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1. PURPOSE

1.1. Exxon Mobil Corporation and its affiliates adopt Manufacturing Best Practices as part of an ongoing global effort to enhance safe practices worldwide. This Best Practice has been designated a Tier 1 Manufacturing Best Practice (T1BP), which has the potential to prevent Category 1 safety, health, environmental, or security risks.

1.2. This document defines the minimum requirements to prevent fatal injuries associated with lifting and rigging activities. Sites must establish Site-specific procedures which are consistent with these guidelines and ensure compliance with all requirements of this T1BP.

2. PHILOSOPHY

2.1. Preventing lifting-related incidents is the primary focus of this T1BP. The scenarios used to develop these safeguards included loss of control of the Load or tipping of the Crane and subsequent fatal crush injuries to those nearby, as well as fatal injuries as a result of loss of containment of hazardous materials. The requirements included herein reduce the probability of fatal incidents to an "E" probability on the Corporate Risk Matrix. However, in some instances measures to mitigate the consequence of an incident may also be appropriate. Accordingly, Sites shall define the criteria for when lift-specific emergency response plans are required for lifts over or near process equipment containing highly hazardous materials. Lift-specific emergency response plans must be approved by the Process Manager or their delegate. Appendix R provides factors to consider when developing Site criteria for when specific emergency response plans are required and what should be included in them.

3. SCOPE

3.1. Implementation is mandatory at each Site owned or operated by Exxon Mobil Corporation or its wholly-owned or majority-owned affiliates adopting Manufacturing T1BPs, and is the responsibility of line management. All new capital projects must comply with Manufacturing T1BPs.

3.2. This document applies only to land-based Crane lifting and rigging activities, and Manual Hoisting & Shifting activities. The requirements apply to the personnel involved in planning and executing the work, including ExxonMobil employees, lifting equipment owners, contractors and their subcontractors.

3.3. The format and content of the checklists included as Appendices must not be modified except to comply with local regulatory requirements. Terminology on the forms may be altered to be consistent with the local vernacular, and a header and footer may be added to facilitate inclusion of form in the site document management system.

4. DEVIATIONS AND CONTINUOUS IMPROVEMENT

4.1. Compliance with local laws and regulations and timing of such compliance are independent of the requirements expressed here. Notwithstanding anything to the contrary expressed or implied in these materials, local legal requirements must be met. Where the requirements in this T1BP differ from local legal requirements, the more stringent must be adopted unless there is a conflict. If there is a conflict, the local legal requirements must be adopted.

4.2. Sites must follow the deviation process as defined on the Tier 1 Best Practice Administration page of the Manufacturing OIMS eManual.
4.3. Deviations from the Engineering Controls requirements defined in LoP 2.1 - 2.7 must be documented and approved using Appendix Q, and are not subject to the requirements of 4.2.

4.4. Sites are encouraged to submit continuous improvement suggestions to the Crane & Lifting CoP to be vetted and potentially incorporated in periodic updates.

5. CRITICAL LIFE-SAVING MEASURES

CLSM 1 – Competent Personnel
CLSM 2 – Engineering Controls
CLSM 3 – Inspection and Maintenance
CLSM 4 – Lift Planning
CLSM 5 – Lifting Personnel
CLSM 6 – Lifting Near Overhead Power Lines

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CLSM 1 - Competent Personnel

LoP 1.1 General Competency Requirements

*Requirement 1.1.1* The competency requirements for personnel involved in planning and executing lifts are defined in Appendix O. Satisfactory attainment of the applicable competency must be verified and documented prior to performing lifting work.

LoP 1.2 Lift Crew – Key Responsibilities

*Requirement 1.2.1* Lift Crew members shall:

i. Only perform roles for which they possess the necessary skills/qualification and which they are Authorized to perform.

ii. Signal for the lift (or shift), or A/D to stop if unsafe conditions arise or if the Lift Plan (or A/D Plan) is not being, or cannot be followed.

iii. Actively participate in the entire pre-lift briefing to ensure they know and understand the lift sequence, travel path of the Load, and their responsibilities during the lift.

iv. Know the boundaries of the Exclusion Zone(s) and the plans for preventing non-lift crew personnel from entering them.

v. As required by the applicable checklist(s), acknowledge their understanding of the items discussed during the pre-lift briefing (i.e., the Lift Plan) by signing them.

LoP 1.3 Site Lift Specialist – Key Responsibilities

*Requirement 1.3.1* A Site Lift Specialist shall:
LoP 1.4  *Lift Planner - Key Responsibilities*

**Requirement 1.4.1** A Lift Planner shall:

i. Select a Crane or Manual Hoist that meets the minimum requirements for the lift, and complete the planning section of the applicable lift plan checklist(s).

   (a) Obtain the weight and size of the Load, including application of appropriate contingency factors and the weight of any process residuals.

   (b) Determine rigging configuration (e.g., number of slings, length, etc.) with respect to capacity and load stability.

   (c) Determine the maximum radius during the lift along the entire path of the Load.

   (d) Interpret manufacturer’s instructions (e.g., load chart for a Crane) regarding the capacity of lifting equipment in the context of how it will be used.

   (e) Determine minimum Support requirements for the Crane or Manual Hoist.

LoP 1.5  *Lift Director - Key Responsibilities*

**Requirement 1.5.1** The Lift Director shall:

i. Confirm that all applicable lift plan checklists have been completed.

ii. Complete the highlighted fields in the verification section of the applicable lift plan checklist(s).

iii. Ensure all Lift Crew members and Lift-Related Personnel participate in a pre-lift briefing, during which the following items are discussed:

   (a) The highlighted fields on the applicable lift planning checklist(s).

   (b) The plan for managing the boundaries of the Bystander Exclusion Zone.

   (c) The Drop Zone(s) and Load Crush Zone(s), and the criteria for when (if at all) Lift Crew members may enter them.
iv. Ensure Lift Crew members acknowledge their understanding of the items discussed during the pre-lift briefing (i.e., the Lift Plan) by signing the applicable lift plan checklists.

v. Confirm appropriate measures (e.g., barricades) have been implemented to prevent personnel from entering the Counterweight Crush Zone.

LoP 1.6 A/D Director - Key Responsibilities

*Requirement 1.6.1* The A/D Director shall:

i. Be present for the entire duration of any assembly and disassembly of the Crane. If transferring the role to another person, ensure that the incoming A/D Director:
   (a) Participated in the initial pre-job briefing, or has reviewed the A/D Plan, and
   (b) Has been informed of the status of the job, and
   (c) Signs on to the risk assessment (LMRA/JSA/JLA) being used to manage the job.

ii. Lead the pre-job briefing to review the A/D Plan with the Lift Crew.

iii. Monitor weather conditions so that A/D activities are ceased if weather conditions are forecasted to potentially exceed the limits defined in the job plan.

iv. Monitor communications between Lift Crew members during A/D to verify that the job is being executed per the plan. If radios are being used by the Lift Crew, the A/D Director must also have a radio.

LoP 1.7 Operator - Key Responsibilities

*Requirement 1.7.1* The requirements for the Operator in this Tier 1 BP apply to lifting and A/D activities. Operators shall:

i. Operate only the specific make and model Cranes for which they have been trained.

ii. Only perform lifting operations in a manner consistent with the Crane manufacturer's instructions.

iii. Not initiate Crane motion unless directed by a Signal Person and only then if satisfied that the movement will not create an unsafe condition. Exception: While traveling outside a process unit, a Signal Person is not necessarily required.

iv. Stop the lift if any member of the Lift Crew signals the lift to be stopped due to an unsafe condition.

v. Carry a radio to allow two-way communication with the Signal Person except in circumstances where the Operator and Signal Person can clearly hear each other.

vi. Perform and document a pre-use inspection prior to the first lift for each Crane that they operate during a shift.

vii. Assess the adequacy of Support conditions prior to any travel or positioning of the Crane.

viii. Confirm the Support for the Crane conforms to the Lift Plan.

ix. Participate in a job plan briefing with the Lift Crew to review the plan for assembly, disassembly, or reconfiguration of a Crane prior to commencing those activities and at appropriate intervals during those activities.

x. Participate in performing the verification checks defined in the Lift Plan Checklist(s).
xi. Monitor wind speed and stop the lift if it exceeds the allowable limit taking into account the wind sail area of the Load and the ability to safely control the Load.

xii. Safe-park the Crane prior to leaving it unattended.

xiii. Only perform the role of A/D Director when the complexity of those activities does not compromise the ability to operate the Crane safely.

LoP 1.8  **Rigger - Key Responsibilities**

* **Requirement 1.8.1** The requirements for the Rigger in this T1BP apply to lifting activities, assembly/disassembly and configuration changes. The Rigger shall:

i. Select rigging components, perform the planning and verification checks defined in the Rigging Plan Checklist, and document them on the Rigging Plan Checklist when the Load weighs more than 2t.

ii. Inspect rigging and segregate or tag deficient rigging equipment for repair or disposal (in accordance with local Site procedures).

iii. Protect synthetic slings by using softeners or edge protectors if they are, or could be in contact with the Load, unless the Load has a round smooth surface such as a pipe.

iv. Analyze Loads to determine the potential for instability/tilting/inverting, and rig/support/constrain them to ensure their stability.

