## 1.0 PURPOSE

This General Instruction (GI):

1.1 Specifies the methods, procedures, and responsibilities for performing standard lifts and critical lifts that involve onshore cranes operated by Saudi Aramco and contractor personnel.

1.2 Defines various types of crane lifts.

1.3 Identifies procedures required for performing various types of crane lifts.

1.4 Identifies the categories and work capacities of riggers.

1.5 Improves Saudi Aramco and contractor safety performance when involved in crane activities.

## 2.0 REFERENCES

It shall be the responsibility of Saudi Aramco USERs and contractors to make themselves familiar with the current version of the various publications referenced below.

ASME: American Society of Mechanical Engineers
SAES: Saudi Aramco Engineering Standard

| | | |
|---|---|---|
| A) | ASME B30.1 | Jacks |
| B) | ASME B30.2 | Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist) |
| C) | ASME B30.3 | Construction Tower Cranes |
| D) | ASME B30.4 | Portal, Tower and Pillar Cranes |
| E) | ASME B30.5 | Mobile and Locomotive Cranes |
| F) | ASME B30.6 | Derricks |
| G) | ASME B30.7 | Base Mounted Drum Hoists |
| H) | ASME B30.8 | Floating Cranes and Floating Derricks |
| I) | ASME B30.10 | Hooks |
| J) | ASME B30.11 | Monorails and Underhung Cranes |
| K) | ASME B30.14 | Side Boom Tractor |
| L) | ASME B30.16 | Overhead Hoist (Underhung) |
| M) | ASME B30.17 | Overhead and Gantry Cranes (Top Running Bridge, Single Girder, Underhung Hoist) |
| N) | GI 2.100 | Work Permit System |
| O) | GI 2.702 | Moving Drilling Rig, High Clearance Equipment/Loads, or Operating Cranes Under or Near Power-Lines |
| P) | GI 7.024 | Marine and Off-Shore Crane, Hoist and Rigging Operations |
| Q) | GI 7.025 | Heavy Equipment Operator Testing and Certification |
| R) | GI 7.026 | Cranes, Elevating and Heavy Equipment Accident Reporting |
| S) | GI 7.027 | Crane Suspended Personnel Platform (Manbasket) Operations |
| T) | GI 7.029 | Rigging Hardware Requirements |
| U) | GI 7.030 | Inspection and Testing Requirements of Elevating/Lifting Equipment |
| V) | SAES-A-114 | Excavation and Backfill |
| W) | SAES-B-063 | Aviation Obstruction Marking and Lighting |
| X) | | Saudi Aramco Safety Handbook |
| Y) | | Saudi Aramco Construction Safety Manual |
| Z) | | Saudi Aramco Job Training Standards:<br>1) Basic Crane Operator<br>2) Advanced Mobile Hydraulic Crane Operator |
| AA) | | IPT's Crane and Rigging Handbook |

BB) W. G. (Bill) Newberry's Handbook for Riggers

**3.0 SCOPE**

This GI covers all onshore cranes operating within Saudi Aramco facilities, on Saudi Aramco jobsites outside of operating facilities, off Saudi Aramco property under a Saudi Aramco contract, and in applicable Saudi Aramco domestic joint venture companies. It also covers all Saudi Aramco and contractor personnel.

**4.0 DEFINITIONS**

4.1 AIR TUGGER – Air-operated winch used **only** for hoisting materials.

4.2 BLIND LIFT – Crane lift that does not allow direct visual contact between the crane operator and the signalman, usually the rigger. In blind lifts, additional signalmen, radios, or other communications may be used. However, if electronic communications is used (i.e., radios or telephones), a back-up communications system shall also be in place in cause of electronics failure.

4.3 CERTIFIED INSPECTOR – A person certified by the Saudi Aramco Inspection Department to perform inspections and certifications on elevating/lifting equipment (For additional information, refer to Inspection Department definition in GI 7.030).

4.4 CRANE – A crane consisting of a rotating superstructure with a power plant, operating machinery, and boom, mounted on a base and equipped with crawler treads for travel or mounted on a crane carrier equipped with axles and rubber-tired wheels for travel.

4.5 CRANE LIFT – CRITICAL - Any crane lift that requires a Critical Lift Plan (See Section 5.0 for types of critical lifts).

4.6 CRANE LIFT - STANDARD (ORDINARY) - A standard crane lift is any lift not classified as a critical lift. Crane configuration shall be with main boom only.

4.7 CRANE OPERATOR - A person certified by Saudi Aramco as being qualified to operate a specific model and capacity of crane; may also receive additional certifications for crane attachments, tandem lifts, pick and carry operations, and personnel platforms (manbaskets).

4.8 CRITICAL LIFT PLAN - A Critical Lift Plan is a document (SA 9644) [See Attachment #1] that identifies a specific load and the operating restrictions. Pertinent information includes all weights on hook blocks and attachments.

