

# MATERIAL HANDLING

## Audited May 5 2024

Fatalities and serious injuries can occur if cranes are not inspected and used properly. Many fatalities can occur when the crane boom, load line or load contacts power lines and shorts electricity to ground. Other incidents happen when workers are struck by the load or caught inside the swing radius or fail to assemble/ disassemble the crane properly.

### **Cranes are to be operated only by qualified and trained personnel.**

- A designated competent person must inspect the crane and all crane controls before use.
- Be sure the crane is on a firm/stable surface and level.
- During assembly/disassembly do not unlock or remove pins unless sections are blocked and secure (stable).
- Fully extend outriggers and barricade accessible areas inside the crane's swing radius.
- Watch for overhead electric power lines and maintain at least a 10-foot safe working clearance from the lines.
- Inspect all rigging prior to use; do not wrap hoist lines around the load.
- Be sure to use the correct load chart for the crane's current configuration and setup, the load weight and lift path.
- Do not exceed the load chart capacity while making lifts.
- Raise load a few inches, hold, verify capacity/balance, and test brake system before delivering load.
- Do not move loads over workers.
- Be sure to follow signals and manufacturer instructions while operating cranes.



**Exits.** Every scaffolding, building or structure exits shall be so arranged and maintained as to provide free and unobstructed egress from all parts of the building or structure at all time when it is occupied. No lock or fastening device can prevent free escape from the inside of any building. Every exit must be clearly marked. Every access to an exit must be maintained clear of any obstructions and be at least 36 inches wide.

**Access.** When storing materials remember to leave adequate access ways. Do not block aisles or exits. Any rise over 19 inches a step or ramp must be provided.

**Flammable/Toxic.** Flammable and toxic or other harmful materials shall be stored in properly designated, well-ventilated areas. Observe and abide by "No Smoking" or Open Flame within 15 ft. and other warning signs.

**Heavy Loads.** Do not attempt to lift heavy loads without assistance. Learn how to lift properly by bending your knees and keeping your feet together. Avoid strain by lifting with your legs and arms, not your back.

**Lifelines.** When working with a fall hazard of 6 ft or more wear a safety harness attached to a lifeline and have somebody standing by in case of an emergency.

**Non-compatible Materials.** Avoid stacking non-compatible materials in the same pile. Dry chemicals should always be stacked above liquids.

## **General**

- Wear required Personal Protective Equipment.
- Avoid jagged edges, slivers, burrs, rough or slippery surfaces of material.
- Watch for and avoid tripping and stumbling hazards.
- Use caution when handling long or a large item to prevent striking other objects or people.
- Inspect Material to be handled.
- Inspect travel route and the area around the material.
- Read and follow warning labels on all containers.

### **Lifting and pulling:**

- Use proper lifting techniques.
- Keep back straight and use leg muscles for support and strength.
- Raise object to waist level before lifting to shoulder height.
- Keep body weight positioned directly over feet.
- Keep feet apart- one beside and one behind the object.
- Do not twist, move feet and body in one motion.

### **Hoisting Material:**

- Inspect all equipment before using; do not use damaged equipment. (I.e. Cables, chains, hooks, slings, etc)
- Note hoisting capacity and do not overload. Ensure hoist limits are not exceeded.
- Use slings, chokers or other rigging substantial enough to safely support the load. (Weight divided by angle sin equals force on sling. Use 3 times the load as a rule of thumb.)
- Do not leave loads suspended or unattended. Keep fingers and hands clear of pinch points.
- Use taglines to steady a suspended load.
- Avoid tip loads and side pulling with hoists.
- Avoid Sharp bends over materials, corners or edges.
- Destroy slings with evidence of cuts, excessive wear or damage.
- Lift gradually.
- Always use taglines. (Keeps load from spinning and helps align. If the tagline creates a hazard do not use the tagline.)
- Consider weather conditions, (wind, and lightning) and look around for electrical, sloping grades etc. when rigging loads.
- Avoid impact loading.
- Do not divert operator.
- Report any unusual conditions and refer all questions to your supervisor.

### **FORKLIFTS:**

- The operator must be trained in the operation of the lift and certified in writing.
- A pre-use inspection should be completed prior to the day's operation of the lift. (see pre-use section for inspection list)
- The lift operator cannot wear headphones.
- The area to be traveled must be clean of debris and level.
- As material is loaded guardrails must be reinstalled.
- No one should be beneath the load.
- Only one signalman must use hand signals.
- Power lines must be observed it is best to keep clear of them by a minimum of 10 ft.
- Parking brake must be used and forks lowered when lift is not in use.
- Special care must be taken when operating the lift, damage to people, material and property can occur at any time.
- For specifics on forklifts see the forklift section in this manual.
- Never overload the lift check weights and charts.