LoP 1.9  **Signal Person - Key Responsibilities**

* **Requirement 1.9.1** The Signal Person shall:

i. Carry a radio to allow two-way communication with the Operator except when lifting with a Fixed Cab Crane and the Operator and Signal Person can clearly hear each other.

ii. Provide signals to the Operator via radio when Lifting Blind, when lifting personnel (except when the occupants of the Man-Basket are required to wear a respirator or use breathing air), or when the Load or Signaler is not in full view of the Operator. Otherwise provide them verbally, by hand, or by whistle.

iii. During Crane positioning and set-up, position themselves so that they can view clearances between the Crane and obstructions.

iv. Provide clear instructions to the Operator for any and all movement of the Crane or Load during A/D, mobilization/demobilization (including positioning or traveling within a process unit), moving an empty hook, or lifting activities in either of the following ways:

   (a) Signals containing three elements issued in the following order:

      (i) Function and direction of each motion (i.e., may be one or more motions simultaneously). then

      (ii) Distance and/or speed, which must be updated frequently enough throughout the motion to indicate that communication has not been broken, then

      (iii) Function (if simultaneous commands have been provided) and Stop, or

   (b) Simple instructions to move the Load to a specific destination point, without describing each motion in detail, provided all of the following conditions are met:

      (i) The Load must remain in full view of the Operator, and
(ii) The Operator must have sufficient view of potential obstructions to be able to maintain adequate clearance, and
(iii) No Lift Crew members or other personnel are (or will be) in the Drop Zone or the Load Crush Zone during movement of the Load.

v. Monitor movement of the Load and Crane until such time that the lift is complete or another Signal Person acknowledges acceptance of signaling the Crane.
vi. Understand when and to whom the responsibility for signaling the Operator is to be transferred during the lift sequence.

vii. Monitor clearances to prevent contact between the Crane/load line/rigging/Load and obstructions, and when necessary, utilize a Hazard Watch to prevent contact.

viii. Only relay signals to the Operator via another Signal Person in the event of a radio failure.

LoP 1.10  Spotter - Key Responsibilities

* Requirement 1.10.1  A Spotter must be utilized if any part of the Work Zone is closer than the Minimum Approach Distance (MAD) to an Overhead Power Line that has not been confirmed by an authorized representative of the electrical asset owner/operator to be de-energized and visibly grounded or sufficiently insulated to prevent electric shock. The Spotter shall:
  i. Possess the competency of a Signal Person.
  ii. Use a visual aid such as a line painted on the ground or a clearly visible line of stanchions to assist in identifying the Minimum Clearance Distance.
  iii. Hold a horn (or other noise generating device) to indicate an “all stop” command.
  iv. Position themselves to effectively view the clearance between the Crane or Load and the boundary of the MAD (or Minimum Clearance Distance if lifting inside the MAD).
  v. Monitor and anticipate movement of the Crane and Load and signal all-stop to prevent encroachment using any reliable means (e.g., horn or whistle).
  vi. Have no responsibilities other than those described above.

LoP 1.11  Hazard Watch - Key Responsibilities

* Requirement 1.11.1  A Hazard Watch must be utilized when the Signal Person is unable to see all potential contact points between parts of the Crane/load line/rigging or the Load that could contact obstructions during the lift. The Hazard Watch shall:
  i. Position themselves to effectively view the clearance between the Crane or Load and obstructions.
  ii. Monitor movement of the Crane or Load and provide appropriate information to the Signal Person in a timely manner to prevent contact with obstructions.
  iii. Have no responsibilities other than those described above until released by the Signal Person.

LoP 1.12  Inspection and Maintenance Personnel - Key Responsibilities
* Requirement 1.12.1 Lifting equipment must be inspected, maintained, and repaired by a Qualified Person who shall:
    i. Possess sufficient knowledge and understanding of the lifting equipment they inspect or repair.
    ii. Inspect, maintain, and repair lifting equipment per manufacturer’s instructions.
    iii. Document the results of inspections and maintenance they perform.

CLSM 2 - Engineering Controls

LoP 2.1 Load Moment Limiter (LML)

* Requirement 2.1.1 Cranes must be equipped with an LML that shuts off power to functions that would cause the Crane to be operated beyond its rated capacity and range limits. The LML must display current load, radius, and rated capacity.

* Requirement 2.1.2 Safety features of the LML must not be bypassed except during A/D, reconfiguration and positioning activities, and only then if required by the manufacturer’s operating manual. If the LML is bypassed, it must be re-enabled as soon as practicable.

* Requirement 2.1.3 LML bypass switches that bypass anything other than the anti two-block limit switch must meet the following requirements:
    i. LML bypass switches located inside the operator cabin must be keyed, and its key must be stored outside the reach of the Operator.
    ii. LML bypass switches located outside the Operator’s reach may be keyed or unkeyed.
LoP 2.2  External Capacity Indicating Lights

* Requirement 2.2.1  Cranes must be equipped with external lights that indicate the load utilization status of the Crane relative to its capacity.
  i.  External indicator must illuminate red to indicate when Crane utilization exceeds 100% of its rated capacity, when the LML system is bypassed, or when the anti-two block function is defeated with anything other than a momentary type switch or button.
  ii. External indicator must illuminate amber to indicate high utilization which should occur above 80% of rated capacity.
  iii. External indicator should illuminate green to indicate the LML is not bypassed and that the load status is less than or equal to 80% of rated capacity.

LoP 2.3  Event Recorder

* Requirement 2.3.1  Cranes must be equipped with an event recorder that monitors and records load-related data and Crane geometry information when events such as overloads, bypassing of the LML, activation of safety interlocks, and configuration changes trigger data capture. Event data stored in the event recorder must be capable of being retrieved in the event of an incident.

LoP 2.4  Range Limiting Switches

* Requirement 2.4.1  Cranes must be equipped with range limiting switches (e.g., anti two-block limit switch) to prevent contact between Crane components that could result in damage.

* Requirement 2.4.2  If a range limiting switch is bypassed during assembly/disassembly, reconfiguration, or positioning activities, it must be re-enabled as soon as practicable.

LoP 2.5  Disable Free Fall Feature

* Requirement 2.5.1  Cranes other than those dedicated to clamshell/dragline operations that are equipped with a boom or load line free fall feature must have it disabled in a manner such that the Operator does not have the ability to re-enable it.

LoP 2.6  Swing (Slew) Alarm

* Requirement 2.6.1  Crawler Cranes with a counterweight less than two (2) meters above the ground must be equipped with an audible swing (slew) alarm. The alarm must sound while swinging/slewing (rotating) motions are occurring and be loud enough to warn personnel in the vicinity.

LoP 2.7  Rear Facing Camera
*Requirement 2.7.1* Crawler Cranes with a counterweight less than two (2) meters above the ground must be equipped with a rear-facing camera. The camera must provide the Operator with a clear view of anyone in the Counterweight Crush Zone created between the counterweight and a stationary object other than the carrier of the Crane.

**LoP 2.8 Design and Testing of Engineered Lifting Attachments and Engineered Rigging Components**

*Requirement 2.8.1* Engineered Lifting Attachments and Engineered Rigging Components:

i. Must be designed according to relevant industry consensus standards such as ASME BTH-1, Design of Below-the-Hook Lifting Devices.

ii. Must have their design calculations verified and certified by a third party Qualified Person and must be provided with a certificate that describes any restrictions on how these items must be used to achieve their rated capacity.

iii. Must be marked with their rated capacity. Note: Section 3.3.1.ii contains requirements for existing lifting attachments that are not marked.

iv. Must be examined by an appropriate non-destructive examination prior to first use or following repair or modification.

v. Engineered Rigging Components should be Proof Load Tested prior to first use in accordance with the industry standard to which they were designed. Engineered Rigging Components not Proof Load Tested must be evaluated prior to initial use to confirm they have been constructed in accordance with their design.

