HEALTH AND SAFETY MANUAL	
Title: Truck Crane	
Approved by: Greg Savoy	Rev. 1/1/08

1 Purpose/Scope:

The purpose of this program is to provide required information in the operation and safe use of Truck Cranes.

This program applies to all Company employees who operate a Truck Crane in the scope of their job duties and assignments. When work is performed on a non-owned or operated site, the operator's program shall take precedence, however, this document covers Company employees and contractors and shall be used on owned premises, or when an operator's program doesn't exist or is less stringent.

2 Definitions/Responsibilities:

2.1 Definitions:

2.1.1 Truck Crane - consists of a rotating superstructure with power plant, operating machinery and boom, mounted on an automotive truck equipped with a power plant for travel. Its function is to hoist and swing loads at various radii.

- ❑ Includes cherry pickers and excludes service truck mounted hoists.

2.1.2 Wheel Mounted Crane (wagon crane) - consists of a rotating superstructure with power plant, operating machinery and boom, mounted on a base or platform equipped with axles and rubber tired wheels for travel. The base is usually propelled by the engine in the superstructure, but it may be equipped with a separate engine controlled from the superstructure. Its function is to hoist and swing loads at various radii.

2.1.3 Accessory - is a secondary part or assembly of parts that contributes to the overall function and usefulness of a machine.

2.1.4 Appointed - assigned specific responsibilities by the employer or the employer's representative.

2.1.5 ANSI - the American National Standards Institute.

2.1.6 Angle Indicator - an accessory that measures the angle of the boom to the horizontal.

2.1.7 Axis of Rotation - is the vertical axis around which the crane superstructure rotates.

2.1.8 Axel - the shaft or spindle with which or about which a wheel rotates. On truck- and wheel-mounted cranes it refers to an automotive type of axle assembly including housings, gearing, differential, bearings, and mounting appurtenances.

2.1.9 Axel (bogie) - two or more automotive-type axles mounted in tandem in a frame so as to divide the load between the axles and permit vertical oscillation of the wheels.

2.1.10 Base - the traveling base or carrier on which the rotating superstructure is mounted such as a car, truck, crawlers, or wheel platform.

2.1.11 Boom - is a member hinged to the front of the rotating superstructure with the outer end supported by ropes leading to a gantry or A-frame and used for supporting the hoisting tackle.

2.1.12 Boom Angle - is the angle between the longitudinal centerline of the boom and the horizontal. The boom longitudinal centerline is a straight line between the boom foot pin (heel pin) centerline and boom point sheave pin centerline.

2.1.13 Boom Hoist - is a hoist drum and rope reeving system used to raise and lower the boom. The rope system may be all live reeving or a combination of live reeving and pendants.

2.1.14 Boom Stop - is a device used to limit the angle of the boom at the highest position.

2.1.15 Brake - is a device used for retarding or stopping motion by friction or power means.

2.1.16 Cab - is a housing that covers the rotating superstructure machinery and/or operator's station. On truck-crane trucks a separate cab covers the driver's station.

2.1.17 Clutch - is a friction, electromagnetic, hydraulic, pneumatic, or positive mechanical device for engagement or disengagement of power.

2.1.18 Counterweight - Is a weight used to supplement the weight of the machine in providing stability for lifting working loads.

2.1.19 Designated - selected or assigned by the employer or the employer's representative as being qualified to perform specific duties.

2.1.20 Drum - is the cylindrical members around which ropes are wound for raising and lowering the load or boom.

2.1.21 Dynamic (loading) - loads introduced into the machine or its components by forces in motion.

2.1.22 Gantry (A-frame) - is a structural frame, extending above the superstructure, to which the boom support ropes are reeved.

2.1.23 Jib - is an extension attached to the boom point to provide added boom length for lifting specified loads. The jib may be in line with the boom or offset to various angles.

2.1.24 Load (working) - the external load, in pounds, applied to the crane, including the weight of load-attaching equipment such as load blocks, shackles, and slings.

2.1.25 Load Block (upper) - the assembly of hook or shackle, swivel, sheaves, pins, and frame suspended from the boom point.

2.1.26 Load Block (lower) - the assembly of hook or shackle, swivel, sheaves, pins, and frame suspended by the hoisting ropes.

2.1.27 Load Hoist - is a hoist drum and rope reeving system used for hoisting and lowering loads.

2.1.28 Load Ratings – the crane's rating in pounds established by the manufacturer in accordance with regulation.

2.1.29 Outriggers - are extendable or fixed metal arms, attached to the mounting base, which rest on supports at the outer ends.

