Berry Bros. General Contractors, Inc.
Standard Operating Procedures for Crane Operations

Introduction

The Bureau of Labor Statistics (BLS) Census of Fatal Occupational Injuries (CFOI) reported 72 crane related fatal occupational injuries in 2006.

In 2006 there were no multiple fatality incidents involving cranes; however 6 fatalities in 2005 and 8 fatalities in 2004 were the result of multiple fatality incidents involving cranes.

In 2006, 30 crane-related fatalities were caused by being struck by falling objects. Only 9 of these fatalities were due to the crane striking them. The other workers were killed when an object the crane was transporting fell from the crane onto them.

From 2003 to 2006, the most fatal occupational injuries involving cranes occurred in Texas (42). Florida (27), California (25), and Louisiana (17) more information is available from http://www.bls.gov/iif.

Crane-related fatal occupational injuries, 1997-2006

1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
97	93	80	90	72	80	62	87	85	72

OSHA's analysis identified the major causes of crane accidents to include: boom or crane contact with energized power lines (nearly 45% of the cases), under the hook lifting device, overturned cranes, dropped loads, boom collapse, crushing by the counter weight, outrigger use, falls, and rigging failures.

Purpose

The purpose of developing Standard Operating Procedure for activities involving crane operations in lifting and hoisting is to assure a safe work place.

Hazard Evaluation

Some hazards associated with crane operations are:

- Contact with overhead power lines.
- Boom collapse.
- Overturning.
- Crushed by the counter weights.
- Rigging failures.
- Outrigger use.
- Falls.
- Loads that shift/slip.
- Pedestrians entering the work zone.

All foreseeable hazards should be addressed in a written scope of work prior to any crane operations involving lifting or hoisting. The contractor will comply with all Federal and State Regulations involving crane safety, overhead and gantry cranes, overhead hoists, slings, fall protection, walking/working surfaces, and scaffolding.

Standard Operating Procedures for New Construction

- Prior to all crane operations Environmental Health and Safety must be supplied the following information, boom length, crane weight, assembly/onsite or off site, and weight of the heaviest load to be lifted.
- Scope of work will be discussed and conveyed to all affected employees prior to starting work.
- Equipment that is being staged must be barricaded off to pedestrian and student traffic. Barricades will consist of chain link fencing.
- Cranes that require assembly of the boom will be barricaded off to pedestrian and student traffic. Barricades will consist of chain link fencing or orange barricade fencing.
- The accessible areas within the swing radius of the rotating superstructure of the crane must be barricaded. Barricades will consist of yellow caution tape.
- The area around the crane will be barricaded off to pedestrian traffic. No one will be allowed to enter the work area unless they are trained to recognize the hazards associated with crane operations.
- The cranes swing clearance “boom length” will be barricaded off to pedestrian and student traffic in the event of a tip over or boom collapse. Barricades will consist of chain link fencing.
- Proper Personal Protective Equipment will be utilized when working in a construction zone, hard hats, steel toe shoes, eye protection, hand protection, fall protection when applicable.
- Construction zone will be clearly identified by signage. Other signage will be utilized as needed.
- Never suspend a load over or close to people.

- Do not stand under suspended loads or in the loads line of motion.

Contractor Responsibilities

It is the contractor's responsibility to assure a safe work site exists. The use of cranes requires special attention for every application; however, most crane-related incidents fall into four categories: overhead power lines, riggings and maintenance, jumping and falling, and shifting or slipping loads. Accidents in each of these categories generally involve human error and may be preventable. Some safety recommendations for each of the four categories are addressed below.

Overhead Power Lines

- Lower the boom when in transit.
- Consider any overhead wire to be energized unless the line owner or utility company tells you that it is not energized.
- Maintain a minimum clearance of 10 feet between the power line and any part of the crane or load when working around energized power lines rated at 50kv or below.
- Maintain a minimum clearance between the lines and any part of the crane or load of 10 feet plus 0.4 inch for every 1kv over 50kv, or twice the length of the line insulator, for voltages above 50kv.
- Look carefully before moving the boom, particularly in congested areas of poor visibility, and request assistance if you cannot see clearly.