## **CRANES**

The use of cableways cranes, derricks, hoists, hooks, jacks, and slings are subject to certain hazards that cannot be met by mechanical means only by the exercise of intelligence, care, and common sense. It is therefore essential to have personnel involved in the use and operation of equipment who are competent, and careful. Serious hazards are overloading, dropping or slipping of the load caused by improper hitching or slinging, obstructing the free passage of the load, and using equipment for a purpose for which it was not intended or designed. The crane must have good glass in the cab, an angle indicator, and ton-mile cut off records, wire rope inspection records, an annual inspection by a third party, and a serviceable fire extinguisher.

## **GENERAL**

- The rated load capacities and operating speeds of the crane shall be posted.
- All hooks should have a safety latch or you must snub or mouse.
- A thorough annual inspection conducted by a third party.
- Wire rope must be inspected and records kept.
- The swing radius must be guarded to prevent striking or crushing employees.
- All window glass must be in good condition.
- A 5 BC fire extinguisher or higher must be in the cab.
- Must maintain 10 ft of clearance between the cranes and live electrical lines.
- Crawler and Truck cranes shall have stops to prevent movement within 5 degrees.
- Hoists - Safe working loads and angles shall be posted in the cab.
- Taglines must be used to control the load. (If it does not create a hazard)  
Only one person may give signals to the crane operator. (See the following for appropriate signals).

### ***Crane Signals and signaler***

- The signaler must:
  - Be in clear view of the crane operator
  - Have a clear view of the load and the equipment
  - Keep persons outside the crane's operating area
  - Never direct a load over a person

**Examples of some common hand signals:**

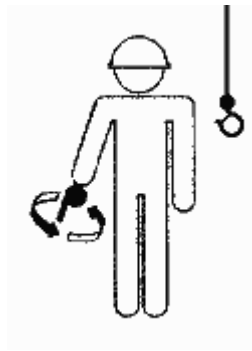
**Hoist:** With forearm vertical, forefinger pointing up move the hand in a small horizontal circle.

**Lower:** With an arm extended downward, forefinger pointing down, move the hand in small horizontal circles.

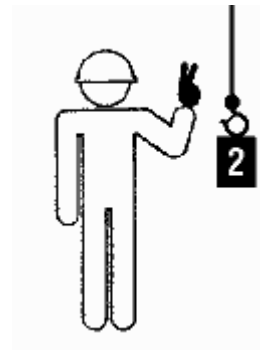
**Multiple Trolleys:** Hold up one finger for block marked "1" and two fingers for a block marked "2." Regular signals follow.



Hoist



Lower



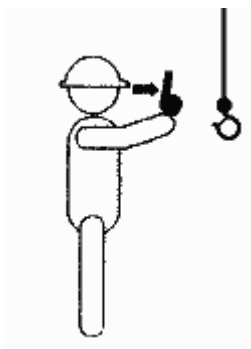
Multiple Trolleys

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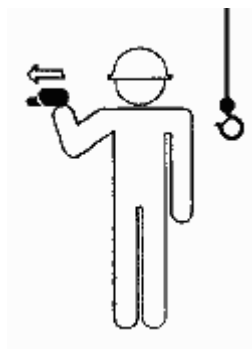
**Bridge Travel:** Arm extended forward, hand open and slightly raised, make a pushing motion in direction of travel.

**Trolley Travel:** Palm up, fingers closed, thumb pointing in direction of motion, and jerk the hand horizontally.

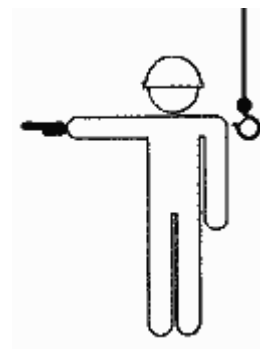
**Stop:** Arm extended, palm down, hold the position rigidly.



Bridge Travel



Trolley Travel

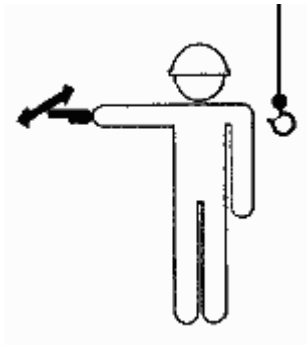


Stop

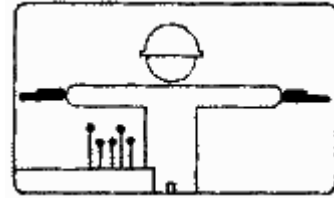
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**Emergency Stop:** Arm extended, palm down, move the hand rapidly right and left.

**Magnet Is Disconnected!** : Crane operator spreads both hands apart, palms up.



Emergency Stop



Magnet is Disconnected!

