

1 Purpose

The crane and rigging safety procedures shall be followed by Westlake employees, contractors, and all persons working on Westlake property, with the only exception for deviation from this procedure being that, where OSHA, ANSI or ASME requirements are more stringent, OSHA, ANSI, and ASME requirements will supersede site requirements. Whenever there is a concern as to safety, the operator must have the authority to stop and refuse to handle loads until a qualified person has determined the lift can be made safely.

2 Scope

This procedure outlines safe work practices for qualified employees who work on or near cranes or carry-deck cranes. The procedure will cover safe rigging and lifting practices, working around high voltage electricity, inspections, lift plans, personnel platforms, and worker requirements.

3 Responsibilities

It is the responsibility of all employees, both Westlake and Contract to inspect lifting equipment before placing it into service.

Employees shall not operate any motorized industrial equipment unless they are trained and authorized.

- It is the operator's responsibility to keep the load under control at all times. This can be accomplished by starting and stopping smoothly and by avoiding swinging the load too fast. Never allow the load or any object to strike the boom. The operator must, at all times, operate the equipment within the guidelines set forth by the manufacturer.
- Always place the boom directly above the load when lifting. Never side-load a boom or use the crane to push or pull a load.
- The equipment operator is ultimately responsible for all operations. If there are any questions, doubts, or uncertainties about the equipment, rigging, equipment setup area, load chart interpretation, or the load, it is the operator's responsibility to halt proceedings until the appropriate authority source has been consulted (Heavy Equipment Supervisor). At no time shall any mobile industrial equipment be engaged in operation unless the appropriate load chart, operator's manual, and necessary decals are in place.

- To safely perform a lift, it is imperative that the weight of the load be known. The operator shall ensure that no lift exceeds the manufacturer's rated capacity for a given radius and angle.

4 Communication

- 4.1 Communication is the key to any safe job. Prior to making a lift, communication should be established to discuss the job with all parties involved. Typically, within a production unit this will include the Crane Operator and Riggers, the Maintenance Foreman and the Operations Foreman who requested the work.
- 4.2 Wind speed; Foxboro will receive a communication from a device that measures wind speed. The Foxboro system will then send a page sent for a sustained wind over the alarm set points occurring for 30 consecutive seconds. The alarms will be cleared and a page sent if for 20 minutes no single wind readings over the alarm set points occur. Separate alarms have been configured for 20 and 25 mph winds. These pages will be sent to the rigging foreman and shift superintendents. Contact Process Control Engineering if you need to receive this page.
- 4.3 As part of the pre-lift preparation, the employees involved in the lift, including a representative from the operating department, should walk down the area where the lift will be made to determine the best location for rig placement and the best path for the load to travel. Special consideration should be given to lifts made over process piping and equipment, instrumentation, utilities, roadways and areas where personnel travel.
- 4.4 The operator shall respond to signals only from the appointed signal person or by radio contact. The operator shall obey an emergency stop signal when given at any time, regardless of who gives the signal. Specific communication procedures must be reviewed and agreed to prior to the lift taking place, including designating a specific signal person.
- 4.5 Barricade tape shall be placed around the swing radius of the lift to prevent unauthorized people from entering the area where the lift is taking place. As an alternate to barricade tape, a person in direct communications with the crane operator can be utilized. Any exception must be approved collectively by the operation and maintenance supervisor, crane operator and Safety department.

- 4.6 Accessible areas within the swing radius of the rear of the rotating superstructure of the crane, either permanently or temporarily mounted, shall be barricaded in such a manner as to prevent an employee from being struck or crushed by the crane. (Requirement from OSHA).
- 4.7 Only designated and authorized employees will be allowed inside the barricaded area. The crane operator has the final say as to who is allowed in the designated area. Typically this should only be the rigger directly involved in the lift.
- 4.8 The crane operator will sound the crane horn or initiate some other type of audible alarm just prior to making the lift to alert everyone that a lift is being made.

