

CITY AND COUNTY OF DENVER

Hoisting and Rigging/Crane Safety Policy		
Occupational Safety and Health Management System No. 65.5.7 This policy was developed and shall be implemented under the authority of Executive Order No. 65 and the Risk Management Office.	January 1, 2008	Prepared / Revised By: Risk Management – Safety Unit

1.0 Introduction

The City and County of Denver recognizes the hazards associated with the operation of hoisting and rigging/crane operations. This policy has been developed to establish guidelines to eliminate injuries from those operations.

2.0 Scope

Hoisting and rigging refers to the lifting and moving of loads using mechanical devices. The objective of the hoisting and rigging policy is to protect personnel from injury, the environment from harm, and equipment and property from damage; specifically, to protect load operators and others in the work area, other city property, and the hoisting and rigging equipment itself.

Hoisting and rigging is a complicated topic and can have significant safety consequences if not performed correctly. Fundamental to the hoisting and rigging policy and consistent with the City and County of Denver’s Safety and Health Management System, is the expectation that agencies/departments involved in hoisting and rigging activities take responsibility to understand the hoisting and rigging requirements and apply them to their operations.

The hoisting and rigging policy follows DOE-STD-1090-2004, which compiles hoisting and rigging codes, standards, and regulations. Web address:

<http://www.hss.energy.gov/NuclearSafety/techstds/standard/std1090-04/toc.html>

City and County employees are required to comply with the procedures outlined in this document. Individual departments / agencies who have an existing Hoisting & Rigging/Crane Safety Policy or Program in place may continue to use that program if it provides the same degree of protection.

3.0 Definitions

- **Attachment point.** Designed lifting point that is part of a load.
- **Below-the-hook lifting device.** See **lifting device**.

- **Come-along.** See **hoist, lever operated.**
- **Crane.** A machine for lifting and lowering a load and moving it horizontally, with the hoisting mechanism an integral part of the machine.
- **Custodian, equipment.** A person assigned responsibility for a piece of hoisting and rigging equipment.
- **Engineer/engineering organization, qualified.** An engineer or engineering organization whose competence in evaluation of the type of equipment in question has been demonstrated to the satisfaction of the responsible line management.
- **Free rigging.** The direct attachment to or placement of rigging equipment (such as slings, shackles or rings) onto the tines (forks) of a powered industrial truck for a below-the-tines lift.
- **Hoist.** A device that applies a force for lifting or lowering.
- **Hoist, lever operated.** A lever-operated manual device used to lift, lower or pull a load and to apply or release tension; commonly referred to as a **come-along.**
- **Hoist, chain operated:** A chain operated manual device used to lift or lower a load and to apply or release tension; commonly referred to as a **chain-fall.**
- **Inspector, crane.** Inspector qualified to inspect cranes, hoists and miscellaneous lifting devices.
- **Inspector, qualified.** Person recognized for competence and whose qualification to perform specific inspection activities has been determined, verified and documented.
- **Lift, critical.** A lift for which the application of requirements applicable to ordinary lifts would not adequately eliminate or control the likelihood or severity of the following:
 - ✓ Personnel injury or significant adverse health impact (on-site or off-site)
 - ✓ Significant release of radioactivity or other hazardous material or other undesirable conditions
 - ✓ Undetectable damage that would jeopardize future operations or the safety of a facility
 - ✓ Damage that would result in delay to schedule or other significant program impact such as loss of vital data
- **Lift, ordinary.** All lifts that do not meet the requirements of **critical** or **pre-engineered production.**
- **Lift, pre-engineered production.** A repetitive, production-type lifting operation, independent of the nature of the load to be lifted, in which the probability of dropping, upset or collision is reduced to a level acceptable to the responsible manager by preliminary engineering evaluation, specialized lifting fixtures, detailed procedures, operation-specific training, independent review and approval of the entire process.
- **Lift plan.** Pre-job plan or procedure for safely executing a lift.
- **Lifting device.** Includes a broad range of equipment used in hoisting and rigging activities.
- **Below-the-hook lifting device.** Device that, used singularly or in combination, alters or transfers the direction or sequence of loading from the lifting device to the load, such as spreader bars, structural lifters, vacuum lifters and magnetic lifters.
- **Miscellaneous lifting device.** Portable A frames (portable gantries), truck mounted cranes with a capacity of one ton or less not covered by ASME B30.5 and self-contained shop cranes as addressed by ASME Portable Automotive Lifting Devices.