Rigging and Maintenance

- Keep your fingers and arms from between the sling and the load and from the sling hook. Gloves are recommended.
- Follow lockout/tagout procedures (turn the crane off, lock the main switch in the off position, and tag it), and place an OUT OF ORDER sign on the crane in a highly visible place before starting any maintenance activity.

Jumping and Falling

- Use the ladder when climbing up to the cab. Keep a firm grip on the handrails to avoid falling if your feet slip.
- Use the ladder to climb down, DO NOT JUMP DOWN.
- Avoid handling or carrying objects while climbing up or down the ladder.
- Take precautions to ensure that loose clothing, such as coats or rain gear, does not catch on bolts or handles and cause a fall.

Shifting or Slipping Loads

- Inspect the crane before use, checking for deformed or cracked hooks and wear on the hoist chain, sling, and associated equipment. Ensure that the crane and associated hoisting machinery is inspected by the annually by a competent person or by an agency recognized by the U. S. Department of Labor.
- Ensure that the load is well secured and balanced in the sling or rigging before it is lifted more than a few inches from the ground.
- Position the hook directly over the center of the load to minimize swinging.
- Do not attempt to manually shift, turn or redistribute a load once it has been lifted, since this increases the risk of accidents and injuries. If the load is off center or looks as if it will slip, ask the operator to lower the load back to the ground before you approach to make adjustments.
- Check the area in the path of the moving load to ensure that it will not hit anything, especially if it swings suddenly.
- Move the load smoothly, avoid sudden accelerations or decelerations, which can cause the load to swing or shift.

References:

1. 29 CFR 1926.550,"Cranes and Derricks"
2. 29 CFR 1910.179, "Overhead and Gantry Cranes"
3. 29 CFR 1917.45, "Cranes and Derricks"
4. 29 CFR 1910.180, "Locomotive and Truck Cranes"
5. ANSI B30.2-90 and B30.2a, "Overhead and Gantry Cranes"
6. ANSI B30.16a-89, "Overhead Hoists"
7. ANSI B30.9-90, "Slings"
8. Mobile Crane Inspection Guidelines for OSHA Compliance Officers

Project Name:		Project Location:
Inspected by:	Date:	Manufacturer:
Equipment #:		Serial #:

CRANE INSPECTION

	Yes	No
HOOK:		
1. Throat opening more than 15%.	___	__
2. Hook in twisted (not straight or on one plane).	___	__
3. More than 10% wear at the throat.	___	__
4. Any cracks or corrosion	___	__
WEDGE SOCKETS:	___	__
1. Wire rope size and wedge socket is a proper match.	___	__
2. Dead end of wire rope extends at least 9 inches beyond wedge socket.	___	__
3. Dead end of the wire rope is secured properly.	___	__
SHEAVES:		
1. The wire rope is seated properly in the sheaves.	___	__
2. The wire rope keepers (keeps cable from coming out of the sheaves) are in good shape.	___	__
3. Check the bolts on the sheave plates for tightness.	___	__
4. Check for any weld cracks.	___	__
5. Signs of bent or buckled panels or parts.	___	__
BOOM:		
1. Hydraulic leaks.	___	__
2. Check all 4 sides of boom for bent parts or buckled panels.	___	__
3. Lattice boom extension is secured properly.	___	__
4. Lattice sections are not bent (each rib is straight).	___	__
TIRES:		
1. Properly inflated (look on load charts for Manufacturing recommendations)	___	__
2. Cuts in the tires or bulges.	___	__

FLUIDS:

1. Crank case oil is clean and full. ____ __
2. Water is about 2 inches below cap. ____ __
3. Check hydraulic oil level. ____ __

