MATERIALS HANDLING EQUIPMENT

Often, a load is too heavy to move manually, and it might not be safe or feasible to handle the load with a forklift. In these situations, a hoist or crane can be used to safely lift the load.

WHERE ARE THE REGULATIONS?

The Occupational Safety and Health Administration (OSHA) have developed rules governing materials handling. These rules are found at 29 CFR 1910.176 through .184 in Subpart N. Your supervisor will train you to operate materials handling equipment safely. When hoist and crane safety is involved, strict inspection, maintenance, and operating procedures must be followed.

WHAT ARE THE HAZARDS?

Some of the equipment includes:

- Slings.
- Overhead and gantry cranes.
- Derricks.

If materials handling equipment is defective and fails during use, a heavy load could shift and fall. A load can also shift and fall if it is not properly rigged for lifting.

As loads are moved, the equipment operator must make sure that the load and the equipment have plenty of room to clear obstacles. If the load or equipment suddenly hits an object in the path, the load could shift and fall.

Electrical hazards need to be avoided during materials handling operations, too. The load and equipment needs to maintain a safe clearance near overhead electrical lines. If proper clearance is not maintained, the load or equipment can become energized and cause electrocutions.

KNOW YOUR PLACE AROUND EQUIPMENT

Only designated personnel are permitted to operate a crane or derrick. Whenever a crane or derrick is in operation, the operator must stay at the controls. Only authorized representatives should perform equipment repairs.

If you are not a designated operator, you should stay clear of the area where loads are being moved. Never stand under a raised load. If you hear a warning signal for an overhead or gantry crane operation, move to a safe area. Of course, never attempt to ride a load.

If your job requires you to manually guide loads into place, use tag lines - never handle loaded slings or other rigging directly because a shifting load can easily crush a hand.

FOLLOW SAFE INSPECTION PROCEDURES

Slings used with hoists or cranes need to be inspected for damage or defects every day before use. Alloy steel chain slings need a more thorough inspection at least annually. Slings that are damaged or defective must be immediately removed from service.

Cranes and derricks are complex equipment, and they need detailed inspections. OSHA requires both frequent (daily to monthly) and periodic (monthly to annually) inspections of this equipment.

Frequent inspections can include inspections of:

- Operating mechanisms (steering, lifting mechanisms, brakes, etc.).
- Hydraulic or air lines.
- Hooks.
- Ropes and chains.
- Electrical apparatus.

In addition, certified records must be kept for monthly inspections of hooks, chains, and ropes.

Periodic inspections include inspections of the same components, but the periodic inspection is more complete. Periodic inspections can include inspections of:

- Structural members of the equipment.
- Bolts and rivets.
- Sheaves and drums.
- Bearings, pins, shafts, gears, etc.
- Load, wind, and other operating indicators.
- Gasoline, diesel, or electrical systems.
- Chain drives and chains.
- Electrical components (controls, limit switches, push buttons, etc.).
- Travel, steering, locking devices, and tires.
- Brakes.
- Foundation or supports.

After any inspection, deficiencies must be carefully examined to determine if there is a safety hazard. Unsafe equipment may not be used.

GOOD MAINTENANCE IS IMPORTANT

Slings that are damaged or defective may only be repaired by a sling manufacturer or equivalent repair service.

Keeping a crane or derrick in good operating condition requires preventive maintenance as well as timely repairs. Designated maintenance personnel will follow the City's preventive maintenance program. The basis for this program is the manufacturer's recommendations on preventive maintenance.

Maintenance procedures must include the following precautions:

- Move the equipment to a location where it will cause the least amount of interference with other equipment or operations.
- Turn all controls to the "off" position.
- Lock the main or emergency switch in the "off" position.
- Place "Out of Order" signs on the equipment and on the hook or on the floor beneath the equipment.
- Provide rail stops or other suitable means to prevent the interference of other cranes operating on the same runway as the idle crane.

Do not operate the equipment after repairs or adjustments until all guards have been reinstalled, safety devices reactivated, and maintenance equipment removed.

Some components must be regularly adjusted to maintain their proper operation:

- Limit switches.
- Control switches.
- Brakes.
- Power plants

PLAN THE LIFT

Every time a load is lifted, operators should make a final check of the equipment for additions and modifications, including:

- Checking tags, instruction plates, and decals that will indicate modifications.
- Making sure the equipment's safety factor has not been reduced by additions or modifications.

Operators must understand the characteristics of the load, including:

- Hazardous or toxic materials.
- Weight.

- Dimensions.
- Center of gravity.

In order to lift the load, safe rigging is extremely important. Hoist chains and ropes must be free of kinks and twists and may not be wrapped around a load. Slings or other appropriate devices must be used to support the load and attach it to the hook. Operators need to review rigging sketches and information, including:

- Lift points.
- Methods of attachment.
- Sling angles.
- Load vectors.
- Boom and swing angles.
- Crane orientations.
- Rated capacities.
- Other factors affecting equipment operation.

Since the characteristics of the load and lifting environment can change with each lift, operators need to review the operating procedures, including:

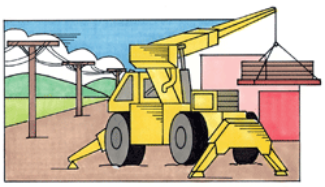
- Step-by-step procedures.
- Applicable rigging precautions.
- Safety measures.
- Emergency procedures.

Before operating a truck crane at an outdoor worksite, review the area and operation for possible hazards. The review should include possible interferences to a safe lift, including:

- Overhead lines.
- Unstable soil.
- High wind conditions.
- Other work activities in the area.

MAINTAIN PROPER CLEARANCE

Where mechanical handling equipment is used, sufficient safe clearances must be allowed for aisles, at loading docks, through doorways, and wherever turns or passage must be made. The employer must post signs to warn of clearance limits.



Overhead and gantry cranes have some additional clearance requirements for the crane and the cab.

Derricks and crawler locomotive and truck cranes have special requirements for clearance from overhead electrical lines. If work is being done near energized overhead lines, the equipment must keep a clearance distance of ten feet if parts may be elevated near the lines. If the line's voltage is higher than 50 kilovolts (kV), the clearance distance is increased by four inches for each 10 kV increase. When a crane or derrick is in transit with its boom lowered, the clearance may be reduced to four feet (with a four inch increase for each 10 kV over 50 kV).

KNOW THE SAFE OPERATING PROCEDURES

Some general safe operating procedures that apply to all types of cranes and derricks include:

- The load-rating must be posted or marked.
- Do not exceed load ratings.
- The load must be secured and balanced using a sling or other appropriate device.
- Hoist lines may not be kinked or twisted.
- The hook must not swing when it is brought over the load.
- There must be no sudden acceleration or deceleration of the load.
- The equipment may not be used to drag a load horizontally.
- Loads may not be raised over people, and people are not allowed to ride loads.
- Operators must test the brakes when lifting near-capacity loads.
- The operator's necessary clothing and personal belongings must be stored so they do not interfere with the equipment's access or operation.
- Tools, fuses, and oil cans are to be stored in a toolbox; they are not to lie loose in the cab.
- The operators must be familiar with the operation of the fire extinguishers provided with the equipment.

WORK AT WORKING SAFELY

When equipment is used to lift and carry heavy loads, it pays to take your time to be sure every step of the job is done correctly.

1. Stay clear of loads.
2. Take inspections seriously - find defects before they cause equipment to fail.
3. Promptly report problems with the equipment.
4. Take defective or damaged equipment out of service.
5. Plan the lift.
6. Rig the load safely.
7. Follow all manufacturers' operating instructions.
8. Maintain safe clearances.