5 Working Around High-Voltage Electricity

- 5.1 Power distribution lines are a major cause in the electrocution of equipment operators. At no time shall any part of the load or the crane be closer than 10 ft. for lines rated less than 50kV. For lines rated over 50kV, an additional 0.4 in. should be added for each 1kV. During transits with no load and boom lowered, the equipment clearance shall be a minimum of 4 ft. for voltages less than 50kV, 10 ft. for voltages between 50kV and 345kV, and 16 ft. for voltages up to and including 750kV. A person shall be designated to observe clearance of the equipment and give timely warning for all operations where it is difficult for the operator to maintain the desired clearance by visual means. Any deviation from this requirement must be approved in writing by the (Heavy Equipment Supervisor and Safety Personal) with a documented safe plan of action.

5.2 Required Clearances from Live Electrical Lines

Minimum Nominal Voltage (kV) Minimum Required Clearance (feet)

0 to 50	10
51 to 75	11
76 to 100	12
101 to 125	13
126 to 200	15
201 to 300	19
301 to 400	22
401 to 500	25
501 to 700	32
701 to 1000	32

6 Adverse Weather Conditions

- 6.1 All operations shall be in accordance with crane manufacturer's operations manual.
- 6.2 Lifts made with wind speeds at 20 mph or greater shall be de-rated according to the crane operator's manual. It is recommended that an engineer is involved prior to making lift.
- 6.3 Crane's shall not be operated when load cannot be controlled due to wind or weather.
- 6.4 In high winds, consideration should be taken as to the area you are working to warrant shutting the crane down.
- 6.5 Crane operation shall stop in lightning storms and boomed down and moved out of operating units if possible. If not possible, the crane shall have a ground cable attached to the nearest ground grid.
- 6.6 Crane operation shall not be performed in sustained winds of 30 mph or greater.

7 Matting Requirements

Outrigger pads shall always be used under outrigger floats and shall be in excellent condition and not deteriorated. Outrigger pads must distribute the weight of the crane with its load and not transfer more than 2000 pounds per square foot to the support surface (escalate to company supervision for further evaluation if this cannot be achieved). Minimum outrigger pad size shall be 3-ft x 3-ft with a minimum thickness of 6 inches for wood pads (2-ft x 2-ft x 3 inches for 9-ton carry deck cranes). Steel or composite pads can be thinner but must be sufficient enough to distribute loads evenly to support surface.

- 7.1 The field supervisor is responsible for the use and selection of crane outrigger mats. Since the maximum outrigger loading on a single outrigger pad can exceed 28,000 lb. /ft.², a thorough investigation of ground conditions must be made prior to positioning the crane. By contrast, ground-bearing pressures on our largest lifts rarely exceed 3,000 lb. /ft.². To ensure the safest working conditions, observe the following minimal guidelines when positioning for a lift:

- 7.1.1 Thoroughly check surface conditions to ensure they will support the intended loading.
- 7.1.2 Make inquiries regarding the presence of voids beneath the surface, such as loose fill, culverts, conduit, drainage channels, etc.
- 7.1.3 *Outrigger mats should be at least two to three times the surface area of the pad (float). The outrigger mat must completely support the float and transmit the load to the supporting surface.*
- 7.1.4 Level and center the mats beneath the outrigger pads. Mats should be strong enough to prevent crushing, free from defects, and of sufficient width and length to prevent shifting or toppling under a load.
- 7.1.5 Recheck mat positioning and integrity after each lift.

8 Mobile Industrial Equipment Inspections

No cranes, regardless of size, will be allowed inside the complex unless it has a current annual inspection as required by OSHA, as well as an initial "Inbound Crane Inspection" (copies to remain in crane cab). The annual inspection will be provided to the company inspector by the equipment contractor and/or equipment owner. When entering the complex, this inspection will be conducted by the heavy equipment supervisor, **or designee**. Contractor coordinators and/or the heavy equipment supervisor, and employees performing the job will evaluate and document on a JSA if any underground structures would be affected and conduct an underground drawing search prior to any lifts, if deemed necessary. Additionally, the heavy equipment operator will visually check the surface and soil conditions where the crane will be set up (probe if necessary). If there are any questions as to the suitability of the supporting subsurface, then escalate to supervision for further investigation and evaluation.