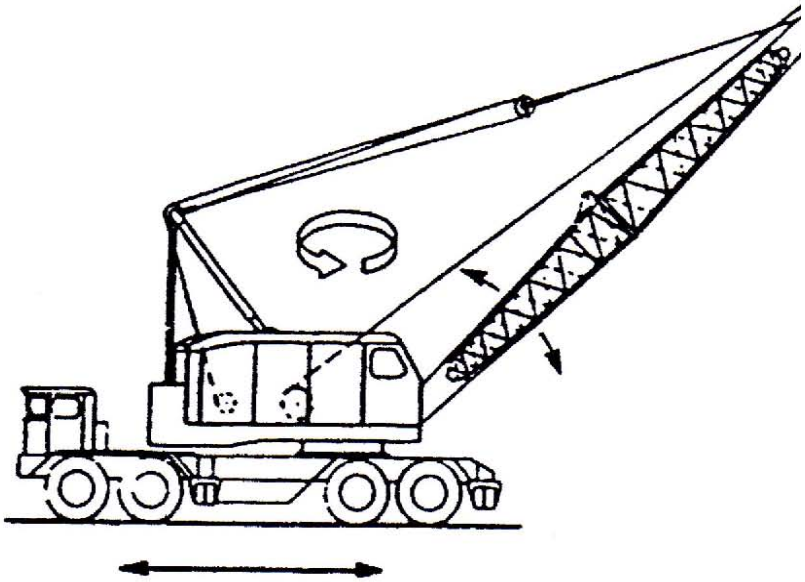
MISCELLANEOUS:

1. Out rigger pads not cracked. ____ __
2. Hydraulic hoses in good condition. ____ __
3. The drum cable is properly spooled. ____ __
4. Handrails leading into crane cab are good. ____ __
5. Fire extinguisher is available. ____ __
6. Load chart is in cab. ____ __
7. Boom angle indicator is available and working. ____ __
8. Back alarm is working. ____ __
9. Engine is started and gauges are checked, working properly. ____ __
10. Out riggers are extended out; working properly. ____ __
11. Crane is leveled, working properly. ____ __
12. Boom up, unlock the swing break, does it swing when level? ____ __
13. Swing through 360 degrees, does boom angle indicator stay the same throughout rotation? ____ __
14. Does the horn work? ____ __
15. Does boom swing break work properly? ____ __
16. Extend out the boom, are all sections extending evenly. ____ __
17. Brakes & brake systems check out. ____ __
18. Safety pressure relief valves check out. ____ __

Latticework Boom

Figure 3

Wheel-Mounted Crane (Multiple Control Station)