2.1.30 Reeving - a rope system in which the rope travels around drums and sheaves.

2.1.31 Rope - refers to a wire rope unless otherwise specified.

2.1.32 Side Loading - a load applied at an angle to the vertical plane of the boom.

2.1.33 Standby Crane - is a crane which is not in regular service but which is used occasionally or intermittently as required.

2.1.34 Standing Guy Rope - is a supporting rope that maintains a constant distance between the points of attachment to the two components connected by the rope.

2.1.35 Structural Competence - the ability of the machine and its components to withstand the stresses imposed by applied loads.

2.1.36 Superstructure - the rotating upper frame structure of the machine and the operating machinery mounted thereon.

2.1.37 Swing - the rotation of the superstructure for movement of loads in a horizontal direction about the axis of rotation.

2.1.38 Swing Mechanism - the machinery involved in providing rotation of the superstructure.

2.1.39 Tackle - is an assembly of ropes and sheaves arranged for hoisting and pulling.

2.1.40 Transit - the moving or transporting of a crane from one jobsite to another.

2.1.41 Travel - the function of the machine moving from one location to another, on a jobsite.

2.1.42 Travel Mechanism - is the machinery involved in providing travel.

2.1.43 Wheelbase - the distance between centers of front and rear axles. *For a multiple axle assembly the axle center for wheelbase measurement is taken as the midpoint of the assembly.

2.1.44 Whip line (auxiliary hoist) - is a separate hoist rope system of lighter load capacity and higher speed than provided by the main hoist.

2.1.45 Winch Head - is a power driven spool for handling of loads by means of friction between fiber or wire rope and spool.

2.2 Responsibilities:

2.2.1 Managers/Supervisors are responsible to ensure that employees are trained and qualified on the proper operations and have been trained in this program.

2.2.2 Managers/Supervisors are responsible that all provisions of this program are being followed and that the crane inspections are performed and the crane is in a safe operating condition

2.2.3 Employees are responsible to follow the requirements of this program and to report damage and/or repairs that are needed to supervision.

2.2.4 Crane Operator is responsible for the lift and is to make the required inspections, ensure that the crane is maintained, and that all other personnel working around that crane are kept clear of all hazards related to the operation of the crane.

3 Requirements:

3.1 General:

3.1.1 Application:

- ❑ This section applies to crawler cranes, wheel mounted cranes of both truck and self-propelled wheel type, and any variations thereof, which retain the same fundamental characteristics.

3.1.2 Only designated personnel shall be permitted to operate a crane covered by this program.

3.2 Load ratings:

3.2.1 Load ratings for cranes shall not exceed the following:

Type of Truck Crane	Percent of Tipping Load
Crawler, without outriggers	75
Crawler, using outriggers fully extended	85
Truck and wheel mounted without outriggers or using outriggers fully extended	85

3.2.2 The weight of all auxiliary handling devices such as hoist blocks, hooks, and slings shall be considered a part of the load rating.

3.2.3 Load ratings will be influenced by such additional factors as freely suspended loads, track, wind, or ground conditions, condition and inflation of rubber tires, boom lengths, proper operating speeds for existing conditions, and, in general, careful and competent operation.

- ❑ All conditions must be taken into account by the crane user.

3.2.4 A rating chart that is clearly legible and fixed to the crane cab in a location easily visible to the operator while seated at the controls is required.

3.3 Inspections:

3.3.1 Initial Inspection:

- ❑ Prior to initial use, all new and altered cranes shall be inspected to ensure compliance with regulatory requirements.

3.3.2 Regular Inspection:

- ❑ Inspection procedure for cranes in regular service is divided into two general classifications based upon the intervals at which inspection must be performed.

- ❑ The intervals in turn are dependent upon the nature of the critical components of the crane and the degree of their exposure to wear, deterioration, or malfunction.

- "Frequent" and "periodic", inspection shall be performed with respective intervals between inspections as defined below:

- Frequent Inspection: Daily to monthly intervals.

  - ✓ All control mechanisms for maladjustment interfering with proper operation: Daily.
  - ✓ All control mechanisms for excessive wear of components and contamination by lubricants or other foreign matter.
  - ✓ All safety devices for malfunction.
  - ✓ Deterioration or leakage in air or hydraulic systems.