- 8.1 At the beginning of each shift or prior to use if the crane is not used daily, an equipment operator shall conduct a visual and functional inspection prior to using the equipment. These inspections should be documented on the Daily Equipment Inspection Form and shall be maintained onsite for one year. The designated equipment operator shall also perform a detailed inspection at monthly intervals. These inspections shall be documented on the Monthly Equipment Checklist and shall be maintained onsite for two years.
- 8.2 All equipment shall undergo a thorough annual inspection. The equipment owner is responsible for ensuring that annual inspection reports are available for

all equipment being used, whether borrowed, rented, owned, or assigned. Deficiencies that are discovered through operational use or inspection should be reported immediately to equipment owner, and the defective equipment should be placed out of service. No equipment shall be placed back in service until deficiencies are evaluated and corrected by a qualified person.

8.3 Crane headache balls and blocks shall be inspected on an annual basis.

8.4 Employees must not modify, redesign, or repair tools or equipment without specific instructions from the equipment owner. Tools and equipment are to be used only for the purposes for which they were designed and in accordance with the manufacturer's recommendations, unless specific consent is obtained from the equipment owner.

9 Critical Lifts

9.1 A critical lift is any lift with a mobile crane that meets the following criteria:

9.1.1 The lift exceeds 75% of the rated capacity of the equipment as determined by the load chart

9.1.2 The lift is personnel hoisted in a personnel basket

9.1.3 All multi-crane lifts (excluding tailing rigs)

The following lift types shall be evaluated for the need to initiate a critical lift plan.

9.1.4 Any other lift that may not be completely routine,

9.1.5 Horizontal lifts weighing more than 50 tons and vertical lifts weighing more than 40 tons

9.1.6 Vertical lifts weighing more than 20 tons without lifting lugs and trunnions

- 9.1.7 All lifts over 20 tons requiring more than 150 ft. of boom
- 9.1.8 All barge transferals weighing more than 20 tons
- 9.1.9 All jib lifts weighing more than 5 tons (hydraulic cranes, lattice boom)
- 9.1.10 All lifts where the boom or load is over pipe racks or other critical equipment
- 9.1.11 Jack and skid lifts or stationary rigging lifts weighing more than 20 tons
- 9.1.12 The boom assembly is over pipe racks or other obstructions
- 9.1.13 Lifts requiring modifications or special configurations of lifting equipment
- 9.1.14 Lifts requiring design and/or fabrication of special rigging equipment
- 9.1.15 Lifts over 20 tons that require walking the load with a crawler or truck crane
- 9.1.16 All derrick and pole lifts
- 9.1.17 Any other lift deemed critical by any single or combination of factors
- 9.1.18 Transportation of equipment weighing more than 75 tons or oversize in any dimension
- 9.2 A pre-lift meeting shall be held for all critical lifts. At a minimum, meeting attendance shall include the supervisor, foreman, equipment operators, and all other employees directly associated with the lift.
- 22 **9.3 While the lift is in progress, the representative in charge of the lift shall assure A lift plan must be completed for ALL critical lifts and must be available for presentation to any requesting party. The following points must be completed when preparing a lift plan.**

10 Lift Plans

10.1 A lift plan must be completed for ALL critical lifts and must be available for presentation to any requesting party. The following points must be completed when preparing a lift plan.

- 10.1.1 Once a formal lift plan has been developed, if any of the variables in the equipment, load, or lift change, then the plan must be updated or a new lift plan must be developed.
- 10.1.2 ALL lifts must be planned with equipment capabilities, weights of loads, radius of lifts, etc. determined before any lift is made.
- 10.1.3 The signed and dated documentation of the formal lifting plan is to be retained in the jobsite files for one year. Leave a duplicate copy with the equipment operator.
- 10.1.4 If there are any questions, doubts, or uncertainties about the equipment, rigging, equipment setup, and load chart interpretation, or the load, the Heavy Equipment Supervisor should be consulted prior to completing a formal lifting plan.

10.2 These guidelines do not limit the documentation of any lift. Many variables may dictate that other lifts are defined as “critical” or that documentation may be desired for other lifts.

11 General Rigging Safety

11.1 Lifting with Hoisting Equipment Dos and Don'ts

- 11.1.1 DO give safety first consideration in the handling of materials.
- 11.1.2 DON'T lift a piece without knowing its weight.
- 11.1.3 DON'T make a lift without knowing the lifting equipment's capacity and the method to be used.
- 11.1.4 DO familiarize yourself with the types of slings available for easiest and safest lifting.