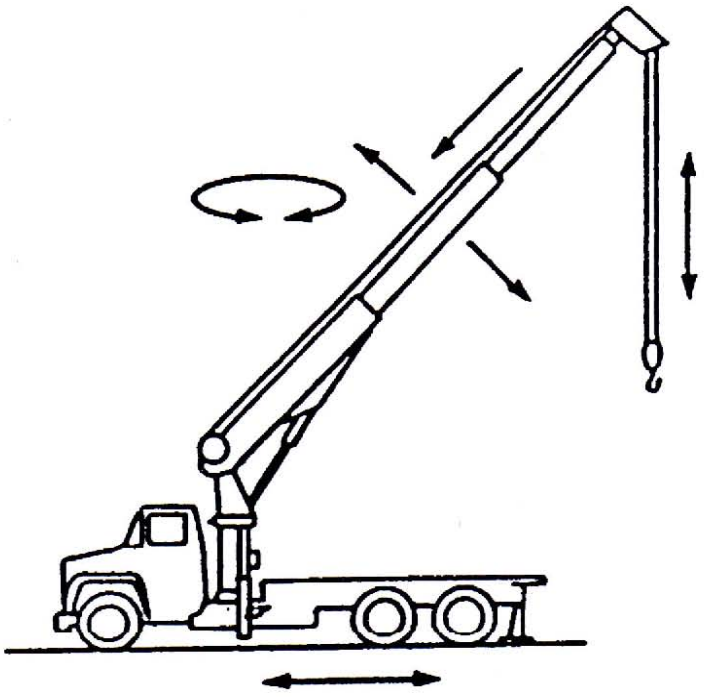


Flatbed Truck-Mounted Cranes

Hydraulic Boom

Figure 4

Commercial Truck-Mounted Crane—Telescoping Boom



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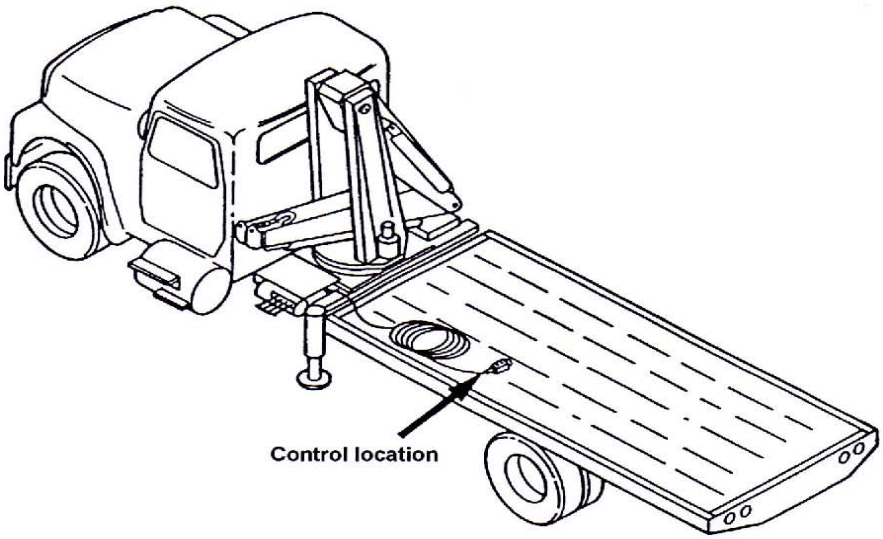
Articulated Boom

Figure 5

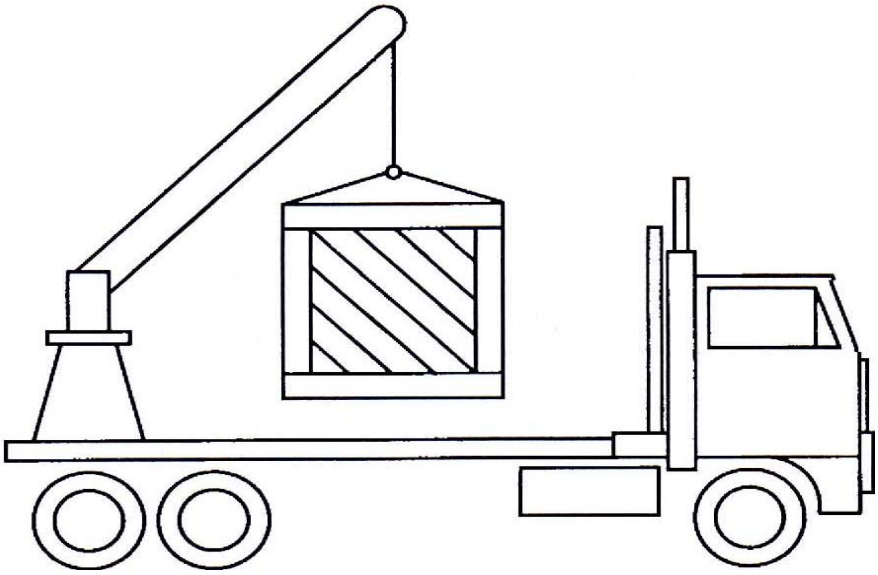
Commercial Truck-Mounted Remote Control



Trolley Boom

Figure 6

Trolley Boom Crane



Crawler-Mounted Latticework Boom Cranes

Figure 7

Crawler Crane