**CLSM 3 - Inspection and Maintenance**

**LoP 3.1 Inspection of Cranes**

*Requirement 3.1.1* The structural and mechanical components and safety devices of Cranes must be inspected and tested to ensure the Crane is capable of functioning and performing as designed. The scope of the inspections must be in accordance with manufacturer’s recommendations and must include sufficient detail to ensure the detection of any deficiencies which could affect the capacity or safe operation of the Crane. All of the items inspected and all deficiencies must be documented by the person performing the inspection, and must be retained by the equipment owner for audit for the retention period indicated below. Deficiencies which could affect the capacity or safe operation of the Crane must be rectified prior to use. An investigation must be conducted to determine the cause of any deficiencies not attributable to normal use.
* Requirement 3.1.2  Mandatory Crane inspections:

i. **Initial**: Must be performed by a Qualified Person prior to the first use of a Crane at the Site. This inspection must include confirmation that the Crane is fitted with the required engineering controls. Document retention period: 12 months or until next annual inspection.

ii. **Post-assembly**: Must be performed by a Qualified Person following assembly or reconfiguration except if only changing outrigger extension, changing amount of counterweight, or telescoping of the boom. Document retention period: Until the Crane departs the Site or until next annual inspection.

iii. **Pre-Use**: Must be performed by the Operator prior to first use in the shift or following any change of Operator. The accuracy of the LML radius readout must be verified using a tape measure as part of this inspection. Document retention period: 30 days.

iv. **Periodic**: Must be performed by a Qualified Person at a frequency consistent with manufacturer’s recommendations. Document retention period: 12 months or until next annual inspection.

v. **Annual**: Comprehensive inspection and full function testing performed by a Qualified Person in accordance with the manufacturer’s instructions. Document retention period: Life of equipment.

vi. **Post Repair or Modification**: Must be performed by a Qualified Person if the repair or modification has the potential to affect the capacity or safe operation of the Crane. The scope of the inspection plan must be determined by the Crane manufacturer’s representative or a Qualified Person and must include relevant non-destructive testing, function testing, and a statement as to why load testing is not required if it is not part of the inspection plan. Document retention period: Life of equipment.

LoP 3.2  Inspection of Rigging including Engineered Rigging Components

* Requirement 3.2.1  A pre-use inspection of all rigging components including shackles and Manual Hoists must be performed prior to each use to ensure that all load bearing parts are capable of withstanding their design loads.

i. Results of the inspection must be recorded on the Rigging Plan Checklist if the Load weighs more than 2t.

ii. Rigging components must be clearly marked or labeled to identify the manufacturer, rated capacity, and means of traceability (i.e., serial/lot number).

iii. Equipment with deficiencies must be segregated or tagged for investigation and repair or disposal.

* Requirement 3.2.2  All rigging components except for shackles must be inspected periodically at an interval not exceeding 12 months.

i. The inspection results must be documented. Document retention period: Life of equipment.

ii. Rigging that has been inspected must be marked to indicate that its inspection is current.

iii. Defective equipment must be segregated or tagged for investigation and repair/disposal.
iv. All rigging equipment must have a certificate of manufacture to a recognized industry standard. The certificate of manufacture must be traceable to the rigging item by the lot/serial number.

* Requirement 3.2.3 Engineered Rigging Components must be subject to the following additional inspection requirements.
  i. Must be marked with their rated capacity or evaluated to ensure they are adequate for the load that will be applied to them.
  ii. Prior to use, conformance to requirements of 2.8.1 must be confirmed.

LoP 3.3 Inspection of Engineered Lifting Attachments

* Requirement 3.3.1 A pre-use inspection of all Engineered Lifting Attachments must be performed prior to each use to ensure that all load bearing parts are fit-for-purpose.
  i. Results of the inspection must be recorded on the Rigging Plan Checklist unless the Load weighs less than 2t.
  ii. Lift attachments with a required capacity greater than 1t that are not marked with their rated capacity must have their capacity formally evaluated.
  iii. Equipment with deficiencies must not be used until repaired to be fit-for-purpose.

CLSM 4 - Lift Planning

LoP 4.1 Lift Plans

* Requirement 4.1.1 All lifting (or shifting) jobs within the scope of this T1BP must be planned using the applicable lift plan checklist(s) included as appendices. All of the applicable fields on the checklist(s) must be completed, or equivalent information must be included in attachments.

* Requirement 4.1.2 A pre-lift briefing must be conducted for all lifting (or shifting) jobs to review the Lift Plan with the all Lift Crew members and all Lift-Related Personnel, even if a checklist is not mandatory for the job.
  i. A pre-lift briefing must be conducted prior to connecting the rigging to the Load, and must be repeated following a crew change prior to disconnecting the rigging from the Load at the end of the lift.
  ii. At a minimum, the following items must be reviewed during the briefing:
     (a) The highlighted fields on the applicable lift planning checklist(s).
     (b) The plan for managing the boundaries of the Bystander Exclusion Zone.
     (c) The locations of the Drop Zone(s) and Load Crush Zone(s), and the circumstances for when (if at all) Lift Crew members may enter them.

* Requirement 4.1.3 All lifts by Cranes must have a Lift Director.

* Requirement 4.1.4 For lifts by Cranes, as required by the specific checklist(s) being used:
In order to confirm that the LML is configured correctly, the LML capacity, adjusted for reeving configuration, must be confirmed to match the load chart capacity. This comparison must be made prior to the lift, and at a radius chosen from the applicable load chart.

A Dry Run must be performed with no Load or rigging on the hook to verify key Lift Plan parameters including adequate capacity and clearances prior to the lift proceeding.

After all field verifications are completed, the maximum expected capacity utilization must be reassessed to verify that the lift can be completed without exceeding the Crane’s rated capacity or the Crane Support capacity.

* Requirement 4.1.5 A group of lifts by a Crane may be planned using a single Mobile Crane Lift Plan Checklist and is subject to the following requirements:

i. The lift plan parameters documented on the checklist must be for the lift with the highest capacity utilization of the Crane. Exception: The Drop Zone/Load Crush Zone/Rigging Assessment portion of the Verification Section may be used to document the assessment for all of the lifts within the group or any subset of the lifts within the group.

ii. There must be no changes to the Crane location or configuration.

iii. There must be no Complex Lifts within the group except if all of the lifts within the group have identical planning parameters.

iv. All of the lifts within the group must be performed by the same Operator during the same shift.

v. The Dry Run performed for the group of lifts must assess the operating envelope created by all lifts within the group.

vi. A separate Rigging Plan Checklist must be used for each unique rigging configuration for Loads greater than 2t.

vii. All of the lifts within the group must be assessed against the parameters listed in the Drop Zone/Load Crush Zone/Rigging section of the checklist. Note: Using this section of the checklist as a guide will allow the user to identify if the documented assessment is representative for all of the lifts within the group, or only for a subset of them. If deemed necessary by the Lift Director, further lift-specific Drop Zone/Load Crush Zone/rigging assessments can be documented using a Rigging Plan checklist.

* Requirement 4.1.6 Complex Lift Plan Requirements:

i. For all Complex Lifts, the Complex Lift Plan Checklist must be used to define which documents (if any) that are needed for the Lift Plan in addition to the Checklist(s) already required, as well as supporting documents that are not required to be included in the Lift Plan (e.g., design documents for Engineered Rigging Components).

ii. The Site Lift Specialist shall approve the Complex Lift Plan Checklist prior to the documents defined by the checklist being collected and generated.

iii. Calculations or drawings prepared for a Complex Lift Plan must be checked by someone other than the originator of the work before being issued.

iv. The Complex Lift Plan Checklist must be included in the Lift Plan.

LoP 4.2 Determining Radius and Load Weight
* **Requirement 4.2.1** For lifts by Cranes, the path of the Load throughout the lift cycle must be assessed to identify the location of the maximum lift radius.
   i. The maximum lift radius must be determined by tape measure, scaled drawing, laser range finder, or other suitable (i.e., fit-for-purpose) means.
   ii. The maximum lift radius must be documented in the Lift Plan prior to the Dry Run.

* **Requirement 4.2.2**  Load Weight must be established by one or more of the following means:
   i. Weighing by calibrated scale or load cell(s).
   ii. Data from drawing, document, or name plate.
   iii. Engineering calculation.
   iv. Estimate (only for Basic Lifts of Loads expected to weigh less than 2t that will utilize less than 75% of the rated capacity of the Crane or Manual Hoist).

* **Requirement 4.2.3**  If the lift does not involve Sudden Load Transfer, the following contingency factors must be applied to the Load Weight to calculate the Factored Load Weight.
   i. No contingency is required if both of the criteria below are met:
      (a) The weight of the Load is known because documentation is available from when it was previously weighed using a weighbridge/scale/load cell, or LML, and
      (b) The Load is Dressed the same as it was when it was weighed.
   ii. 10% contingency must be added to weights that are obtained from vendor drawings, calculated, or estimated (if weight < 2t).

* **Requirement 4.2.4** If the lift involves Sudden Load Transfer to a Crane, a contingency of 100% must be used to calculate the Factored Load Weight.

* **Requirement 4.2.5** The weight of process residuals must be included in the Factored Load Weight. If residuals are present, or could be present, the weight of residuals must be:
   i. Calculated, or
   ii. Based on directly relevant previous experience, or
   iii. An estimate not less than 15% of the Load Weight

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**LoP 4.3  Load Transfer**

* **Requirement 4.3.1** In order to prevent the possibility of overloading / impacting the Crane or Manual Hoist, and to prevent unexpected Load movement, Sudden Load Transfer must be avoided except in circumstances where there are no practical means of avoiding it. Temporary supports or bolted joints that can be progressively undone should be considered as a means to comply with this requirement.