- 11.1.5 DO inspect the lifting equipment before and after it is used to make certain it is in good condition.
- 11.1.6 DO report any lifting equipment that appears to be unsafe before someone else uses it.
- 11.1.7 DO remove damaged lifting equipment
- 11.1.8 DON'T use lifting equipment that is damaged to lift loads lower in capacity than the original rated capacity of the equipment.
- 11.1.9 DO report all accidents causing damage to lifting equipment, operating equipment, and products even if you feel there was no danger.
- 11.1.10 DON'T leave equipment where it can be accidentally damaged by bending, cutting, or crushing.
- 11.1.11 DO refuse to move a load if you are not satisfied with the way the load is attached
- 11.1.12 DON'T let anyone overrule the judgment of the operator. Higher authority should be considered.
- 11.1.13 Do use a back up sling or tether when making multiple piece lifts.
- 11.1.14 Do assume equipment and piping that has been in service has internal corrosion that may fail unexpectedly.

12 Proper Use of Chain and Wire Rope Slings Dos and Don'ts

- 12.1 DO protect the sling from the cutting action in making a lift by using padding, blocks, or corner protectors.
- 12.2 DON'T point load (tip load) standard sling hooks.
- 12.3 DO choose a sling one size larger where conditions will subject the sling to severe wear, abrasion, impact, or corrosive conditions.
- 12.4 DO select the proper style hook or attachments.
- 12.5 DON'T subject hooks or attachments to a bending action.
- 12.6 DO stand clear while a sling is being drawn from beneath a load. Hooks and slings may catch and suddenly fly free or tip the load.
- 12.7 DON'T let the load lie directly on a sling wrapped around a load (lower the load on proper blocking).
- 12.8 DO face the hook opening out and away from the sling pull when making choker hitches.
- 12.9 DON'T assume in a choker hitch that the hook is going to stay in place when the slack is being taken out of the sling.

13 Shackle Dos and Don'ts

- 13.1 DO make certain that the bolt in a screw pin shackle turns easily, and then tighten it (use oil on the threads).
- 13.2 DON'T use any screw pin shackle where the bolt is very difficult to turn (the pin is either bent due to overload or the threads have been damaged).
- 13.3 DO use safety shackles wherever possible (they are safer).
- 13.4 DON'T use round pin shackles instead of safety shackles or screw pin shackles.
- 13.5 DO use the largest bearing surface possible on the shackle pin. This will reduce the bending movement on the pin.

14 Proper Use of Nylon Webbing Slings Dos and Don'ts

- 14.1 DO inspect the surface and stitching of the sling for cuts and abrasions.
- 14.2 DON'T attempt to inspect the inside nylon fibers of webbing (this is not necessary because these fibers are protected by the outside fibers, and it may damage the sling).
- 14.3 DO use nylon slings in the presence of oils, greases, hydrocarbon, and degreasing solutions.
- 14.4 DON'T use nylon slings in acid pickling solutions and concentrated alkaline solutions (Dacron or polypropylene webbing slings are normally used in these solutions).
- 14.5 DON'T use nylon slings at temperatures above 250° F.
- 14.6 DON'T use nylon slings on hoist hooks that are gouged or nicked (there could be sharp edges that could cut the sling).
- 14.7 DO use softeners, pads, sheaths, etc. to protect nylon and synthetic slings from cuts and abrasions **anywhere it contacts a potentially damaging surface.**
- 14.8 DON'T use nylon slings to lift structural steel.

15 Tools and Equipment

- 15.1 Tools and equipment are not to be modified, interchanged, or put to uses other than those described by the manufacturer. Tools and equipment are to be repaired only by designated persons and are not to be left running, energized, or under pressure when unattended. Defective tools and equipment are to be reported immediately and removed from service until the defect can be corrected. Any defect shall be indicated on a "DANGEROUS – DO NOT USE" label if the tool or equipment is left unattended. Only qualified persons or the manufacturer will repair tools and equipment.

15.2 ALL guards are to be left in place and are to be properly used. Do not modify or tamper with the guards. Tools and equipment with defective, broken, modified, or missing guards are to be tagged “DANGEROUS – DO NOT USE” and removed from service. Any employee found modifying or deactivating a safety guard or mechanism will be subject to disciplinary action up to and including termination.