4.9 OPERATIONAL AID - A component that provides information to facilitate operation of a crane, or that takes control of particular crane functions without action by the crane operator, when a limiting condition is sensed.

4.10 ORIGINATOR - The person who fills out the Critical Lift Plan form, prior to review and approval by a Rigger-I. Only a Rigger-I or Rigger-II can be the originator.

4.11 RATED CAPACITY [LOAD] LIMITER (RCL) - A device that automatically monitors radius, load weight, and load rating and prevents movement of the crane, which would result in an overload condition.

4.12 RIGGER - A person certified by Saudi Aramco to prepare a load for lifting. Saudi Aramco rigger categories are Rigger-I, II, and III (See Section 8.0 for more information).

4.13 TAILING - The placement of a load resting on the ground from the horizontal position to the vertical position or the vertical position to the horizontal position.

4.14 TANDEM LIFT (MULTI-CRANE LIFT) - Any crane lift involving two (2) or more cranes lifting or tailing the same load at the same time.

4.15 TURNING - The placement of a load suspended in the air from the horizontal position to the vertical position or the vertical position to the horizontal position.

4.16 USER - The Saudi Aramco proponent department or other organization authorized to act on behalf of the Saudi Aramco proponent department.

4.17 USER SUPERVISOR - The person, representing the USER, with the responsibility for the crane operation.

## 5.0 CRITICAL CRANE LIFTS

**NOTE #1**: Approved critical lift plans shall be on site prior to the lift. Local work permit requirements shall also be observed.

5.1 High risk work environment crane lifts include, but are not limited to, the following examples and restrictions/requirements:

5.1.1 Any part of a crane whose boom or boom attachment is working within 10 meters (33 feet) of any hydrocarbon and/or pressurized piping areas. This includes cranes having to suspend a load over vessels, piping, and/or equipment containing hydrocarbons, steam, or other pressurized liquids.

5.1.2 Any part of a crane whose boom or boom attachment is working within 10 meters (33 feet) of any populated/traffic areas. This includes cranes having to suspend a load over pedestrians, vehicle traffic, occupied construction equipment, and/or occupied buildings.

5.1.3 Any crane lift that requires an attachment(s) to the main boom.

5.1.4 Any load forty (40) tons or greater.

5.1.5 Any load that exceeds eighty-five percent (85%) of the crane's rated load capacity or manufacturer's specifications for that specific lift.

5.1.6 Any crane lift with explosion/fire/high heat hazards.

5.1.7 Any crane working near energized power-lines.

When working less than 1-1/2 fully extended boom lengths from energized power-lines, a designated signalman shall ensure the following minimum distances are maintained:

| **Line Voltage** | **Absolute Limit of Approach** |
|---|---|
| Up to 50,000 volts | 3.0 meters/10 feet |
| 50,000 to 250,000 volts | 6.1 meters/20 feet |
| Over 250,000 volts | 7.6 meters/25 feet |

Local work permit procedures shall be followed when work is performed within the above limits (Refer to GIs 2.100 and 2.702). Power Distribution Department concurrence shall be required on all Critical Lift Plan forms for cranes whose booms, when calculated at full extension and with attachments, could be operating within 10 meters (33 feet) or less of energized power-lines.

5.1.8 Any part of a crane whose boom or boom attachment is working within 10 meters (33 feet) of a railway line. The USER shall submit a copy of the railway train schedule as an additional required attachment to the completed Critical Lift Plan form.

5.1.9 Have a Rigger-I in charge of actual lift coordination.

5.2 Special critical crane lifts, hazardous by their nature and requiring special training, rigging, and/or boom attachments, include, but are not limited to, the following examples and restrictions/requirements:

5.2.1 Tailing, tandem (multiple), or turning lifts (See Paragraphs 4.11, 4.12, and 4.13 for additional information)

A. De-rate all cranes involved in the lift by twenty-five percent (25%) of the load chart.

B. Utilize cranes of same size, manufacturer, and model, if possible, (except tailing lift) for tandem (multiple), and turning lifts.

C. Have a separate, approved Critical Lift Plan on site prior to the lift, each time one of these types of lifts is performed.

D. Have a Rigger-I in charge of actual lift coordination.

**NOTE #2:** For Drilling and Workover operations involving bottom hole assemblies (BHAs), the rig shall be allowed to use its draw works and one (1) tailing crane to move the BHA onto and off of the rig floor. The following minimum requirements shall be followed for BHA tailing operations:

(a) Only Saudi Aramco certified crane operators shall be used. The Saudi Aramco certified crane operator shall also be Saudi Aramco certified for tandem lifts.

(b) A Saudi Aramco Critical Lift Plan (form SA 9644 for land and form SA 9672 for offshore and marine) shall be completed and signed by a Saudi Aramco certified Rigger-I.

(c) A safety meeting shall be held prior to beginning BHA tailing operations to discuss the activity and the individual personnel job duties and responsibilities.