* **Requirement 4.3.2**  A Crane must not be used to free (i.e., break loose) a Load that is stuck or bonded to its supports. Jackbolts, wedges, jacks, etc. should be considered as a means of complying with this requirement.

* **Requirement 4.3.3** Loads must be adequately stabilized and secured prior to being released from a Crane or Manual Hoist.
* Requirement 4.3.4  The Support for a Load (including those that are partially complete) must have adequate capacity to support the weight of the Load.

LoP 4.4  Load Spreading and Support for Crane

* Requirement 4.4.1  The capacity of the Support for the Crane must not be exceeded.
  
i. Sites shall determine the Support capacity so that the load spreading requirements can be determined.
  
ii. Load spreading material must be of a sufficient size and strength.
  
iii. The effect of underground services, voids, and excavations must be considered.
  
iv. Crane manufacturer’s specified limits for levelness must not be exceeded, including consideration of the effects of differential settlement.

LoP 4.5  Rigging Plan

* Requirement 4.5.1  Loads that have a Factored Load Weight greater than 2t must have a documented plan for rigging using the Rigging Plan Checklist unless the Load has dedicated rigging (e.g., skid pan / material box).
  
i. All of the fields on the Rigging Plan Checklist must be completed or equivalent information must be included in attachments prior to proceeding with lift.
  
ii. The Load must not be allowed to tilt or invert in an uncontrolled way. To ensure this, the rigging connection/choke points must be above the center of gravity, or the rigging arrangement must constrain the Load.
  
iii. Rigging arrangements must be configured in consideration of the orientation and design of the lifting attachments.
  
iv. Synthetic slings must be protected by softeners or edge protectors if they are, or could be in contact with the Load, unless the Load has a round smooth surface (e.g., pipe).
  
v. When more than two slings (legs) are used to connect a Load to a hook, a maximum of two legs may be used to calculate the required sling capacity unless the actual load distribution between the legs has been determined by a Qualified Person or by direct measurement (e.g., by using load cells on each leg).
LoP 4.6  Job Plan for Assembly, Disassembly and Configuration Changes (A/D)

* **Requirement 4.6.1**  An A/D Director must be designated for Crane assembly, disassembly, and configuration changes.

* **Requirement 4.6.2**  A Site specific job plan consistent with manufacturer’s instructions must be developed for Crane assembly, disassembly, and configuration changes including deploying/stowing the jib, changing manual jib offset or changing number of parts of line. This requirement does not apply to changes that only involve changing outrigger extension position or telescoping of the boom.

* **Requirement 4.6.3**  Prior to commencing A/D operations, and at other appropriate stages of the A/D operations, the A/D Director shall conduct a pre-job briefing of the A/D Plan with all crew members to ensure they understand the following:
  i.  Their tasks.
  ii.  The hazards associated with their own tasks as well as how they might be impacted by the tasks of others.
  iii.  The hazardous positions/locations that they need to avoid.
  iv.  That before they go to a location that is out of view of the Operator and is where they could be injured by movement of the Crane or Load, they must inform the Operator that they are going to that location.

* **Requirement 4.6.4**  Lifts associated with Crane assembly, disassembly and configuration changes must be planned in accordance with the requirements for Basic and Complex Lifts.

LoP 4.7  Restrict access to Drop Zone, Load Crush Zone and Counterweight Crush Zone

* **Requirement 4.7.1**  Only Lift Crew and Lift-Related Personnel are permitted inside the Bystander Exclusion Zone.

* **Requirement 4.7.2**  Only Lift Crew members are permitted inside the Drop Zone or the Load Crush Zone. Lift Crew members are not allowed to enter either zone except:
  i.  During dismantling or final setting of a Load, or while actuating a Manual Hoist, and
  ii.  Their presence is essential to perform the lift, and
  iii.  There is no lower risk alternative way of completing the task, and
  iv.  The lifting device(s) are not imparting any net lateral force on the Load.

* **Requirement 4.7.3**  The boundary of the Counterweight Crush Zone must be marked with warning lines, railings or similar barriers to prevent personnel from entering. Where it is not feasible to erect barriers, the hazard areas must be clearly marked with warning signs.

* **Requirement 4.7.4**  Lift Crew personnel may enter the Counterweight Crush Zone only if they inform the Operator and the Signal Person immediately prior to entering, and the Operator must not rotate the superstructure until being informed that the Lift Crew member is in a safe position.
**LoP 4.8  Taglines**

*Requirement 4.8.1*  Taglines must:

i. Only be used when they are needed to limit swinging of the Load or to control the orientation of the Load.

ii. Only be retrieved when the Load is not being moved by the Crane (i.e., when there is no active Load Crush Zone).

iii. Be long enough to allow users to stay outside the Drop Zone and Load Crush Zone when the Load is being moved by the Crane.

**LoP 4.9  Inclement Weather**

*Requirement 4.9.1*  Lifting activities must cease if weather conditions compromise the safety of the lift.

i. A Weather Forecast must be used to confirm that the lift can be completed without exceeding the allowable wind speed and in compliance with Site guidelines for lifting when lightning is in the vicinity.

ii. The allowable wind speed must be adjusted based on the sail area of the Load and the need to control the Load against the effect of the wind, and wind speed must be monitored when there is a reasonable potential for it to exceed the allowable limit.

*Requirement 4.9.2*  Cranes out of service must be parked in a configuration capable of withstanding the maximum expected winds.

i. If the Weather Forecast indicates an out of service Crane may experience winds in excess of allowable for out of service, a contingency plan must be developed to ensure:
   
   (a) Sufficient space is available to lay the boom down.
   
   (b) Resources are available to lay the boom down prior to winds exceeding allowable.

**LoP 4.10  Manual Hoisting & Shifting**

*Requirement 4.10.1*  Manual Hoisting & Shifting jobs involving hoisting Loads > 0.5t or shifting pipe or structural members beyond their fit-up (i.e., design) position must:

i. Have a designated Lift Director.

ii. Be planned using the Manual Hoisting & Shifting Checklist. All of the fields on the checklist must be completed or equivalent information must be included in attachments.

*Requirement 4.10.2*  The force exerted to operate a Manual Hoist must not exceed that which one person can apply.

*Requirement 4.10.3*  Engineering approval is required for:

i. Use of a Cantilever member for a Support Structure unless it is specifically designed to be a Support Structure for a hoist.

ii. Use of a Support Structure to lift a Load with a Factored Load Weight >3t unless the Support Structure is specifically designed for a hoist (e.g., a monorail).
**LoP 5.1  Equipment Design**

* Requirement 5.1.1 Cranes for lifting personnel:
  i. Must be approved by their manufacturer for lifting personnel.
  ii. Must have an emergency lowering system if there is no alternative way to rescue personnel in the event of loss of Crane motion.
  iii. Should have an emergency operating system to help expedite a rescue operation in the event of loss of normal Crane power source.

* Requirement 5.1.2 Man-Baskets must be designed and constructed according to relevant consensus standards such as ASME B30.23, Personnel Lifting Systems.

**LoP 5.2  Lift Plan for Lifting Personnel**

* Requirement 5.2.1 A plan for lifting personnel with a Man-Basket must be documented using the Lifting Personnel Checklist.
  i. All of the fields on the checklist must be completed or equivalent information must be included in attachments prior to proceeding with lift.
  ii. A new checklist must be utilized:
    (a) At the start of each shift.
    (b) If the Crane is repositioned.
    (c) If the boundaries of the work area change.

**LoP 5.3  Communication while Lifting Personnel**

* Requirement 5.3.1 The Signal Person shall be an occupant of the Man-Basket except when the occupants of the Man-Basket are wearing a respirator (or using breathing air) that impedes their ability to use a radio.

* Requirement 5.3.2 The primary method of communication between the Signal Person and Operator must be by radio. A secondary means must be available to signal all-stop.

* Requirement 5.3.3 Where necessary, a Hazard Watch must be used to help monitor clearances to avoid contact between the Crane/load line/rigging/Man-Basket and obstructions.
**LoP 6.1  Lift Plan for Lifting Near Overhead Power Lines**

* **Requirement 6.1.1**  Overhead Power Lines must be considered energized and uninsulated unless an authorized representative of the electrical asset owner/operator has verified that they are de-energized and visibly grounded, or sufficiently insulated to prevent electric shock.

* **Requirement 6.1.2**  When Lifting Near Overhead Power Lines, the boundaries of the Work Zone must be determined.  Note: See definition of Lifting Near Overhead Power Lines and Work Zone.

* **Requirement 6.1.3**  If no part of the Work Zone is closer than 20’ (6m) to the power line:
  i. The boundary of the Work Zone must be demarcated with flags, cones or similar objects (that are not normally in the environment) in a manner that prevents any part of the Crane or Load (including rigging) from encroaching the 20’ (6m) clearance distance so long as the Crane is not operated beyond the demarcated Work Zone boundary.
  ii. The flags, cones, or similar objects used to demarcate the Work Zone boundary must be located and spaced such that the Operator and Signal Person are able to use them to judge whether the Crane and Load remains within the demarcated boundary.
  iii. The location of the Overhead Power Lines and the boundaries of the Work Zone must be reviewed during the pre-lift briefing.