16 Tool and Equipment Inspections

16.1 Tools and equipment utilized in lifting operations will be inspected on a quarterly basis. All Chain Hoists and Lever Hoists will be inspected yearly by a qualified Contract Inspector as part of the Annual Inspection Program. Wire rope and synthetic slings will be inspected in accordance with EDM document #4301-06-372. Tools and/or equipment found defective during inspection will be tagged and immediately removed from service until properly repaired by qualified personnel. Employees are responsible for inspecting tools, equipment, and mechanical lifting devices prior to use. Employees must not use defective or broken tools or equipment. All deficiencies are to be reported and corrected immediately, or the tool or equipment is to be tagged and removed from service.

16.2 Employees must not modify, redesign, or repair tools or equipment without specific instructions from the jobsite superintendent. Tools and equipment are to be used only for the purposes for which they were designed and in accordance with the manufacturer's recommendations.

17 Personnel Platform Procedure

17.1 Lifting employees in personnel platforms suspended from crane load lines is prohibited, except when the supervisor considers this practice safer than other methods or when other methods are not feasible due to structural design or other jobsite conditions. When making the determination as to whether or not a personnel platform should be used, the supervisor should consider the following:

17.1.1 Alternative methods to access the jobsite, including aerial lifts, permanent platforms and ladders, scaffolding, etc.

17.1.2 Frequency with which the location must be reached

17.1.3 The nature of the work to be performed

17.1.4 The minimum number of personnel required

17.1.5 Surrounding facilities and/or processes

17.1.6 Follow SP#23, fall protection Appendix B when using personal platforms.

17.2 In all cases where consideration is being given to the use of a personnel platform, the supervisor should consult with personnel experienced in other methods of providing access and the personnel who will be performing the work prior to finalizing the decision. Once the decision has been made to use a personnel platform, a written lift plan must be completed.

18 Worker Requirements

18.1 A pre-lift meeting that will include all personnel involved in the job shall be held prior to beginning work to review the job, the lift plan, all the applicable rules and procedures, and to complete the checklist. All of this documentation shall be attached to the permit authorizing the work.

18.2 Except over water, personnel occupying the platform shall use a full-body safety harness equipped with dual shock-absorbing lanyards attached to a designated structural member within the platform. When working over water, the requirements of CFR 29 1926.106 shall apply.

18.3 Personnel occupying the platform shall be knowledgeable in the use of crane hand signals.

18.4 The number of personnel occupying the platform shall not exceed the minimum number required to complete the task to be performed or the rated capacity of the personnel platform.

19 Equipment Requirements

19.1 Crane

19.1.1 The load chart shall be “de-rated” to 50% when lifting personnel.

19.1.2 The crane shall be equipped with a boom angle indicator readily visible to the operator.

19.1.3 The crane shall be equipped with a functional anti two-block device that is capable of deactivating the hoist and boom extension controls.

19.1.4 The hook shall be equipped with a safety latch that can be closed and locked to eliminate the hook throat opening or a hook whose throat opening can be wired closed when lifting personnel.

19.1.5 The load line drum hoist and boom hoist shall have controlled lowering (i.e., power mode) at all times.

20 Personnel Platforms

20.1 They shall meet 29 CFR Part 1926.550 requirements and be certified (design and construction) by a qualified structural engineer.

20.2 They shall be clearly labeled as to their empty weight, rated load capacity, or the maximum intended load.

20.3 In addition to the use of hardhats, they shall be equipped with overhead protection when there is a potential for personnel to be exposed to falling objects.

20.4 They shall be proof-tested at 125% of the platforms rated capacity prior to lifting personnel.

20.5 All rigging used for lifting personnel baskets shall be dedicated to that purpose and shall not be used except when lifting personnel.

20.6 All eyes in the wire rope slings shall be fabricated using thimbles.

20.7 They are not to be used for lifting materials or tools except when associated with personnel lifts.

21 Inspection

21.1 A designated crane inspector shall inspect the crane prior to lifting personnel. This inspection shall be repeated at each new setup location before commencing work.