(d) A signalman, if required, shall wear a fluorescent vest and fluorescent gloves to provide better visibility to the crane operator.

5.2.2 Crane suspended personnel platforms (manbaskets)

A. **Only** allow work from, or transport by, a crane suspended personnel platform (manbasket) when conventional means of performing the work or reaching the worksite (such as personnel hoist, ladder, stairway, aerial lift, elevating work platform, or scaffold) would be more hazardous, or is not practical, because of structural design or worksite conditions (Refer to GI 7.027 for more details).

B. Have an approved Critical Lift Plan on site prior to the lift.

C. Have a Crane Suspended Personnel Platform (Manbasket) Permit (SA 9648) properly completed, signed, and onsite prior to the lift (Refer to GI 7.027, Attachment #1).

D. De-rate the crane by fifty percent (50%) of the load chart.

E. Not perform crane suspended personnel platform (manbasket) lifts in wind speeds exceeding 25 km/h (15 mph – 13 knots – 7 meters/second).

F. Have prior written approval from the Facility Manager for crane suspended personnel platform (manbasket) operations that are performed at night (See Paragraph 5.2.3 for additional nighttime crane lift requirements).

5.2.3 Nighttime crane lifts

A. Have an approved Critical Lift Plan on site prior to each crane lift performed at night.

**NOTE #3**: Night is defined as the hours between sunset and sunrise.

B. Have specific prior written approval from the Facility Manager for each crane lift performed at night, except during a T&I or Shut Down.

C. Have proper lighting, sufficient to perform the lift safely.

5.2.4 On rubber or pick and carry lifts

A. Have the on rubber and pick and carry lift duties stated on the manufacturer's crane load chart for this duty to be an acceptable option.

B. Have the crane operator confirm that the proper recommended tires are fitted (sand tires are not acceptable).

C. Have the crane operator confirm the proper recommended tire pressure and that the tires have no obvious defects.

D. Have the travel surface level, free of potholes, and with acceptable ground conditions. Travel speed shall not exceed 4 km/h (2.5 mph).

E. Have the load secured to prevent any swing into the crane structure. Snubbing or tag lines shall be used.

F. Have travel procedures, as specified by the manufacturer, followed (e.g., the turntable swing-lock pin should be engaged during travel).

**NOTE #4**: Traveling with a load is an inherently hazardous procedure that requires extra precautions to ensure operations are conducted safely.

5.2.5 Blind lifts

A. Have properly tested communications equipment, if hand signals are not used.

B. Have an established set of universal hand signals as a back-up communications system in case of failure of original communications equipment.

C. Ensure that all signalmen and the crane operator are familiar with the hand signals.

D. Have clear visibility between all signalmen and between final signalman and crane operator if only hand signals are used.

## 6.0 CRITICAL LIFT PLANS

6.1 **All critical lifts require an approved Critical Lift Plan (See Attachment #1).**

6.2 Loads noted in approved Critical Lift Plans shall be rigged by a rigger certified for that load category (Rigger-I, II, or III). [See Section 8.0 for more information on rigger duties].

6.3 The Critical Lift Plan form shall be properly completed, signed, and approved prior to the lift. It shall first be signed by the originator; then signed by the crane operator, rigger, and USER supervisor. It shall then be reviewed and approved by a Saudi Aramco certified Rigger-I.

The Critical Lift Plan form also requires an additional signature concurrence from the Power Distribution Department for any work near energized power-lines (See Paragraph 5.1.7).

**NOTE #5:** Do not mix metric and non-metric measurement systems.

6.4 The Rigger-I shall physically examine the jobsite and the equipment to be used prior to giving signature approval to the Critical Lift Plan. He shall be physically present to supervise all lifts that require a Rigger-I.

**NOTE #6:** For critical lifts that are repeated, a Rigger-II or Rigger-III may be allowed to execute identical lifts at the same location, under the same Critical Lift Plan, without Rigger-I supervision, if the Rigger-I has:

(a) Reviewed the procedure

(b) Conducted the initial lift

(c) Supervised the Rigger II/Rigger-III during two (2) subsequent lifts to verify that it is within the Rigger-II or Rigger-III's capabilities

(d) Given written permission on the crane operator's copy of the Critical Lift Plan (including Rigger-I's name, Saudi Aramco Rigger-I certification number, and date) for the Rigger-II/Rigger-III to perform those routine critical lifts.

Allowing a Rigger-II or Rigger-III to execute lifts under a Critical Lift Plan does not relieve the Rigger-I of responsibilities for that Critical Lift Plan or the lifts covered under it.

Only a Rigger-I shall execute tandem lifts, lifts over forty (40) tons, lifts exceeding eighty-five percent (85%) of the crane's rated load capacity, working beside energized power-lines (See Paragraph 5.1.7), and/or on rubber pick and carry operations (See Paragraph 5.2.4).