- **Sling.** Wire rope, chain, synthetic web, and metal mesh made into forms, with or without fittings, for handling loads.
- **Rigging hardware or accessories.** Such items as shackles, eyebolts, rings, links, swivel hoist rings, turnbuckles, wire rope clips and load-indicating devices.
- **Rigging hooks.** A rigging hardware component typically attached to chain, wire rope or suspension members.
- **Load owner.** Person responsible for the load to be lifted including attachment and lift points.
- **Maintenance supervisor, crane.** Supervisor in the organization designated to maintain cranes and hoists.
- **Non-destructive examination.** The development and application of technical methods to examine materials or components in ways that do not impair future usefulness and serviceability in order to detect, locate, measure and evaluate discontinuities, defects and other imperfections; assess integrity, properties and composition; and measure geometrical characteristics.
- **Non-destructive test.** Testing that does not destroy or damage the item. Examples include magnetic particle, ultrasonic, liquid penetration or radiographic testing.
- **Operator.** Person who operates cranes, hoists and miscellaneous lifting devices.
- **Operator, no-load.** Operators who use hoist bridges and trolleys only as a personal platform to perform maintenance (for example, changing light bulbs).
- **Person, authorized.** A person who has completed the required training and is authorized to perform the work.
- **Person, designated.** An individual selected or assigned as being qualified to perform specific duties.
- **Person, qualified.** A person who, by possession of a recognized degree, certificate or professional standing, or who by extensive knowledge, training and experience, has successfully demonstrated an ability and competence to solve or resolve problems relating to the subject matter and work.
- **Person-in-charge.** A qualified person responsible for the safe planning and performance of a critical lift.
- **Sling.** See **lifting device**.
- **Supervisor, first-line.** The qualified person authorizing hoisting and rigging activities.

4.0 **Responsibilities**

4.1. Department Heads will:

- Ensure that this policy and all department rules in the equipment training procedure are followed.
- Ensure a Qualified Person is available for hoisting/rigging/crane safety training.
- Provide a resource for training the operators of hoisting/rigging/crane that is needed to operate all equipment safely.

4.2. Departmental Manager/Supervisors will:

- Enforce this policy and all departmental rules in the equipment training procedures.

- Identify and provide the appropriate training for the Qualified Person to conduct hoisting/rigging/crane training.
- Ensure that operators of hoisting/rigging/cranes are trained, evaluated, observed and given skills needed to operate the equipment safely.
- Document random observations and on the spot corrections or department refresher training.
- Enforce these safety procedures and rules as related to hoisting/rigging/crane such as but pre-use inspections.

4.3. Employees will:

- Follow this policy and other safety rules pertaining to the pre-use inspection of, operation and routine maintenance of hoisting/rigging/crane.
- Perform pre-use inspections prior to start of work for respective equipment.
- Report any pre-use inspection deficiencies with equipment to their immediate supervisor for maintenance or further action prior to operation of the equipment.
- Obey signs and signals and audible or visual warning devices.

4.4. Qualified Person (Equipment Trainer) will:

- Train and evaluate equipment operators in classroom, hands-on training process and refreshers.
- Be knowledgeable and experienced in the particular equipment operation and how-to train.
- Document evaluations and training.

4.5. Risk Management Safety will:

- Provide assistance for compliance with the policy to requesting individual departments/agencies.

5.0 **General Operating Requirements**

- Equipment operators are responsible for keeping the equipment under control at all times.
- Alteration or modification of equipment is not permitted without prior written consent of the manufacturer and location management.
- All equipment rated capacities shall not be exceeded.
- Equipment operators shall perform a pre-use inspection on all equipment using the appropriate form in the Attachments.
- Any deficiencies found in the pre-use inspections shall be reported and the equipment taken out of service until repairs are made and equipment is safe to operate.

Fixed-Rail Equipment or Overhead Cranes

- Crane control shall be moved smoothly and gradually and remove slack from the sling and hoisting cables before lifting the load.
- Crane hoist cables shall be kept vertical.

- The crane block shall not be lowered below the point that there are less than two full wraps of cable remaining on the hoisting drum.
- Sound horn or bell when raising, lowering or carrying loads where personnel are working.
- A load shall never be left without the presence of an operator.
- Personnel must not place any part of their body between a fixed object and any part of the crane including the load.
- Swinging loads must be stopped by setting the load down easy and backing away. Personnel must not grab a swinging load.
- Personnel shall wear gloves to protect their hands.
- Operators shall know their route of travel.
- Operators must not bump or crash into another crane on the same runway or track.
- The load shall be centered prior to lifting to prevent swinging the load.
- For areas of limited visibility or to warn others who are working in or standing in the vicinity, the operator shall sound the horn if available.
- Slings and cables shall be inspected prior to use.
- Personnel must not stand under a load or carry a load over someone. Stand clear of the load at all times.
- The hoist shall not be excessively jogged.
- Operators shall look in all direction for obstructions in their path.
- Operators involved in troubleshooting cranes during maintenance shall follow procedures in the manufacturer's manual and the location's Lockout/Tagout/Try program.

