policy for the PA Department of General Services (DGS) and all of its employees. Authority and responsibility for its execution are pursuant to DGS Secretary Topper’s “Safety Program Policy Statement,” PA Management Directive 530.31, PA Code Title 34 Chapter 129 and “Element C” of the DGS Accident & Illness Prevention Program (AIPP). All of these documents are available for review online.

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

This policy must be considered together with DGS Protocol #11 – Preoperational Process Review since many instances of crane usage involve new or altered processes. In instances where there is no record of a preoperational process review having been conducted pertaining to a particular crane use job, a preoperational process review must be conducted and documented.

B. Application and Purpose

This protocol applies to the use of cranes of any type. Crane use usually involves rope, chain, wire-rope and/or fabric-straps. Refer to P-13 (Rigging) for required precautions if any rigging is involved.

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

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 protocol P-07.

C. Definitions

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

Competent person – a person 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 the hazard(s), 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 (verb) – securing objects with rope, chain, wire rope, fabric straps or other tools in preparation for lifting, lowering, moving or suspending them

Rigging (noun) - any devices used to connect a load to a crane 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

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 accidental entry by persons not involved in the work

Shock loading – the rapid application of force (dropping an object onto rigging, for example) causing crane and rigging 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

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 crane and rigging

Suitable equipment – crane and rigging that have passed pre-job inspection, are within any applicable expiration date (including periodic preventive maintenance due dates) 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 protocol P-11 shall be conducted before any new, unique or potentially hazardous crane use operations begin. The competent person who will be present during crane use shall participate in the pre-operational planning.
2. Cranes shall not be used for side pulls except when specifically authorized by a responsible 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.
3. All cranes and rigging will meet the definition of suitable equipment and be operated within specific safe working load limitations or breaking strength. In order to prevent the failure of cranes and rigging, a safety factor of two to one shall be maintained as a minimum. For example: if the breaking strength of the weakest item (crane or rigging) is 1,000 lbs., then the load lifted cannot be more than 500 lbs. The safety factor allows a margin for failure prevention in the event of accidental shock loading, unsuitable equipment being undetected during pre-job inspections, or other accidental errors.
4. Static loading shall be performed in all instances. Shock loading is a common cause of catastrophic crane and rigging failures and must be avoided.
5. Cranes are designed to operate on stable, level surfaces and 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 crane use operations shall make sure that the following information is available during pre-operational planning and crane use operations for each piece of equipment to be used:
 - a. manufacturer’s product manual, instruction manual, record of purchase date and/or other documents needed to allow for safe and proper operation

- b. load-bearing capacity rating of all machinery, equipment and rigging
 - 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 & Environmental Division if assistance is needed 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 for crane use may be present within the safety zone 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 work area as soon as their presence is no longer necessary or if risk levels rise to an unacceptable level. The work area boundaries 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 crane use 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 cranes and rigging shall be inspected prior to each use. Equipment or accessories that are not suitable for use (not rated or recommended for the loads or techniques anticipated, for example) shall be taken out of service immediately and replaced with suitable equipment. Managers in charge of crane use 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 manufacturer's instructions or best-practices guidelines. The competent person in charge will be familiar with all equipment and the instructions pertaining to each.

E. Communication of Hazards

1. Physical barriers, such as portable saw horses with ropes, shall be set up around the work area of any crane use operations so that neither employees nor passersby will accidentally enter it.

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

F. Training

1. Training sufficient to allow for the safe performance of crane use operations shall be arranged by the managers in charge. If a planned crane use operation is unique, training needs should 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 cranes and/or rigging and tools that they will use.
3. Training should also include the review of this protocol with each participating employee.
4. Retraining for crane operators is required when a process changes, or if a crane operator is observed operating in an unsafe manner. Retraining for crane operations support workers is required when a process changes, or if a person working around crane operations is observed working in an unsafe manner.

G. Recordkeeping

1. Manufacturer's product manuals, instruction manuals, record of purchase date, and other materials required by this protocol and training materials shall be kept on file by the managers, supervisors and foremen responsible for crane use operations.
2. Training records shall be kept on file by managers in charge of crane use 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. Completion of the attached form (Appendix A) along with a brief summary of the job in question shall constitute an acceptable training record.