6.5 Blanket or multiple use Critical Lift Plans are intended to expedite operations where crane lifts are identical, yet performed on different dates, or where lifts will be performed continuously until the work is completed. The following Notes explain when blanket and multiple use Critical Lift Plans may be used:

**NOTE #7**: Blanket Critical Lift Plans can be used for critical lifts using the same model and capacity of crane, working from the same location, to lift the same piece of equipment during different time periods, without having to fill out and sign a new Critical Lift Plan form. The same Critical Lift Plan may be used for critical crane lifts, provided:

a) The load configuration is **IDENTICAL**,

b) The same lifting equipment and accessories (crane, load weight, location, obstructions, work environment, etc.) are used,

c) The same rigging configuration is used, and

d) Field verification has been performed by the USER Supervisor. The USER Supervisor shall sign and date the top of the Critical Lift Plan prior to the crane lift.

**NOTE #8**: Multiple use Critical Lifts Plans are crane lifts using the same model and capacity of crane and location to lift an assortment of different pieces of equipment. The same Critical Lift Plan may be used for multiple use critical crane lifts, provided:

a) The most extreme radius, boom length, and load weight of the multiple lifts is used in the calculations,

b) The same crane is used (identified in the Critical Lift Plan by the Equipment ID #),

c) The certified crane operator and certified rigger, who signed the multiple use Critical Lift Plan are used, and

d) A multiple use Critical Lift Plan shall not be valid thirty (30) days from the date of signature by a Rigger-I. After thirty (30) days, a new multiple use Critical Lift Plan shall be obtained.

6.6 Critical lifts routinely performed in high risk operating environments, such as plants, refineries, and pressurized piping areas, should have related job standards or operation procedures modified to include approved 'blanket' Critical Lift Plans that specify required rigging for repetitive jobs.

6.7 Saudi Aramco USER departments who do not have the in-house capability to safely perform required Critical Lifts shall contact T&ESD.

**NOTE #9:** Only technical clarification on issues related to crane lifts shall be provided by T&ESD.

6.8 The USER shall have the authority to require an approved Critical Lift Plan for crane lifts that do not meet the mandatory requirements of Section 5.0.

## 7.0 GENERAL

7.1 All crane lifts (standard and critical) require properly licensed and certified operators (Refer to GI 7.025). All electrical or engine powered cranes require a valid safety sticker issued by an Inspection Department certified inspector (See Paragraph 4.1; also refer to GI 7.030). Local work permit procedures in plants and other critical areas apply as required by GI 2.100. Crane operators shall perform all lifts as per the Saudi Aramco job requirements.

7.2 The crane operator shall have the final decision on any crane lift that affects the safety of his crane.

7.3 Saudi Aramco certified riggers shall be used to rig **all** loads, regardless of weight to be lifted, configuration, or location. This includes such operations as standard and critical lifts, loading or off-loading trucks (including boom trucks), etc. The USER shall provide, in writing, the weight of any load prior to the lift.

7.4 Personnel with Saudi Aramco certifications as both a crane operator and as a Saudi Aramco certified rigger shall not be allowed to perform both functions at the same time, nor shall such a person be permitted to supervise a lift while operating a crane.

7.5 All crane travel on highways and outside plant areas shall be with the normally mounted boom sections only. All hydraulic cranes shall have boom sections fully retracted, jibs removed or stowed, and hook blocks secured. A positive locking device shall be engaged to prevent the boom from swinging during travel. For all cranes fitted with retractable suspension units, the suspension shall be level before traveling.

7.6 All hydraulic cranes traveling inside plant facilities with more than the normally mounted boom sections shall do so in strict accordance with manufacturer's specifications and procedures. Hydraulic cranes, traveling with more than the normally mounted boom sections, shall not travel more than 1 km (0.6 miles). All crane turns shall be assisted by a flagman to ensure that the boom tip is clear of any obstruction.

7.7 All lattice boom cranes traveling inside plant facilities, without boom disassembly and on the same job, shall do so in strict accordance with manufacturer's specifications and procedures. Repositioning of lattice boom cranes, without boom disassembly and on the same job, shall be permitted, providing the movement is less than 1 km (0.6 miles) and escorted front and back. All crane turns shall be assisted by a flagman to ensure that the boom tip is clear of any obstruction.

7.8 If an operational aid stops working properly during the lift, the device/crane manufacturer's recommended procedures shall be followed. If no procedures are available, a Rigger-I shall establish procedures to complete the lift.

7.9 The use of operational aids **shall not** replace the requirements for verifying load weights, radii, and lift parameters.

7.10 All cranes working around populated or traffic areas shall have barricades placed to provide clearance for tail swing. Only authorized personnel shall be permitted inside the barricaded area.

7.11 Cranes working near trenches and excavations shall be a minimum distance equal to the depth of the trench or excavation for Class A soils and twice the distance for Class B and C soils (Refer to the Saudi Aramco Safety Handbook or the Construction Safety Manual for information on soil classifications). If a safe distance cannot be kept, the trench or excavation shall be filled and compacted prior to the crane being moved on site. The USER shall be responsible for determining the soil classes and conducting all soil compaction and tests per Saudi Aramco compaction standards.