Periodic Inspections

A qualified inspector or person must perform and document an annual periodic inspection on all hoisting and rigging equipment as appropriate for the equipment type.

Inspection tags shall be affixed to equipment, including rigging hooks but excluding other rigging hardware and accessories and synthetic slings, upon successful completion of the periodic inspection. The location shall maintain an inventory of all hoisting and rigging equipment to ensure periodic inspections are preformed for all equipment.

Testing

Requirements and procedures for testing hoisting and rigging equipment vary with the type of equipment and are specified in DOE-STD-1090-2004. Specifically:

- All testing must be performed in accordance with the recommendations of the manufacturer
- Operational tests are required following maintenance or servicing of cranes and hoists
- Documented load tests are required:
 - ✓ As part of the initial inspection for all hoisting and rigging equipment, including rigging hooks but excluding other rigging hardware, accessories and synthetic slings
 - ✓ For any hoisting and rigging equipment, including rigging hardware and accessories used in critical lifts
 - ✓ All cranes and hoists where load bearing parts have been altered or repaired
 - ✓ All below-the-hook lifting devices where load bearing parts have been altered or repaired

Performing Lifts

- Lift shall be performed as planned. Any deviation shall be made in accordance with the departmental work process.
- Only trained, qualified, and authorized personnel shall be allowed to rig loads or operate cranes or hoists. Training for the type of equipment used must be completed to the required level.
- All pre-use inspections for hoists, cranes and hoisting and rigging hardware and accessories must be performed prior to the lift
- Rigging practices and operator conduct are provided in DOE-STD-1090-2004 and shall be followed

6.0 Equipment Operator Training and Evaluation

6.1. General Training Requirements:

- (1) A training program that consists of a combination of classroom instruction with competency testing and practical training.
- (2) Training shall include safety rules, operating procedures, equipment controls and safety work instructions such as, but not limited to, job safety analyses and standard operating procedures.
- (3) A qualified person who has the requisite equipment knowledge, training and experience to conduct the training and evaluations.
- (4) Operators receive training and exhibit the satisfactory skill associated with proper hand signals and the use of rigging crane load capacities or slinging practices for loads to be lifted.
- (5) All personnel who perform preventative maintenance program inspections for cranes and lifting devices receive appropriate crane and/or lifting device inspection training.

6.2. Safe Operation Topics for Training:

- (1) All operating instructions, warnings and precautions for the type of equipment the operator will be authorized to operate.
- (2) Equipment controls and what they do and how they work.
- (3) Motor operation.
- (4) Maneuvering.
- (5) Visibility (including restrictions due to loading).
- (6) Fork and attachment adaptation, operation and use limitation.
- (7) Equipment capacity.
- (8) Equipment inspection and maintenance the equipment operator will be required to perform.
- (9) Any other operating instruction, warning or precaution listed in the operator's manual for the type of equipment that the employee is being trained to operate.
- (10) Workplace related topics and operating procedures (i.e., load weight, centering, etc).
- (11) Composition of probable loads and load stability.
- (12) Load manipulation, stacking, un-stacking.
- (13) Pedestrian traffic areas where equipment will be operated.

- (14) Narrow aisles and other restricted places of operation where equipment will be operated.
- (15) Other unique or potentially hazardous environmental conditions that exists or may exist in the workplace.
- (16) Operating limitations.

6.3. Evaluation and Refresher Training:

- 6.3.1. A periodic evaluation and periodic formal documented refresher training based on the evaluation shall be conducted for equipment operators.
- 6.3.2. A qualified person(s) shall conduct and document an evaluation of the performance of the operator of hoisting/rigging/cranes at least initially and whenever new equipment or procedures are introduced.
- 6.3.3. Documented corrective training shall be required when conditions in the workplace change or the equipment operator demonstrates the following:
 - (1) Observed operating in an unsafe manner;
 - (2) Involved in an incident;
 - (3) Evaluated not operating the equipment safely;
 - (4) Assigned to operate a different piece of equipment; or
 - (5) Conditions in the workplace have changed and could effect the safe operation of the equipment.