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**Here are some common hand signals for crawler, truck and locomotive cranes.**

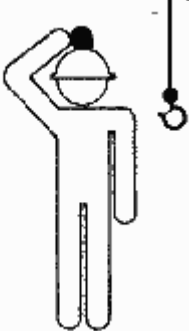
**Use Main Hoist:** Tap fists on head; then use regular signals.

**Use Whip Line (Auxiliary Hoist):** Tap elbows with one hand; then use regular signals.

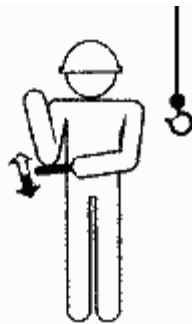
**Raise Boom:** Arm extended, fingers closed, thumb pointing upward.

**Lower Boom:** Arm extended, fingers closed, thumb pointing downward.

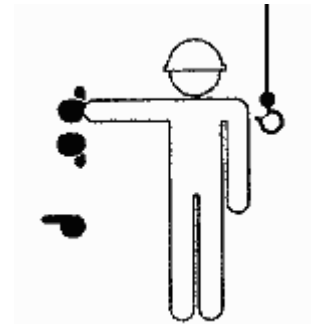
**Swing:** Point with a finger in direction of swing of a boom.



Use Main Hoist



Use Whip Line



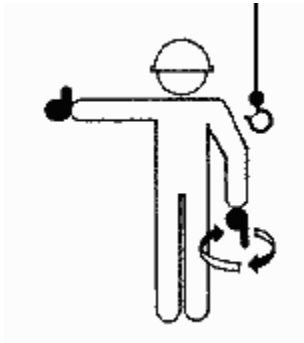
Raise Boom; Lower Boom; Swing

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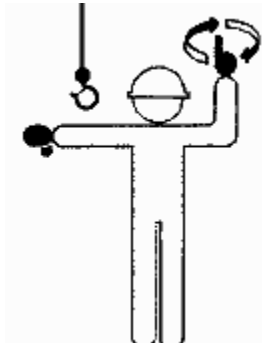
**Raise the Boom and Lower the Load:** Arm extended, fingers closed, thumb pointing upward, other arm bent slightly with forefinger pointing down and rotate hand in horizontal circles.

**Lower the Boom and Raise the Load:** Arm extended, fingers closed, thumb pointing downward, other arm with forearm vertical, forefinger pointing upward and rotate the hand in horizontal circles.

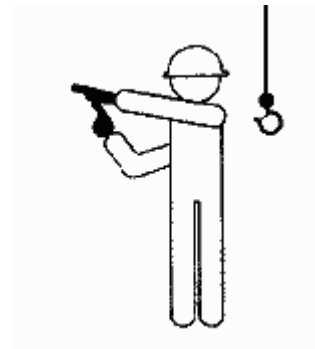
**Move Slowly:** Use one hand to give any motion signal and place the other hand motionless in front of the hand giving the motion signal. (Hoist, Slowly shown as example.)



Raise the Boom and Lower the Load



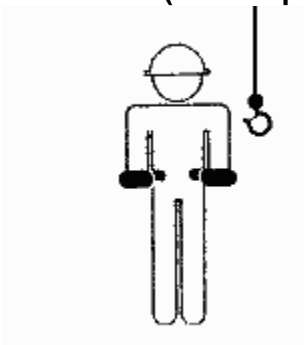
Lower the Boom and Raise the Load



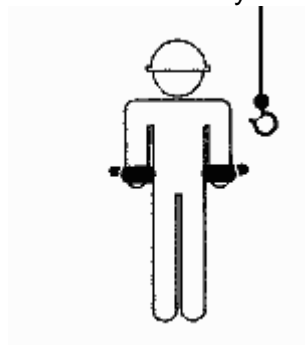
Move Slowly

**Retract Boom (Telescoping Booms):** Both fists in front of body with thumbs pointing toward each other.

**Extend Boom (Telescoping Booms):** Both fists in front of body with thumbs pointing outward.



Retract Boom



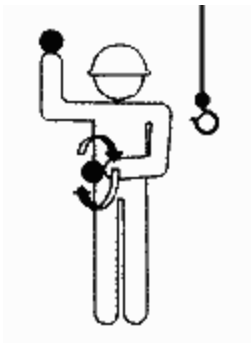
Extend Boom

**Some signals for crawler cranes only**

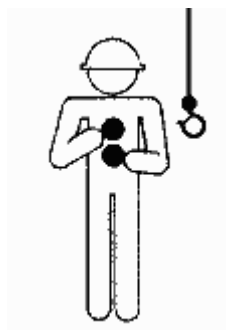
**Lock Track:** this side as indicated by raised fist.

**Turn Travel Track:** this side in direction shown by revolving fist.

**Travel Both Tracks:** forward or backward by revolving fists.



Lock Track  
Turn Travel Track



Travel Both Tracks