7.12 Standard and critical crane lifts shall not be performed in wind speeds exceeding 32 km/h (20 mph – 17.4 knots – 9 meters/second), unless otherwise specified by the crane manufacturer (See Paragraph 5.2.2.E for wind speed limitations for crane suspended personnel platform [manbasket] lifts).

7.13 It is the responsibility of the crane operator to:

7.13.1 Install and reposition swing-away jibs and extensions on the hydraulic cranes;

7.13.2 Reeve the hook block with the proper number of wire rope falls to accommodate the load to be lifted within the safe working limits of the crane; and

7.13.3 Insert and remove boom sections for truck and crawler mounted lattice boom cranes.

**NOTE #10:** Any assembling, disassembling, or change of lattice boom configuration requires re-inspection by a certified inspector before the crane can be re-mobilized to perform any crane lifts.

7.14 Suitable knot-free and defect-free tag lines shall be used to control suspended loads, except when their use may create a greater hazard.

7.15 The pinned extension of the hydraulic boom crane shall be extended prior to using a jib to obtain the maximum lifting capacity and radius.

7.16 All cranes shall have their safe working load rating clearly visible in English. All information and warning decals shall be in English when possible.

7.17 Each Saudi Aramco crane operator shall perform a daily pre-operational safety inspection, prior to operating his assigned crane, using Saudi Aramco form SA 9466, Crane Operator Daily Inspection Checklist (See Attachment #2 or the Saudi Aramco website). Any hazardous safety deficiency shall require corrective maintenance prior to the crane being used. Records of daily pre-operational inspections shall be maintained by the USER for a minimum of three (3) months and made available for assessment.

Each contractor crane operator shall perform a daily pre-operational safety inspection, prior to operating his assigned crane, using Saudi Aramco form SA 9466 (which can be obtained from the USER, as Attachment #2 of this GI, and/or is located on the Saudi Aramco website) or the crane manufacturer's daily inspection checklist. Any hazardous safety deficiency shall require corrective maintenance prior to the crane being used. Records of daily pre-operational inspections shall be maintained by the USER for a minimum of three (3) months and made available for assessment.

**NOTE #11:** The USER shall ensure that all cranes have a documented program of preventive maintenance that is properly implemented and maintained. Crane maintenance shall be performed in accordance with manufacturer's specifications.

7.18 All cranes shall be fitted with the following safety items: fire extinguisher, back-up alarm, spark arrestor (for cranes that are without an emission controlled engine system), and, if applicable, seat belts for highway driving.

7.19 Cranes extending more than 60 meters (197 feet) above ground level shall have a permanently mounted aircraft warning light operating 24 hours a day. This light shall be a medium intensity, flashing white obstruction light during daytime hours with automatically selected reduced intensities for twilight and nighttime hours. The warning light shall be placed at the highest point of the crane.

7.20 **All** cranes working for Saudi Aramco (Company-owned and contractor cranes), with the exception of articulating boom cranes (boom trucks), shall be equipped with properly working Rated Capacity [load] Limiters (RCLs) and anti-two-block devices or two-block damage prevention features for all points of two-blocking (i.e., jibs, extensions, etc.).

7.21 Rigging hardware shall be inspected per GI 7.029 and crane suspended personnel platforms (manbaskets) per GI 7.027. Inspection records (logbooks) shall be current for all rigging hardware as per the above GIs.

7.22 All outdoor cranes, crane suspended personnel platforms (manbaskets), and elevating equipment (telescopic/hydraulic/scissor) shall suspend operations during electrical storms and personnel shall seek shelter until the danger has passed.

7.23 Removable float-pads on cranes shall be removed and stowed prior to traveling the crane.

7.24 The USER shall advise the crane operator and the rigger of all underground utilities in the area of the crane prior to any lift.

7.25 All cranes shall be leveled in accordance with manufacturer's specifications and shall be located on a properly compacted foundation prior to performing any lift. The USER shall be responsible for determining the soil classes and conducting all soil compaction and tests per Saudi Aramco compaction standards.

7.26 Welding or modification on load hooks and other lifting equipment is strictly forbidden.

7.27 When outriggers are used, they shall be extended or deployed according to the crane load rating chart specifications. The crane's wheels shall be raised completely off the ground.

7.28 Outrigger mats shall be used under all crane outrigger float pads during crane lifts (if applicable). Outrigger mats shall be designed to support the total weight of the crane and load to be lifted. Any blocking (cribbing) used under outrigger mats shall be stable to avoid overturning or sinking into the soil. Outrigger mats shall not be permanently attached to the crane outriggers.

7.29 Cranes shall be secured during high winds (See Paragraph 7.12) or after working hours by snubbing to structures, laying down the lattice booms, withdrawing the hydraulic boom extensions, and/or following manufacturer's specifications. Tower cranes, when unattended, shall have slew brakes released to allow weathervaning.