7.0 **Hoisting/Rigging/Crane Safety Requirements:**

- (1) Only trained personnel are permitted to operate a crane.
- (2) Personnel shall make a visual inspection daily for any safety hazard. (Attachment One)
- (3) Before moving a load be sure the path is clear, as well as the area to which the load is going.
- (4) If there is ever a question regarding the safe hoisting of a load it is the operator's responsibility to ask before attempting to hoist the load.
- (5) All hoisted loads, regardless of weight, may pose a hazard.
- (6) Never stand under hoisted objects.
- (7) Position the load under the hoist and bring the hook down to the load. Do not try to position the load and maneuver the hoist at the same time. Serious back strains may result.
- (8) Do not allow the control pendant to strike other equipment.
- (9) Keep control pendant from becoming wet or oily.
- (10) Never raise the load more than two (2) feet when in transit. Raise only (if required) when it is ready to be placed.
- (11) Avoid moving the load if excessive swing occurs. Stabilize the load before moving; lower to the floor if necessary
- (12) Lifting a load:
 - Check the weight of the load
 - Check the capacity of the hoist
 - Check the capacity of the chain or straps

- Check that the straps are not cut or damaged
- Check chain inspection tag to be sure inspection is up to date
- Ensure the chain is not damaged
- Check the type of chain hooks. If you are unsure which to use, ask before setting the hooks
- Check the angle of the chains when tight and compare with the load limit chart
- Check that hooks are positioned properly
- Ensure the position of the hoist over the load is centered
- Ensure that there are no twists in the chains
- Protect the item being moved from the chain
- Protect the chain or strap from sharp edges
- Ensure all clamps are removed
- Ensure that links are not caught in the tee slots of machine tools
- Ensure that cables are wrapped on the drum properly
- Determine the center of gravity of the part

(13) Moving a load:

- Ensure that the load is centered properly
- Check how far the hoist coasts in each direction
- Ensure that all personnel are clear of the part before lifting
- Do not move a part over personnel
- Do not lift the load with personnel on it
- Only lift the load as high as necessary (2 feet) until ready to place
- Do not stand in areas where you could be trapped
- Move slowly and carefully with the hoisted load
- Ensure the hook is no less than eight (8) feet above the floor when not in use
- Never leave a load suspended on the crane
- Before moving a load be sure the path is clear of people and equipment
- Ensure the load is attached properly before lifting
- Report any and all malfunctions immediately
- Never exceed the capacity of the crane, chain, strap or clamp
- Avoid moving the load if excessive swing occurs. Stabilize the load before moving; lower to the floor if necessary
- Never walk under a suspended load
- Remove all lifting devices and place in proper storage area when the crane is not in use
- Position the crane directly over the load before lifting
- Stand clear of a load being raised or lowered
- If uncertain of the safe operation of the crane get qualified help

NOTE: If a helicopter is to be used for moving a load, OSHA 1926.551 and FAA regulations shall be adhered to.

PRE-USE CRANE INSPECTION FORM

DEPARTMENT/AGENCY: _____

INSPECTOR: _____

DATE: _____ LOCATION: _____

CRANE NUMBER: _____

VISUAL INSPECTION

Pendant - Damaged/worn?	Y <input type="checkbox"/>	N <input type="checkbox"/>
Main hook - Cracked/deformed/worn?	Y <input type="checkbox"/>	N <input type="checkbox"/>
Aux. hook - Cracked/deformed/worn?	Y <input type="checkbox"/>	N <input type="checkbox"/>
Wire rope - Damaged/frayed?	Y <input type="checkbox"/>	N <input type="checkbox"/>
OPERATE INSPECTION WITHOUT LOAD		
Raise hook & block to vertical stop - Mechanical stop OK?	Y <input type="checkbox"/>	N <input type="checkbox"/>
Main hook - Cracked/deformed/worn?	Y <input type="checkbox"/>	N <input type="checkbox"/>
Aux. hook - Cracked/deformed/worn?	Y <input type="checkbox"/>	N <input type="checkbox"/>
Wire rope - Damaged/frayed?	Y <input type="checkbox"/>	N <input type="checkbox"/>
Move bridge in both directions - Brakes OK?	Y <input type="checkbox"/>	N <input type="checkbox"/>
Move trolley in both directions - Brakes OK?	Y <input type="checkbox"/>	N <input type="checkbox"/>
Lower hook & block to eye level - Downward brake OK?	Y <input type="checkbox"/>	N <input type="checkbox"/>

IF ANY ITEM IS DEFECTIVE - IMMEDIATELY NOTIFY YOUR SUPERVISOR

REMARKS