- Daily:

  - ✓ Crane hooks with deformations or cracks.
  - ✓ For hooks with cracks or having more than 15 percent in excess of normal throat opening or more than 10 degrees twist from the plane of the unbent hook.
  - ✓ Rope reeving for noncompliance with manufacturer's recommendations.
  - ✓ Electrical apparatus for malfunctioning, signs of excessive deterioration, dirt, and moisture accumulation.

- Periodic Inspection: 1 to 12- month intervals, or as specifically recommended by the manufacturer.

  - ✓ Deformed, cracked, or corroded members in the crane structure and boom.
  - ✓ Loose bolts or rivets.
  - ✓ Cracked or worn sheaves and drums.
  - ✓ Worn, cracked, or distorted parts such as pins, bearings, shafts, gears, rollers and locking devices.
  - ✓ Excessive wear on brake and clutch system parts, linings, pawls, and ratchets.
  - ✓ Load, boom angle, and other indicators over their full range, for any significant inaccuracies.
  - ✓ Gasoline, diesel, electric, or other power plants for improper performance or noncompliance with safety requirements.
  - ✓ Excessive wear of chain-drive sprockets and excessive chain stretch.
  - ✓ Travel steering, braking, and locking devices, for malfunction.
  - ✓ Excessively worn or damaged tracks or tires.

3.3.3 Cranes not in Regular use or Standby Cranes:

- A crane which has been idle for a period of six months shall be given a complete inspection conforming with requirements of the above before placing in service.

3.3.4 Inspection Records:

- ❑ Certification records which include the date of inspection, the signature of the person who performed the inspection and the serial number, or other identifier, of the crane which was inspected shall be made monthly on critical items in use such as brakes, crane hooks, and ropes.
  - ✓ This certification record shall be kept readily available.

3.4 Maintenance Procedures:

3.4.1 General:

- ❑ After adjustments and repairs have been made the crane shall not be operated until all guards have been reinstalled, safety devices reactivated, and maintenance equipment removed.

3.4.2 Rope Inspection:

- ❑ A thorough inspection of all ropes in use shall be made at least once a month and a certification record which includes the date of inspection, the signature of the person who performed the inspection and an identifier for the ropes shall be prepared and kept on file where readily available.

- ❑ All inspections shall be performed by an appointed or authorized person.

- ❑ Any deterioration, resulting in appreciable loss of original strength shall be carefully observed and determination made as to whether further use of the rope would constitute a safety hazard.

- ❑ Conditions that could result in an appreciable loss of strength are the following:

  - ✓ Reduction of rope diameter below nominal diameter due to loss of core support, internal or external corrosion, or wear of outside wires.
  - ✓ A number of broken outside wires and the degree of distribution of concentration of such broken wires.
  - ✓ Worn outside wires.
  - ✓ Corroded or broken wires at end connections.
  - ✓ Corroded, cracked, bent, worn, or improperly applied end connections.
  - ✓ Severe kinking, crushing, cutting, or unstranding.
- ❑ Heavy wear and/or broken wires may occur in sections in contact with equalizer sheaves or other sheaves where rope travel is limited, or with saddles.

  - ✓ Particular care shall be taken to inspect ropes at these locations.

- ❑ All rope that has been idle for a period of one month or more due to shutdown or storage of a crane on which it is installed shall be given a thorough inspection before it is used.

  - ✓ This inspection shall be for all types of deterioration and shall be performed by an appointed or authorized person whose approval shall be required for further use of the rope.
  - ✓ A certification record that includes the date of inspection, the signature of the person who performed the inspection and an identifier for the rope that was inspected shall be prepared and kept readily available.

- ❑ Particular care shall be taken in the inspection of non-rotating rope.

3.5 Load Handling:

3.5.1 Size of Load:

- ❑ No crane shall be loaded beyond the rated load.

- ❑ When loads which are limited by structural competence rather than by stability are to be handled, it shall be ascertained that the weight of the load has been determined within plus or minus 10 percent before it is lifted.

3.6 Attaching the Load:

3.6.1 The hoist rope shall not be wrapped around the load.

3.6.2 The load shall be attached to the hook by means of slings or other approved devices.

3.7 Handling the Load:

3.7.1 The crane is level and where necessary blocked properly.

3.7.2 The load is well secured and properly balanced in the sling or lifting device before it is lifted more than a few inches.