7.30 The crane operator shall not leave the controls at any time while a load is attached.

7.31 The hoisting, slewing, crossing, luffing, or traveling motions of a crane shall not be used to drag any load along the ground with the hoist rope out of the vertical position. Crane operators shall only pick up loads when the boom head and hook are in plumb (centered directly over the load).

7.32 The main boom line and the auxiliary boom line (whip line) shall not be used at the same time on the same load, unless otherwise specified by the crane manufacturer.

7.33 All cranes shall have load charts available in the cabs stating lift capacity based on boom length, attachments, boom angle, outrigger configuration, radius, and lift quadrant. Load charts, if permanently attached to the crane cab wall, shall be positioned for easy visibility to the operator while he is seated at his control station. Environmentally protected load chart manuals may be approved as an alternate to plaques (All plaques and manuals shall be in the English language).

7.34 Windows shall be provided in the front and on both sides of the cab or operator's compartment with clear visibility forward and to either side. Visibility forward shall include a vertical range adequate to cover the boom point at all times.

7.35 Personnel shall not ride the hook, auxiliary headache ball, or the load during the lift.

7.36 Cranes working in close proximity to operating high heat sources (flare stacks, etc.), that may affect the boom, sheaves, boom line, etc., shall take special safety precautions to protect such equipment from damage.

7.37 The USER shall verify, in writing, the structural load bearing capacity of roofs, floors (other than the ground floor), or other elevated structure surfaces prior to placement of the load.

7.38 A designated signalman shall be used at all times during the lifting, moving, and setting of a load. Only one designated signalman shall give signals to the crane operator.

The type of communication to be used shall be determined prior to the lift by the USER supervisor. He shall also provide a full explanation of hand signals to be used, whether as primary or back-up communication. The designated signalman and crane operator shall verify that they are familiar with the same set of hand signals. The signalman shall wear a bright fluorescent vest for easy identification. Radio communication is preferred, especially in cases where signal relays are required.

If, at any time, the crane operator does not have direct eye contact with the designated signalman, he shall immediately stop the crane lift operation until such time that he can again see the signalman.

7.39 Use of any mobile phone function is strictly prohibited in Saudi Aramco restricted areas, during lifting operations, and while driving a crane.

## 8.0 RIGGERS

8.1 All riggers shall be certified by ITD as Rigger-III, Rigger-II, or Rigger-I for a maximum of two (2) years. The rigger certification identifies the load weight limits and type of lifts that can be rigged without supervision.

Rigger-III Can rig loads up to 10 tons (except loads covered in Section 5.0 that require a Rigger-I.

Rigger-II Can rig loads up to 40 tons, originate Critical Lift Plans, and rig/supervise crane suspended personnel platform (manbasket) operations.

Rigger-I Can rig all loads and approve Critical Lift Plans for critical lifts.

A Rigger-III and/or a Rigger-II may only rig loads exceeding their certificate level if supervised by the Rigger of the higher certificate level.

Loads noted in approved Critical Lift Plans shall be rigged by a rigger certified for that load category (Rigger-I, II, or III). However, all loads forty (40) tons or greater require a Rigger-I to supervise the lift.

8.2 The Rigger-I shall physically examine the job site and the equipment to be used prior to the lift. He shall be physically present to supervise all lifts that require a Rigger-I.

8.3 Saudi Aramco certified riggers shall be used to rig **all** loads, regardless of weight to be lifted, configuration, or location. This includes such operations as standard and critical lifts, loading or off-loading trucks (including boom trucks), etc.

## 9.0 CRANE OPERATOR CERTIFICATION

Refer to GI 7.025 for crane operator certification requirements. Some critical lifts (See Section 5.0) require specific testing and certification, with exception of the swing-away jibs.

## 10.0 TRIAL LIFTS

All crane lifts shall have a trial lift prior to the actual lift. The trial lift shall consist of the load being hoisted just clear of the support (float/suspend the load) to test the mechanical condition of the crane and to ensure that rigging hardware is properly secured.

## 11.0 SIDE BOOM TRACTORS

11.1 Side boom tractors should be used for its primary designed purpose.

11.2 Side boom tractors, when used for lifting purposes other than pipe laying, shall have a safety latch fitted on the hook or the hook/sling wired to prevent a slack sling becoming loose.

11.3 Operators shall be certified per GI 7.025 and equipment inspected per GI 7.030.

11.4 Side boom tractors shall be exempt from Section 5.0, in regard to critical lift requirements of this GI, when used for pipe laying only.