- 21.2 The personnel platform and rigging shall be inspected by a designated rigging inspector before and after each lift and/or proof-test.

22 Work Practices

22.1 Crane and Platform Setup

- 22.1.1 Cranes equipped with outriggers shall have them fully extended, according to the manufacturer's specifications.
- 22.1.2 Mats shall be used under all outriggers.
- 22.1.3 An accurate determination of the load radius shall be made prior to making the trial lift.
- 22.1.4 The crane shall be level within 1% of level grade and located on firm footing.
- 22.1.5 Wire rope bridle slings shall be attached to the platform to ensure the load is evenly distributed.
- 22.1.6 Materials and tools for use during a personnel lift shall be evenly distributed within the confines of the platform and shall be secured to prevent displacement.
- 22.1.7 Only those materials and tools necessary to complete the specific task at hand shall be in the platform during a personnel lift.
- 22.1.8 The personnel platform shall not be loaded in excess of its rated capacity.
- 22.1.9 No lift shall be made on any other of the crane's load lines while personnel are suspended on a platform.

22.2 Crane Operating Practices When Lifting Personnel

- 22.2.1 A trial lift (proof test) shall be performed using all configurations and all lift routes prior to lifting personnel. During the initial trial lift at any location, the platform shall be loaded to 125% of its rated capacity.

- 22.2.2 The trial lift shall be repeated at the beginning of each shift or when either the crane setup or route is changed.
- 22.2.3 The crane operator shall remain at the controls at all times when lifting personnel.
- 22.2.4 Hoisting of the personnel platform shall be performed in a slow, controlled, and cautious manner with no sudden movements of the crane or platform.
- 22.2.5 Lifting of personnel while traveling is prohibited.
- 22.2.6 No lifts shall be made on any other crane load lines while personnel are being lifted.
- 22.2.7 Load and boom hoist blades, swing brakes, and locking devices, such as pawls or dogs, shall be engaged when the occupied personnel platform is in a stationary position.
- 22.2.8 Use the most direct and clear path between points of origin and destination.
- 22.2.9 Avoid taking a path over or through process equipment, equipment containing hot, corrosive, or toxic materials, or near overhead electrical wires. Consideration shall be given to wind direction when working around flare stacks, furnace stacks, safety valve exhaust lines, and vent stacks.
- 22.2.10 Tag lines shall be used except where their use creates an unsafe condition.
- 22.2.11 Lifting of personnel shall be suspended at any time there are indications of dangerous weather conditions or other impending danger. Examples of conditions under which lifting personnel shall be suspended include winds in excess of 20 mph, lightening, fog, heavy rain or other conditions limiting visibility, operating emergencies with potential to impact the personnel being lifted, and any other circumstance under which the safety of the personnel cannot be controlled.
- 22.2.12 Platform Occupant Practices

22.2.13 Personnel occupying a platform shall keep all body parts inside the platform during raising, lowering, and positioning. The individual giving signals to the crane operator is exempt from this requirement to the extent required to adequately communicate with the operator.

22.2.14 Only one person is to give signals to the crane operator.

22.2.15 Hoisted personnel shall be in radio contact and/or in continuous sight of the crane operator or relay signal person.

22.3 Escorting mobile equipment within manufacturing units and PSM/RMP covered areas

22.3.1 This procedure pertains to all makes and types of mobile cranes, carry deck cranes, telescoping forklifts, and tractor trailers.

- The equipment operator and/or rigger or “spotter” will obtain the proper permitting (and an O2/LEL monitor in classified areas such as Plant B, Power, Shipping, and other flammables including hydrogen and natural gas) to enter the manufacturing unit prior to crossing the unit boundaries or unit access gate.
- A manufacturing unit operation’s representative will open the gate following the issuance of the permit.
- The rigger or “spotter” will guide the equipment while in plain sight and/or radio contact while maneuvering to the identified work area identified in the permit.
- The rigger or “spotter” will remain in contact with the equipment either in plain sight or radio contact through the duration of project while the equipment is in motion.
- At job completion, the rigger or “spotter” will assist in the “breaking down” and demobilizing of the equipment, staying in plane site and/or radio contact until the equipment exits the boundaries of the manufacturing unit.
- Permits to be returned to the manufacturing unit.