* **Requirement 6.1.4**  If any part of the Work Zone is closer than 20’ (6m) to the power line:
  i. The Lifting Near Overhead Power Lines Checklist must be used, and all of its applicable fields must be completed or equivalent information must be included in attachments prior to proceeding with lift.
  ii. An authorized representative of the electrical asset owner/operator must confirm that the power line is de-energized and visibly grounded or that the power line is sufficiently insulated to prevent electric shock, then implement requirement 6.1.5, or
  iii. An authorized representative of the electrical asset owner/operator shall determine the voltage of the power line and its corresponding Minimum Approach Distance (MAD) and implement the applicable requirements listed below to maintain safe clearance and prevent electrocution.

* **Requirement 6.1.5**  If the power line is de-energized and visibly grounded, or sufficiently insulated to prevent electric shock per requirement 6.1.1, the following requirements apply:
  i. A pre-lift briefing must be conducted with the Lift Crew and other workers who will be in the area of the equipment or Load to review the location of the power lines and the steps that have been implemented to prevent encroachment/electrocution.

* **Requirement 6.1.6**  If the power line is energized and uninsulated, and if no part of the Work Zone is closer than the Minimum Approach Distance (MAD) to the power line:
  i. The boundary of the Work Zone must be demarcated with flags, cones, or similar objects in a manner that prevents any part of the Crane or Load (including rigging) from
breaching the MAD so long as the Crane is not operated beyond the demarcated Work Zone boundary.

ii. The flags, cones or similar objects used to demarcate the Work Zone boundary must be located and spaced such that the Operator and Signal Person are able to use them to judge whether the Crane and Load remains within the demarcated boundary.

iii. The location of the Overhead Power Lines and the boundaries of the Work Zone must be reviewed during the pre-lift briefing.

* Requirement 6.1.7  If the power line is energized and uninsulated, and if the Work Zone is closer than the Minimum Approach Distance (MAD) to the power line:

i. The lift must be classified as a Complex Lift except when the work is being performed by electrically qualified personnel working on electric power transmission and distribution lines and equipment.

* Requirement 6.1.8  If the power line is energized and uninsulated, and if the Work Zone is closer than the Minimum Approach Distance (MAD) to the power line, but no part of the Crane or Load is planned to be closer than the MAD to the power line:

i. A Spotter who shall fulfill the requirements defined in section 1.10.1 must be used.

ii. A range limiting feature (of LML) must be used to prevent encroaching the MAD in accordance with manufacturer’s instructions.

iii. The Crane must be properly grounded.

iv. Slings must be non-conductive (i.e., special type synthetic slings).

v. If tag lines are used, they must be non-conductive.

vi. A pre-lift briefing must be conducted with the Lift Crew and other workers who will be in the area of the equipment or Load to review the location of the power lines and the steps that have been implemented to prevent encroachment/electrocution.
**Requirement 6.1.9** Lifts where any part of the Crane or Load will be closer than the MAD to an energized, uninsulated power line should be avoided. Power lines must be de-energized and grounded when feasible (i.e., possible to do easily or conveniently) and when doing so would not result in higher net risk (e.g., process safety risks associated with a unit shutdown). However, if it is necessary to lift inside the MAD, the following additional requirements apply:

i. Except when the work is being performed by electrically qualified personnel working on electric power transmission and distribution lines and equipment, a Qualified Person shall determine the Minimum Clearance Distance that must be maintained in light of on-site conditions affecting the ability to prevent electrical contact such as wind conditions, degree of sway in the power line, atmospheric conductivity, etc.

ii. Lift Crew members other than the Operator shall wear voltage rated gloves during the lift.

iii. Insulating line hose or cover-up must be applied to exposed conductors.

iv. If the power line’s circuit interrupting device contains an automatic reclosing feature, it must be made inoperative if the design of the device permits.

v. An insulating link must be installed between the load line and the Load, and while any part of the Crane or Load is closer than the MAD to the power line, workers other than the Operator must be prohibited from touching the load line above the insulating link.

vi. A barricade forming a perimeter at least 10 feet away from the Crane must be erected to prevent unauthorized personnel from entering the work area. In areas where obstacles prevent the barricade from being at least 10 feet away, the barricade must be as far from the Crane as feasible.

vii. Except when the work is being performed by electrically qualified personnel working on electric power transmission and distribution lines and equipment, or when lifting above or below an Overhead Power Line, an elevated warning line or barricade must be provided, in view of the Operator, and must be equipped with flags or similar high-visibility markings.

viii. A Spotter who shall fulfill the requirements defined in section 1.10.1 must be used except when the work is being performed by electrically qualified personnel working on electric power transmission and distribution lines and equipment.

ix. A range limiting feature (of LML) must be used to prevent encroaching the Minimum Clearance Distance and must be used in accordance with manufacturer’s instructions.

x. Slings must be non-conductive (i.e., special type synthetic slings), and if tag lines are used, they must also be non-conductive.

xi. Only personnel essential to the lift are permitted to be in the area of the Crane and Load.

xii. The Crane must be properly grounded.
GLOSSARY

Authorized
Formal recognition by the employer that a person meets the minimum requirements as defined by the Site to perform a role. Minimum requirements must include the competency requirements as defined in Appendix O, and could include certification, letter of authorization from employer, etc.

A/D
Assembly, disassembly, and reconfiguration of a Crane.

A/D Director
Person designated to be overall responsible for A/D. The Operator shall be the A/D Director unless specified otherwise on an A/D Plan.

A/D Plan
Written job plan for A/D that provides all instructions that must be followed to ensure tasks are completed safely.

Basic Lift
Lift that does not meet the criteria of a Complex Lift.

Bystander
Person that is neither a member of the Lift Crew nor meets the criteria for Lift-Related Personnel.

Bystander Exclusion Zone
Area defined by physical barricade(s) or Human Barricade(s) from which Bystanders are excluded in order to prevent them from entering the Drop Zone(s) and Load Crush Zone(s).

Cantilever Support
A Support Structure that is supported only at one end.

Complex Lift
A lift that meets one or more of the following criteria:
   a. Factored Load Weight over 50t (metric tonnes or short tons; units appropriate to location) in the planning phase.
   b. Crane capacity utilization exceeds 80% (of the chart capacity) in the planning phase.
   c. More than one Crane being used.
   d. While Crane supported on tires (except for Fixed Cab Cranes).
   e. Travelling with a Load on the hook (except for Fixed Cab Cranes).
   f. Work Zone is closer than the Minimum Approach Distance to an energized, uninsulated Overhead Power Line (except when the work is being performed by electrically qualified personnel working on electric power transmission and distribution lines and equipment).
   g. Over an occupied building.
   h. Potential for Sudden Load Transfer to the Crane or Manual Hoist.
   i. Use of an Engineered Rigging Component except for the following:
      • Single-purpose lifting beam / spreader bar
      • Multi-purpose (i.e., adjustable/modular) lifting beam / spreader bar that is labeled with instructions for use.

Counterweight Crush Zone
Area between the rotating counterweight of a Crane and a fixed object (including the carrier of the Crane) in which a person could be crushed.
**Crane**
Land-based equipment used to lift, lower, and swing * Loads at various radii that incorporates a lattice or hydraulic telescopic boom and is designed to be readily moved between operating locations. Types include: Rough Terrain, Truck, All Terrain, Carrydeck, Crawler, and Tractor, but specifically not a Lorry Crane where an articulating boom is mounted behind the cabin of a conventional truck (or similar).

**Crane – Fixed Cab**
*Crane* which has its operator cabin located within the undercarriage/carrier and has a capacity of not greater than 25t. Equivalent term: carry deck crane, Franna.

**Dressed**
The presence of auxiliary structures and materials (e.g., piping, platforms, ladders, insulation, etc.), that are connected to a *Load*.

**Drop Zone**
Area in the vicinity of a suspended *Load* where a person could potentially be struck if the *Load* were to drop or invert. When the *Crane* is in motion, this includes the area below an empty hook and any below-the-hook lifting attachments (e.g., spreader bar).

**Dry Run**
Maneuvering a *Crane’s* empty hook (or a *Man-Basket* with proof load weight) to the points along the load path (or through the perimeter of the work area) to verify clearances and *Lift Plan* parameters including radii and adequate capacity.

**Engineered Lifting Attachment**
Welded or bolted attachments used to connect rigging apparatus to equipment, including but not limited to lifting lugs, pad eyes, and trunnions.

**Engineered Rigging Component**
Rigging components such as lifting beams, spreader bars, and link plates. Note: Mass-produced items such as shackles, slings, and eyebolts are not considered *Engineering Rigging Components*.

**Exclusion Zone**
Area defined by physical barricades, *Human Barricades*, or horizontal distance from the *Load* to prevent unauthorized personnel from entering the *Drop Zone*, *Load Crush Zone* or *Counterweight Crush Zone*.