11.5 Welding or modifying the boom structure or superstructure shall be performed in strict accordance with ASME B30.14.

11.6 Welding or modifying the load hooks or other lifting equipment is strictly forbidden.

11.7 Prior to traveling, the side boom tractor (track-type) operator shall:

11.7.1 Visually check the immediate surrounding area to ensure it is free of obstructions and personnel,

11.7.2 Check the position of the load, boom location, ground support, travel route, and speed of movement to ensure that they do not present a safety hazard, and

11.7.3 Sound a warning signal, if supplied by the manufacturer, prior to movement and intermittently during travel.

## 12.0 JACKING OPERATIONS

Jacking operations shall follow ASME B30.1 “Jacks” and manufacturer’s specifications for specific operational requirements. Procedures shall be reviewed by the USER prior to the start of the work.

## 13.0 ATTACHMENTS

13.1 Attachment #1 - Critical Lift Plan Form (SA 9644).

13.2 Attachment #2 –Crane Operator Daily Inspection Checklist (SA 9466)

Recommended by: _____
Manager
Transportation & Equipment Services Department

Concurred by: _____
Manager
Inspection Department

Concurred by: _____
Manager
Loss Prevention Department

Concurred by: _____
Executive Director
Industrial Services

Approved by: _____
Senior Vice President
Operations Services

# Critical Lift Plan*

**(*Each Piece Of Participating Lifting Equipment Shall Have A Separate Critical Lift Plan)**

Organization Name: _____ Date of Lift: _____

Organization Code #: _____ **Work Permit Required? YES☐ NO☐**

Facility Name: _____ Specific Work Location: _____ Contract #: _____

**A) Load Description & Weight (From USER):**

_____ _____ lbs/kgs

**B) Load Handling Devices (See "Notes" Below):**

| Load Handling/Boom Attachments | Stowed | Erected | N/A | Weight: lbs/kgs |
|---|---|---|---|---|
| Swing-Away Jib: | ☐ | ☐ | ☐ | _____ |
| Other Jibs: | ☐ | ☐ | ☐ | _____ |
| Hook Block (Main): | | | ☐ | _____ |
| Auxiliary Boom Head: | | | ☐ | _____ |
| Headache Ball: | | | ☐ | _____ |
| Lifting/Spreader Beam Needed? YES☐ NO☐ | | | ☐ | _____ |
| Does Beam Have Current Inspection Sticker? YES☐ NO☐ | | | | |
| Slings, Shackles, etc.: | | | | _____ |
| Other: _____ | | | | _____ |

Weight of Load Handling Devices (Section B Above) _____ lbs/kgs

\+ Weight of Load to be Lifted (Section A) _____ lbs/kgs

= **Total Gross Weight (Sections A + B)** **_____ lbs/kgs**

**C) Crane Information (See "Notes" Below):**

1. SA Inspection Sticker YES☐ NO☐
2. Inspection Sticker Expiry Date: _____
3. Equipment ID #: _____
4. Crane Model: _____
5. Crane Type: _____
6. Crane Rated Capacity: _____ lbs/kgs
7. Crane Operating Code # (if applicable): ____
8. Single Line Pull Capacity: _____ lbs/kgs
9. # of Parts of Line: _____
10. Total Gross Capacity Hook Block as Reeved: _____ lbs/kgs

**D) Crane Configuration (See "Notes" Below):**

1. Required Boom Length: _____ ft/m
2. Boom Angle: _____ degrees
3. Required Counterweight: _____ lbs/kgs
4. Operating Radius: _____ ft/m
5. Lift Quadrant (Front, Rear, 360°): _____

**E) Rigging (See "Notes" Below):**

1. Hitch Arrangement: _____
2. Sling Type(s): _____
3. Sling Size(s): _____ in/cm
4. Sling Length(s): _____ ft/m
5. Shackle Size: _____ in/cm & Capacity: _____ lbs/kgs
6. Capacity of Above Configuration: _____ lbs/kgs

F) Crane Capacity in This Configuration (De-rated, if applicable): _____ lbs/kgs | Total Gross Weight ÷ Capacity =_____ %

G) Surface Requirements Needed (Other Than Mandatory Outrigger Pads): Mats? YES☐ NO☐ Is the Ground Level? YES☐ NO☐ Proper Ground Compaction? YES☐ NO☐ Excavation Hazards Controlled? YES☐ NO☐ Other _____? YES☐ NO☐

**H) Wind Speed Shall Not Exceed GI 7.027 Limits for Manbaskets or GI 7.028 Limits/Manufacturer's Specifications for Loads**

I) Energized Power-Lines Within Boom Radius?YES☐ NO☐ Explosion/Fire/High Heat Hazards Within Boom Radius? YES☐ NO☐

J) Is This a Nighttime Crane Lift? YES☐ NO☐ If Yes, Do You Have Written Approval From Facility Manager? YES☐ NO☐

*****Attention: A Pre-Lift Safety Meeting is Mandatory**

**CAN CRANE MAKE LIFT? YES☐ NO☐**

| Positions: | Name (Signature) | Badge # | Certificate # | Approved by Rigger-I |
|---|---|---|---|---|
| Originator: | _____ | _____ | _____ | Name (Print): _____ |
| Rigger: | _____ | _____ | _____ | Badge #: _____ |
| Crane Operator: | _____ | _____ | _____ | Certificate #: _____ |
| USER Supervisor: | _____ | _____ | _____ | Signature: _____ |

**Notes**:
1. Attach sketch(es) of lift site, noting obstacles to movement of load, boom, or tail swing.
2. All units of weight shall be listed in the same units of measure as Crane Load Chart.
3. All units of measure shall be listed in the same units of measure as Crane Range Diagram.
4. Attach copy of Crane Load Chart, Range Diagram, and Safety Notes.
5. Certain weights may be deducted from Crane Load Chart capacities based on manufacturer's specifications.