3.7.3 Hoist rope shall not be kinked.

3.7.4 Multiple part lines shall not be twisted around each other.

3.7.5 The hook shall be brought over the load in such a manner as to prevent swinging.

3.7.6 During hoisting, care shall be taken that:

- ❑ There is no sudden acceleration or deceleration of the moving load.

- ❑ The load does not contact any obstructions.

- ❑ Side loading of booms shall be limited to freely suspended loads.
- ❑ Cranes shall not be used for dragging loads sideways.
- ❑ No hoisting, lowering, swinging, or traveling shall be done while anyone is on the load or hook.
- ❑ The operator shall not carrying loads over people.
- ❑ On truck-mounted cranes, no loads shall be lifted over the front area except as approved by the crane manufacturer.
- ❑ The operator shall test the brakes each time a load approaching the rated load is handled by raising it a few inches and applying the brakes.
- ❑ Outriggers shall be used when the load to be handled at that particular radius exceeds the rated load without outriggers as given by the manufacturer for that crane.
    - ✓ Where floats are used they shall be securely attached to the outriggers. Wood blocks used to support outriggers shall:
        - ➢ Be strong enough to prevent crushing.
        - ➢ Be free from defects.
        - ➢ Be of sufficient width and length to prevent shifting or toppling under load.
- ❑ Neither the load nor the boom shall be lowered below the point where less than two full wraps of rope remain on their respective drums.
- ❑ When two or more cranes are used to lift one load, one designated person shall be responsible for the operation. This person shall be required to analyze the operation and instruct all personnel involved in the proper positioning, rigging of the load, and the movements to be made.

3.8 In transit:

3.8.1 The following precautions shall be exercised while the crane is in transit:

- ❑ The boom shall be carried in line with the direction of motion.
- ❑ The superstructure shall be secured against rotation, except when negotiating turns when there is an operator in the cab or the boom is supported on a dolly.
- ❑ The empty hook shall be lashed or otherwise restrained so that it cannot swing freely.

- ❑ Before traveling a crane with load, a designated person shall be responsible for determining and controlling safety.
    - ✓ Decisions such as position of load, boom location, ground support, travel route, and speed of movement shall be in accord with his determinations.
- ❑ The load must be controlled by using a tag line or tag lines to the truck crane and/or personnel.
- ❑ A crane with or without load shall not be traveled with the boom so high that it may bounce back over the cab.
- ❑ When rotating the crane, sudden starts and stops shall be avoided.
    - ✓ Rotational speed shall be such that the load does not swing out beyond the radii at which it can be controlled.
        - ➢ A tag or restraint line shall be used when rotation of the load is hazardous.
- ❑ When a crane is to be operated at a fixed radius, the boom hoist pawl or other positive locking device shall be engaged.
- ❑ Ropes shall not be handled on a winch head without the knowledge of the operator.

3.9 Holding the Load:

3.9.1 While a winch head is being used, the operator shall be within convenient reach of the power unit control lever.

3.9.2 No person shall be permitted to stand or pass under a load on the hook.

3.9.3 If the load must remain suspended for any considerable length of time, the operator shall hold the drum from rotating in the lowering direction by activating the positive controllable means of the operator's station.

3.10 Other Requirements:

3.10.1 Necessary clothing and personal belongings shall be stored in such a manner as to not interfere with access or operation.

3.10.2 Tools, oil cans, waste, extra fuses, and other necessary articles shall be stored in the tool box, and shall not be permitted to lie loose in or about the cab.

3.10.3 Refueling with small portable containers shall be done with an approved safety type can equipped with an automatic closing cap and flame arrester.

3.10.4 Machines shall not be refueled with the engine running.

3.10.5 A carbon dioxide, dry chemical or equivalent fire extinguisher shall be kept in the cab or vicinity of the crane.

- ❑ Operating and maintenance personnel shall be made familiar with the use and care of the fire extinguishers provided.

3.10.6 Any vehicle or mechanical equipment capable of having parts of its structure elevated near energized overhead lines shall be operated so that a clearance of 10 ft. (305 cm) is maintained.

- ❑ If the voltage is higher than 50kV, the clearance shall be increased 4 in. (10 cm) for every 10kV over that voltage.

3.10.7 Prior to rigging up a load to make a lift, a tailgate safety meeting shall be conducted for all personnel involved with or near the lift, covering the rigging, lifts, signaling and placement of the loads.

4 References:

29 CFR 1910.180 Crawler, locomotive and truck cranes.

5 Exhibits:

None.