**Factored Load Weight**
The weight of the *Load* to be used for planning the lift following application of contingency factors and accounting for process residuals.

**Hazard Watch**
Person designated to provide details of clearances between the *Crane/Load* and obstructions to the *Signal Person*.

**Human Barricade**
Person positioned at the boundary of an *Exclusion Zone* to prevent personnel from entering.

**Lifting Blind**
Lifting when the *Operator* cannot see the *Load*. 
Lift Crew
Personnel involved in the execution of a lift or A/D, including Lift Director, A/D Director, Operator, Rigger, Signal Person, Hazard Watch, Human Barricade, Spotter and any other personnel that will be (or could be) required to perform a task within the Drop Zone or Load Crash Zone.

Lift-Related Personnel
Personnel that are required to perform a task inside the Bystander Exclusion Zone, but are not a member of the Lift Crew.

Lift Director
Person who is designated to ensure compliance to the specific T1BP requirements listed in LoP 1.5 (Lift Director - Key Responsibilities).

Lifting Near Overhead Power Lines
Lift by a Crane that meets either of the following criteria:

a. Any part of the Crane, load line, or the hook can get closer than 20’ (6m), measured horizontally, to an Overhead Power Line in any direction at the maximum working radius of the boom length indicated on the lift plan checklist without the Load on the hook.

b. Any part of the Crane, load line, hook, or the Load (including rigging) can get closer than 20’ (6m), measured horizontally, to an Overhead Power Line in any direction at the maximum working radius of the longest boom length indicated on the lift plan checklist with the Load on the hook.

Exception: When the uppermost part of the boom, when in the fully extended position, at true vertical, would be more than 20’ (6m) below the plane of the power line.

Lift Plan
The documents and discussions held by the Lift Crew at the lifting location for executing the lift, including:

- The applicable Lift Plan Checklist(s)
- Documents referenced by the applicable Lift Plan Checklist(s)
- Documents identified by the Complex Lift Plan Checklist required to be at the lift site
- Discussions for how to prevent personnel (including Lift Crew members and Lift-Related Personnel) from entering the Drop Zone and Load Crash Zone.

Lift Planner
A person who plans all or part of a lift.

LML
A Load Moment Limiting system that limits the overturning moment on a Crane and also controls other range limiting devices. The system compares the lifting condition to the Crane’s rated capacity for the current configuration, and when the rated capacity is reached, shuts off power to those Crane functions that can increase the severity of loading on the Crane, while allowing those functions that decrease the severity of loading on the Crane to remain operational. Equivalent terms: rated capacity limiter, “computer”.

Load
Object(s) being lifted by a Crane, or lifted (or shifted) by a Manual Hoist.
Load Crush Zone

Area between a suspended Load and a stationary object where a person could be crushed if lateral control of the Load is not maintained. While traveling with a Load, the Load Crush Zone must be expanded in consideration of the dynamic effects of the movement of the Crane.

Load Weight

The weight of the Load without contingency.

Man-Basket

Platform suspended from a Crane for moving people and their tools. Equivalent terms: crane basket or suspended personnel platform.

Manual Hoist

Non-powered device used to apply a force to lift or shift a Load. Examples: chain hoist, lever hoist.

Manual Hoisting & Shifting

Use of one or more Manual Hoists to suspend or shift a Load. Shifting a Load is moving a Load that is not suspended, or deflecting a member such as pipe or structural steel. Exceptions: Use of a Manual Hoist as part of a rigging assembly to connect a Load to a Crane, or use of a Manual Hoist permanently connected to a Support Structure designed for lifting (e.g., monorail) does not constitute Manual Hoisting & Shifting. Equivalent terms: bull rigging.

Mat

Pad, plate or cribbing placed under outriggers or crawler tracks to prevent exceeding the maximum allowable load bearing capacity of the ground or other supporting surface.

Minimum Approach Distance (MAD)

The minimum allowable distance between an energized, uninsulated Overhead Power Line and any part of the Crane or Load (including rigging) as defined by local regulatory requirements for non-electrically qualified workers. In the absence of local regulatory requirements, MAD must be per Table 5-3.4.5.1-1 in ASME B30.5, Mobile and Locomotive Cranes.

Minimum Clearance Distance

When lifting closer than the Minimum Approach Distance (MAD) to an energized, uninsulated Overhead Power Line, the clearance that must be maintained as determined by a Qualified Person in light of on-site conditions.

Operator

Person who operates a Crane.

Overhead Power Line

Aerially suspended power transmission lines that are either insulated or uninsulated, and either energized or de-energized. Insulated cables in temporary installations, or suspended in cable tray or conduit are not considered Overhead Power Lines.

Proof Load Test

A load test equal to or greater than the rated load of a Crane or rigging component as specified by the local consensus standard or regulation to demonstrate it is fit-for-purpose.
Qualified Person
A person who, by possession of a recognized degree, certificate, or professional standing, or who by extensive knowledge, training and experience, successfully demonstrated the ability to solve/resolve problems relating to the subject matter.

Rigger
A person who selects, inspects and connects rigging components to a Load.

Signal Person
A person who monitors clearances between the Crane and fixed objects during positioning and lifts, and directs the Operator to move the Crane or the Load. Equivalent terms: banksman, dogman.

Site
Company facility or construction site and the personnel responsible for its management.

Site Lift Specialist
The person designated by the Site to approve the content and review process for Complex Lift Plans and provides assistance in interpreting the requirements of this T1BP.

Spotter
The person who monitors clearances between Overhead Power Lines and the Crane or Load, and communicates with the Operator to ensure safe clearance is maintained. Equivalent terms: electrical overhead spotter.

Sudden Load Transfer
Removing support of a Load (e.g., cutting support clips, etc.) without having confirmation (e.g., horizontally oriented bolts becoming slack) that the Crane or Manual Hoist is applying a lifting force equal to the actual weight of the Load.

Support
Surface or structure that supports a Crane or Load (e.g., ground, concrete slab, steel structure, road, etc.).

Support Structure
A structure that an anchor point for a Manual Hoist is attached to.

Tagline
A rope attached to a Load for the purpose of controlling its orientation, or to limit its swinging (i.e., pendular motion).

Total Lift Weight
Total weight to be lifted including the Factored Load Weight and all Crane and rigging components.

Weather Forecast
A fit-for-purpose prediction of future weather conditions that, depending on circumstances (e.g., duration of the lift, weather volatility at the site, etc.), may range from a formal weather report from a weather agency to an informal assessment by the Lift Crew of the weather conditions immediately prior to the start of the lift.

Work Zone
The 2-dimensional area (plan view) representing the furthest extent any part of the Crane or Load (including rigging) will be allowed to reach during assembly, disassembly, reconfiguration, and lifting, based on the planned Crane configuration(s) and Load orientation(s).
## MOBILE CRANE LIFT PLAN CHECKLIST

### PLANNING SECTION

<table>
<thead>
<tr>
<th>Lift location:</th>
<th>Unit:</th>
<th>Company:</th>
<th>Crane Make/Model/Capacity:</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Single Lift</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>□ Group of Lifts</td>
<td>Description of the group of lifts:</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- **Lift Classification:** □ Basic □ Complex (Appendix D attached)
- **Criteria:** □ Engineered Rigging Component □ Lift on Tires (except fixed cab)
- □ Planned Factored Load Weight >60t □ Planned capacity utilization >80% □ Multi-crane lift □ Sudden Load Transfer
- □ Travelling with Load (except fixed cab) □ Work Zone closer than MAD to an Overhead Power Line □ Lift over occupied bldg.

### Units used:
- □ Feet/Pounds/Tons □ Meters/Metric Tonnes
- □ Document □ Name Plate □ Estimate (only if less than 2t)
- □ Scale □ Load Cell □ Unverified

### Load Weight verified by:
- □ Crane Operator □ Signal Person □ Lift Director(1) □ Lift Director(2)

### Lift Class:
- □ Basic □ Complex

### Lift location:
- Unit: | Company: | Permit No.: |

### Load Weight:
- Main Block weight: ____________
- Aux. Block weight: ____________
- Aux. Sheave weight: ____________
- Stowed jib weight: ____________
- Elected jib weight: ____________
- Rigging weight: ____________
- Hoist line weight: ____________

### Total Lift Weight (including contingency):
- Initial (pick) radius: ________ chart capacity: ____________
- Final (set) radius: ________ chart capacity: ____________
- Maximum radius: ________ chart capacity: ____________