_____
**PDD Concurrence (when required by GI 2.702)**

# CRANE OPERATOR DAILY INSPECTION CHECKLIST

**Date:**

| Crane Operator Badge # | Supervisor Badge # | Organization Code | Telephone # | Location |
|---|---|---|---|---|
| Manufacturer | Equipment # | Model | Capacity | |

| Carrier | Hour Meter Start | Hour Meter Finish | Crane | Hour Meter Start | Hour Meter Finish |
|---|---|---|---|---|---|
| | | | | | |

| PHASE | ITEM NO. | ITEM NAME | OK | NOT OK | N/A | DEFICIENCY |
|---|---|---|---|---|---|---|
| 1.0 PRE-START WALK-AROUND CHECKS | 1.1 | Inspection Sticker | | | | |
| | 1.2 | Carrier Doors/Panels/Mirrors | | | | |
| | 1.3 | Spark Arrestor | | | | |
| | 1.4 | Under-Chassis Leak Check | | | | |
| | 1.5 | Air Reservoir | | | | |
| | 1.6 | Tire Condition – Pressure/Tread/Sidewalls | | | | |
| | 1.7 | Tracks/Drive Chains | | | | |
| | 1.8 | Deck - Housekeeping/Leaks | | | | |
| | 1.9 | Coolant Level (Radiator) | | | | |
| | 1.10 | Engine Oil Level | | | | |
| | 1.11 | Engine Oil Leak Check | | | | |
| | 1.12 | Wire Rope - Condition/Drum Lay | | | | |
| | 1.13 | Sheaves/Hook Block/Headache Ball | | | | |
| | 1.14 | Swing-Away Jib | | | | |
| | 1.15 | Cab – Doors/Glass/Mirrors/Housekeeping | | | | |
| | 1.16 | Seat Belts | | | | |
| | 1.17 | Load Chart(s) - Accessible/Readable | | | | |
| | 1.18 | Fire Extinguisher(s) – Mounted/Inspected | | | | |
| | 1.19 | Hydraulic Oil Level | | | | |
| | 1.20 | Battery – Terminals/Cables/Electrolite | | | | |
| | 1.21 | Fan Belts | | | | |
| | | | | | | |
| 2.0 ENGINE START-UP CHECKS | 2.1 | Engine Start | | | | |
| | 2.2 | Voltmeter/Ammeter/Tachometer (RPM Gauge) | | | | |
| | 2.3 | Turn Signals/4-Way Flasher Switch/Beacon Light(s) | | | | |
| | 2.4 | Horn/Lights/Wipers | | | | |
| | 2.5 | Engine Oil Pressure Gauge | | | | |
| | 2.6 | Transmission/Converter Temperature Gauges | | | | |
| | 2.7 | Engine Coolant Temperature Gauge | | | | |
| | 2.8 | Fuel Gauge Level | | | | |
| | 2.9 | Braking System(s) | | | | |
| | 2.10 | Transmission Oil Level | | | | |
| | 2.11 | Air Filter/Restriction Condition | | | | |
| | 2.12 | Hydraulic Filter Condition | | | | |
| | 2.13 | Suspension System | | | | |
| | | | | | | |
| 3.0 CRANE SAFETY DEVICE(S) & HYDRAULIC SYSTEM CHECKS | 3.1 | Anti-Two Block/Two Block Damage Prevention | | | | |
| | 3.2 | Rated Capacity (Load) Limiter (RCL) | | | | |
| | 3.3 | Outriggers/Stabilizers/Float Pads | | | | |
| | 3.4 | Bubble Check | | | | |
| | 3.5 | Steering System | | | | |
| | 3.6 | Rear Axle/Oscillation/Lockout System | | | | |
| | 3.7 | Boom Extension/Lift Controls/Lift Operations | | | | |
| | 3.8 | Hoist Controls/Hoist Operations | | | | |
| | 3.9 | Positive Swing Lock/Swing Controls/Operation | | | | |
| | 3.10 | Back-Up Alarm | | | | |
| | | | | | | |

| Crane Operator Name | | Supervisor Name | |
|---|---|---|---|
| (Please Print) | Signature | (Please Print) | Signature |

Distribution: Original – Supervisor Copy – Operator Copy – NA/CA/SA/WA Heavy Equipment Division's Maintenance Unit