### Contingency:
- □ 0%(weighted) □ 10%(calculated/drawings) □ 100% (Sudden Load Transfer)

### Weight of Residue (15% minimum if unknown):
- ____________

### Factored Load Weight:
- Completed by (name): ____________

### Load Crush Zone(s):
- Counterweight:
  - □ Full □ Reduced
  - Counterweight amount(s): ____________

### Lift with highest utilization:
- Description of the group of lifts:

### Bystander Exclusion Zone barricade:
- □ Physical □ Human

### Known underground hazards mitigated:
- □ Yes □ No

### Known underground hazards mitigated:
- □ Yes □ No

### Confirmed ground conditions by (name):
- ____________

### Auxiliary Sheave Weight:
- ____________

### Stowed Jib Weight:
- ____________

### Erected Jib Weight:
- ____________

### Rigging Weight:
- ____________

### Hoist Line Weight:
- ____________

### Total Lift Weight:
- ____________

### Lift Director or VERIFICATIONS

### Dry Run (with empty hook)

### Lifting with:
- □ Main Boom □ Jib/Boom Extension

### Load Crush Zone(s):
- □ Yes □ No

### Backup method:
- □ Radio □ Hand □ Whistle □ Verbal

### Configuration of the boom telescopic sections:
- ____________

### Boom extension Length:
- ____________

### Distance to nearest Overhead Power Line(s):
- ____________

### Lift crew briefed on emergency response plan:
- □ 0% □ N/A

### Maximum allowable wind speed:
- ____________

### Person monitoring wind speed:
- □ 0% □ N/A

### Site Standard:
- □ Aerial Lift □ Man basket □ Aerial Lift □ Man basket▲

### Equivalent information included:
- □ True □ False

### All Highlighted fields discussed during pre-lift briefing:
- □ Led by: □ Lift Director □ Other (name): ____________

### Crane Operator:
- ____________

### Signal Person
- ____________

### Rigger:
- ____________

### Spotter:
- ____________

### Hazard Watch:
- ____________

### Hazard Watch:
- ____________

### Actual Lift Weight from MLL:
- □ Crane capacity and Support adequate for actual Lift Weight: □ Load confirmed stable: □
**Fixed Cab Mobile Crane Lift Plan CHECKLIST - LOAD WEIGHT <5t**

*Note: This form is not allowed for Complex Lifts*

<table>
<thead>
<tr>
<th>Date:</th>
<th>Lift location(s):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operator:</td>
<td>Lift Director:</td>
</tr>
</tbody>
</table>

**Units:** ☐ Feet/Pounds ☐ Meters/Metric Tonnes

<table>
<thead>
<tr>
<th>Number of parts of line:</th>
<th>Line Pull Capacity:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Main Block wt:</th>
<th>Aux. Block wt:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Jib weight:</th>
<th>Rigging wt:</th>
</tr>
</thead>
</table>

**Total deducts:** A =

**Contingency factors:** 0% (weighed) 10% (calculated/drawing)

**Note:** Process Residuals must be at least 15% unless known

<table>
<thead>
<tr>
<th>Time of Lift</th>
<th>Load Description</th>
<th>Load Assessment</th>
<th>Capacity Utilization</th>
<th>Rigging</th>
<th>Verification</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Deducts (A)</td>
<td>Planned Load Weight (B)</td>
<td>Contingency + Residuals (C)</td>
<td>Total Planned Lift Weight (A+B+C)</td>
</tr>
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</tbody>
</table>

*All Highlighted Fields Must Be Discussed with Lift Crew and Lift-Related Personnel*
**RIGGING PLAN CHECKLIST (Mandatory for Loads > 2t)**

To be used for simple 1, 2, 3 and 4 leg arrangements. For other arrangements, provide sketch and calculations on additional page(s) as required.

<table>
<thead>
<tr>
<th>Lift location:</th>
<th>Unit:</th>
<th>Company:</th>
<th>Permit #:</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Single lift</td>
<td>□ Group of lifts</td>
<td>Lift description:</td>
<td></td>
</tr>
</tbody>
</table>

Lift involves Sudden Load Transfer? □ Yes □ No
Engineered Rigging Components* being used? □ Yes □ No *Except if exempted in T1BP
If answered “Yes” to either questions above, lift classified as Complex, and rigging arrangement must be shown on a separate sheet and attached to this form

Rigging attachment points above CG or prevent Load from inverting □
Load has adequate strength at rigging connection points □
Load has adequate overall strength to be lifted? □

All of the above fields completed: □ OR Equivalent information included in attachments: □

---

**VERIFICATION SECTION**

<table>
<thead>
<tr>
<th>Verification Item</th>
<th>Completed</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Edge protection used?</td>
<td>□ Yes □ N/A</td>
<td>Rigging components are compatible</td>
</tr>
<tr>
<td>Softeners used?</td>
<td>□ Yes □ N/A</td>
<td>Rigging in-line with lifting lug (i.e., not side loading)</td>
</tr>
<tr>
<td>Close Visual Inspection of rigging completed</td>
<td>□</td>
<td>Loose items secured? (or N/A)</td>
</tr>
<tr>
<td>Close Visual Inspection of lifting attachments completed</td>
<td>□</td>
<td>Rigging marked/tagged with capacity</td>
</tr>
<tr>
<td>Periodic sling inspection (visual indicator) current</td>
<td>□</td>
<td>Periodic sling inspection (visual indicator) current</td>
</tr>
</tbody>
</table>

Comments: ___________________________________________________________

Rigger Signature: __________________________ Date: / /
# COMPLEX LIFT PLAN CHECKLIST

<table>
<thead>
<tr>
<th>Lift location:</th>
<th>Unit:</th>
<th>Company:</th>
<th>Permit #:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Item(s) to be lifted:</td>
<td>Lift Description:</td>
<td>Crane Make/Model/Capacity:</td>
<td></td>
</tr>
</tbody>
</table>

### CRANE PROVIDER
- C Crane Provider
- L Lift Specialist
- M Mech. Contractor
- T Transport Contractor
- O Owner’s Engineer
- S Site Lift Specialist

### REVIEWER
- R Reviewer (3rd Party)
- P Prime Contractor
- V Equipment Vendor
- D Lift Director
- G Geotechnical Engineer
- E Engineering Contractor

<table>
<thead>
<tr>
<th>Document Required to Supplement Checklists</th>
<th>Obtain/Generate</th>
<th>Review</th>
<th>Approve</th>
<th>Completed (* initials)</th>
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<tbody>
<tr>
<td>Design documents for Engineered Rigging Components</td>
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<tr>
<td>Proof Load Test documents for Engineered Rigging Components</td>
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<td>Design documents for Engineered Lifting Attachments (e.g., lugs)</td>
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<tr>
<td>Documentation of adequacy of strength of Load during lift</td>
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<td>Drawing of Load that shows location of center-of-gravity</td>
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<tr>
<td>Scaled and dimensioned lift plan drawing (plan view)</td>
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<tr>
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<td>Applicable load chart (to confirm configuration and capacity)</td>
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<td>Ground load calculation documentation:</td>
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<td>Detailed rigging arrangement drawing</td>
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<td>Documented access plan for rigging/de-rigging</td>
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</tbody>
</table>

**Comments:** ______________________________________________________________________________________

Complex Lift Plan Checklist prepared by: ___________________________ Date: ________________

Site Lift Specialist Approval (of checklist): ___________________________ Date: ________________

Documents confirmed to be in the field by: ___________________________ Date: ________________

* Initialing in this column signifies that the document has been reviewed (without exception) and approved in accordance with the checklist.
## MOBILE CRANE MAN-BASKET CHECKLIST

### Lift location:
- Unit:
- Company:
- Permit No:

### Safer WAH Alternative not Practicable:
- Crane Make/Model/Cap/Serial Number:

### PLANNING SECTION

<table>
<thead>
<tr>
<th>Units</th>
<th>□ Fee/Pounds</th>
<th>□ Meters/Metric Tonnes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crane manufacturer approves lifting personnel:</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>Not possible to activate freefall capability (or N/A):</td>
<td>□</td>
<td></td>
</tr>
<tr>
<td>Planned number of occupants:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estimated weight of tools &amp; materials:</td>
<td></td>
<td></td>
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<tr>
<td>Total estimated payload weight:</td>
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<tr>
<td>Nameplate weight capacity of the Man-Basket:</td>
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<tr>
<td>Weight of Man-Basket + dedicated rigging:</td>
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<tr>
<td>Main Block weight:</td>
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<td></td>
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<tr>
<td>Auxiliary Block weight:</td>
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<tr>
<td>Auxiliary Sheave weight:</td>
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<tr>
<td>Slowed boom extension/jib weight:</td>
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<td></td>
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<tr>
<td>Hoist line weight:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total Lift Weight (Man-Basket @ 100% capacity):</td>
<td></td>
<td></td>
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</tbody>
</table>

#### Platted radius and capacity values:

| Maximum planned radius: | | |
| Capacity at maximum planned radius: | | |
| Capacity utilization at maximum planned radius: | | |
| Not possible (CAP: utilization must not exceed 50%): | | |
| Lifting with: | □ Main Boom | □ JIB/Boom |
| JIB/Boom Extension: | □ Retracted | □ Partial | □ Full |
| Main boom length: | | |
| Configuration of telescopic sections: | | |
| Boom extension length: | | |
| Number of parts of line: | | |
| Line Pull Capacity: | | |

### CRANE VERIFICATIONS

- Pre-use inspection completed: □
- Not possible to activate freefall capability: □
- LML bypass key not in Operator cab: □

#### 360° slew with min boom & radius (where possible)
- Completed: □
- Not possible (due to obstructions): □
- Counterweight clearance to obstructions sufficient: □
- Crane level, mats/ground condition satisfactory: □
- Crane level, mats/ground condition satisfactory: □
- Counterweight Crush Zone barricaded or marked: □
- LML code entered: | |
- LML code correct for current configuration: □

#### Trial lift
- Proof Load Weight for trial lift (125% of capacity): | |
- Basket inspection satisfactory following trial lift: □

#### Dry Run (with proof load in basket) thru perimeter of work area
- Actual Max radius: | LML capacity: |
- LML capacity @ max radius at least 2x Total Lift Weight with Man-Basket loaded to 100% capacity: □
- LML capacity matches load chart capacity: □
- Boom & Man-Basket clearances to obstructions sufficient: □

### Lift Director VERIFICATIONS

- Counterweight Crush Zone barricaded or marked: □
- Lift Crew and Lift-Related Personnel know the locations of the Drop Zone(s) and Load Crush Zone(s): □
- Lift Crew members know the circumstances they may enter the Drop Zone(s) or Load Crush Zone(s): □
- Lift Crew briefed on location of power lines: □ | N/A |
- Work Zone boundaries demarcated: □ | N/A |

### Miscellaneous

- Maximum allowable wind speed limit: | |
- Person monitoring wind speed: □ | N/A |
- Weather forecast acceptable for duration of work: □
- Work Zone boundaries demarcated: □ | Yes | N/A |
- Signal Person has radio and will occupy man-basket: □
- Backup method: □ Hand | Whistle | Verbal |
- wt. of occupants + tools < Man-Basket rated capacity: □
- Rescue: □ Plan in place, or □ Have Emergency Lowering System
- Fall arrest equipment available for occupants: □
- Lift Crew briefed on emergency response plan: □ | N/A |

### Lift Director(1):
- Date: | Time: | Lift Director(2): |
Appendix F

Lifting Near Overhead Power Lines Checklist

Required if any part of the Work Zone is closer than 20’ (6m) to an Overhead Power Line

Lift location: Unit: Company: Permit #:
☐ Single Lift ☐ Group of lifts
☐ Lift description: Crane Make/Model/Cap:

SECTION 1: Work Zone and Work Schedule (to be completed by lift crew):
1) Shortest distance (measured horizontally) from the Work Zone to an Overhead Power Line: __________________
2) Scheduled Start Date & Time: __________________ Schedule Completion Date & Time: __________________

SECTION 2: Power Line Information (to be completed by an authorized representative of the electrical asset owner/operator):
3) Power line voltage: ________________ ☐ N/A (confirmed deenergized & visibly grounded, or insulated)
4) Minimum Approach Distance (MAD) based on voltage: ________________ ☐ N/A (confirmed deenergized & grounded or insulated)
5) Additional requirements/information: __________________
6) Authorized representative (Print): __________________ (Signature): __________________ Date __________
7) Skip to SECTION 7 if power line deenergized & visibly grounded, or insulated
8) Is any part of the Work Zone closer than the MAD to the power line? ☐ Yes ☐ No If “Yes”, skip to SECTION 4
9) Complex Lift Plan Checklist completed ☐

SECTION 3: Method of Work Zone Demarcation to Prevent Encroaching MAD (to be completed by Lift Crew):
☐ Lifting Away from Power Line ☐ Lifting Toward Power Line ☐ Working in a corner

SKIP TO SECTION 7

SECTION 4: Work Zone Closer than MAD to Power Line (to be completed by Lift Crew):
9) Complex Lift Plan Checklist completed ☐
10) Is any part of Crane or Load planned to be closer than the MAD to the power line? ☐ Yes ☐ No If “No”, skip to line 21

SECTION 5: Lifting Inside MAD (to be completed by an authorized representative of the electrical asset owner/operator):
11) Circuit interrupter automatic reclosing feature disabled? ☐ Yes ☐ N/A (doesn’t have feature, or design doesn’t permit disabling)
12) Insulating hose or cover-up applied to exposed conductors ☐
13) Authorized representative (Print): __________________ (Signature): __________________ Date __________

SECTION 6: Lifting Inside MAD (to be completed by Lift Crew):
16) Minimum Clearance Distance ________________ Qualified Person that determined distance (Print Name): __________________
17) Elevated Warning Line provided for Operator ☐
18) Insulating link installed between hook and Load ☐
19) Voltage-rated gloves provided to workers that may contact the Load when it is closer than the MAD to the power line ☐
20) Barricade erected at least 10’ (3m) around perimeter of Crane ☐ Yes ☐ As far from the Crane as feasible (if obstacles prevent 10’)
21) Spotter (Print Name) __________________ Visual Aid provided for Spotter to identify clearance ☐ Horn/Claxon for Spotter ☐
22) Range limiting feature of LML used to prevent breaching Minimum Clearance Distance ☐
23) Operator familiar with manufacturer’s procedure for use of LML range limiting feature ☐
24) Crane grounded ☐
25) Slings are non-conductive ☐ Yes ☐ Not Being Used
26) Tag lines are non-conductive ☐ Yes ☐ Not Being Used

SECTION 7: All highlighted fields discussed during pre-lift briefing ☐ Led by: ☐ Lift Director ☐ Other (name): __________________
14) Briefing led by (print): __________________ Date & Time: __________________
Operator __________________ Spotter __________________ Signal Person __________________
Rigger __________________ Rigger __________________ Rigger __________________
Hazard Watch __________________ Other Worker __________________ Other Worker __________________
Comments: __________________

Lift Director(2): __________________
## Appendix G

### Manual Hoisting & Shifting Checklist (for hoisting Loads > 0.5t, or shifting members beyond fit-up position)

<table>
<thead>
<tr>
<th>Unit:</th>
<th>Lift Location:</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Single lift (or shift) □ Group of lifts</td>
<td></td>
</tr>
</tbody>
</table>

### Description of Load(s):

#### SECTION 1: LOAD WEIGHT (all applicable boxes must be checked)

- □ Shifting only (i.e., Load will not be suspended) If yes, skip to SECTION 2
- Load weight obtained from: □ Scale □ Drawing / Data Sheet □ Name Plate □ Calculation □ Estimate (up to 2t) □ Lift Plan Checklist

**A:** Load Weight (heaviest if group of lifts): ______

**B:** Contingency (wt.): ______

**C:** Process Residual Weight: ______

**D:** Factored Load Weight (A+B+C): ______

#### SECTION 2: SUPPORT STRUCTURE & ANCHOR POINT (all applicable boxes must be checked)

- Type of hoist(s): □ Chain Hoist □ Lever Hoist □ Other ______________
- Capacity of weakest hoist: ______ □ > Factored Load Weight (or calculated max force)
- Type of support structure: □ Beam □ Pipe □ Other ______________
- Type of anchor point: □ Sling □ Beam Clamp □ Other ______________
- Lowest rated anchor point capacity (including reduction factors): ______
- □ Safe access for connecting/disconnecting to anchor point and to Load

#### SECTION 3: ADDITIONAL PLANNING REQUIREMENTS (all applicable boxes must be checked)

| □ Factored Load Weight > 2t |
| □ More than one hoist/support used simultaneously to support the Load |
| □ Factored Load Weight >3t, or Support Structure is cantilever |
| □ CG uncertain or potential for Load to tilt or invert |
| □ In-service piping used as Support Structure |
| □ Cast iron valve* in Support Structure or in pipe shifted beyond fit-up position |

* Commonly used in water service, and usually have flat-faced flanges

□ Appendix C attached

□ JLA/JSA attached and anchor point(s) rated for non-vertical loads

□ Engineering approval to use Support Structure (if not designed for a hoist)

□ Rigging configured or constraints added to ensure stability of the Load

□ Equipment owner approval

□ Engineering approval obtained

#### SECTION 4: FIELD VERIFICATION CHECKS (all boxes must be checked)

- □ Bystander Exclusion Zone established (or N/A)
- □ Drop Zone & Load Crush Zone(s) defined, and crew understands circumstance for entry (or N/A)
- □ Observer assigned to monitor deflection of Support Structure (or N/A)

□ Rigging (including anchor point) pre-use inspection completed

□ Pawl functioning properly ("clicking" when hoisting up) or N/A

□ Sling softeners/edge protectors used correctly (or N/A)

All Highlighted fields discussed during pre-lift briefing □ Led by: □ Lift Director □ Other (name): ________________________________

1) _____________________________ 2) _____________________________ 3) _____________________________ 4) _____________________________

5) _____________________________ 6) _____________________________ 7) _____________________________ 8) _____________________________

Lift Director(1): _____________________________ Date ____________ Time ____________

Lift Director(2): _____________________________

□ Brake test completed, i.e., brake holds after hoisting up and after lowering the Load (or N/A)

□ Stability Check Performed (or N/A)