	<b>LIFTING DEVICES AND RIGGING</b> CPC-ALL-HSE-PRC-SOP-178	<b>Retention Code:</b> CG01 - CA
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<b>Owner:</b> HSE Performance Assurance	<b>Approved By:</b> Manager, HSE Performance Assurance	<b>Review Frequency:</b> Five years or less



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## 1.0 Scope

This safe operating practice (SOP) applies to all ConocoPhillips Canada (CPC) operations. The SOP provides procedures to follow when managing work involving lifting devices and rigging.

## 2.0 Hazards

- equipment falling from above
- equipment and lifting gear failure
- overhead power lines
- ditches and soft spots on the ground

## 3.0 Roles and Responsibilities

### 3.1. Supervisors

- Ensure workers are competent and are trained to operate the specific devices at the worksite.
- Ensure adequate rigging is available.

### 3.2. Workers

- Be competent to operate specific lifting devices.
- Be familiar with recent log book entries prior to operating particular lifting devices.

## 4.0 Additional Equipment Requirements

### 4.1. Additional Equipment Required

- barricades and flagging
- tag lines
- communication devices

## 5.0 Competency

- Personnel using lifting devices and/or rigging must be deemed competent by an appropriate representative of their company by demonstrating competency in:
  - operation of the specific lifting/rigging equipment and practices;
  - use of load charts; and
  - use of the code of signals for hoisting operations.
- All workers and operators must be authorized to operate the specific equipment and provide proof of training at all times.

### 5.1. Additional Competency Requirements

#### 5.1.1. *British Columbia*

- Mobile cranes and tower cranes must be operated only:
  - by a person with a valid operator's certificate; and
  - in accordance with any conditions stipulated on the certificate.

#### 5.1.2. *Saskatchewan*

- When operating any crane with a load rating greater than or equal to five tonnes, the operator must be a competent operator unless the operation is covered in the following operations below which requires a qualified operator:
  - crane raising or lowering workers on a personnel lifting unit suspended from a hoist line; and/or
  - a mobile crane with a load rating greater than five tonnes unless the crane is mounted on a vehicle and is exclusively used to load or unload that vehicle.

## 6.0 Lifting Devices

### 6.1. Rated Capacity Indication

- The load rating must be clearly indicated and permanently affixed to each lifting device and must include the manufacturer's name, model and serial number.
- If a lifting device is not commercially manufactured, the lifting device must have a plate or weatherproof label permanently secured to it that legibly shows the rated load capacity according to the professional engineer's certification.

**Note:** Within Alberta, the following sections only apply to lifting devices with a rated load capacity greater than 2,000 kg.

- Load charts must also be available to the operator of the mobile cranes or boom trucks and must include:
  - load capacities at vertical and/or horizontal angles of a boom;
  - load capacities at various boom extensions;
  - environmental limitations (e.g., temperature, wind, etc.);and
  - equipment configuration and limitations (e.g., outrigger use/position, tire pressure, etc.).

## 6.2. Log Books

### 6.2.1. Requirements

- A log book in either an electronic or paper document must be kept for each lifting device at the work location and is required for:

<b>Alberta</b>	Lifting devices with a rated capacity greater than 2,000 kg excluding manually operated lifting devices.
<b>British Columbia</b>	Cranes or hoists with a rated capacity greater than 900 kg, all cranes or hoists used to support workers, and all mobile cranes and boom trucks
<b>Saskatchewan</b>	Cranes or hoists with a rated capacity greater than 5,000 kg. A manufacturer log book must be used if provided.

### 6.2.2. Contents

- Where log books are required, results of inspections and maintenance activities must be recorded in the equipment’s log book.
- The log book must contain the following information:
  - the date and time when any work was performed on the lifting device;
  - length of time in lifting service;
  - record hours of service if equipped with a manufacturer’s hour meter;
  - all defects or deficiencies and when they were detected;
  - inspections, including examinations checks and tests as specified by the manufacturer;
  - repairs or modifications performed;
  - a record of certification;
  - any matter or incident that may affect the safe operation of the lifting device; and
  - each log book entry is signed by the person performing the inspection, maintenance or calibration.

### 6.3. Equipment Inspections

- Lifting equipment must be inspected according to the manufacturer’s specifications and the specific requirements listed within this section.

#### 6.3.1. Overhead Travelling Cranes

- All overhead travelling cranes must be visually inspected before each use and in accordance with the following requirements:

Service	Class	Operational/ Visual Inspection	Periodic Inspection
Light	<b>Class A, Standby or Infrequent Use</b> <ul style="list-style-type: none"> <li>precise handling of equipment at slow speeds with long idle periods between lifts</li> <li>used for initial installation of equipment and infrequent maintenance</li> <li>e.g., motor rooms, MCC rooms, compressor buildings, etc.</li> </ul>	Monthly	Annually
	<b>Class B, Light</b> <ul style="list-style-type: none"> <li>low speed, light service requirements</li> <li>occasional full rated loads</li> <li>approximately 2-5 lifts per hour, averaging 2.6 m per lift</li> <li>e.g., cranes in repair shops, light assembly operations, service buildings, warehouses, etc.</li> </ul>	Monthly	Annually
Heavy	<b>Class C, Moderate</b> <ul style="list-style-type: none"> <li>average 50% of rated capacity</li> <li>approximately 5-10 lifts per hour, averaging 3 m per lift, less than 50% of lifts at rated capacity</li> <li>e.g., cranes in machine shops</li> </ul>	Weekly to Monthly	Semi-Annually
	<b>Class D, Heavy</b> <ul style="list-style-type: none"> <li>Loads approaching 50% of rated capacity are handled</li> </ul>	Weekly to Monthly	Semi-Annually

**Note:** See Appendix B for all inspection requirements.

**Note:** For overhead travelling cranes not in regular use in Alberta and British Columbia:

- Before being placed in service, an operational inspection must be completed on a crane that has been in infrequent service or out of service for more than one month but less than a year.
- Before being placed in service, a periodic inspection must be completed on a crane that has been out of service for more than one year.

### 6.3.2. Mobile Lifting Equipment

- All mobile cranes and boom trucks must be inspected using the following table.

Type of Inspection	Inspection Interval
Daily	To be performed daily.
Periodic	Every 3 months or every 350 hours of machine time or as specified by the original equipment manufacturer.
Annual	To be performed annually.
Complete structural inspection of telescopic boom	Any time the boom is disassembled or at a minimum once every 10 years or 10,000 hours of service or as specified by the manufacturer.
Special	Carried out as required after any form of actual, suspected, or potential damage is sustained.

**Note:** See Appendix C for all inspection requirements.

## 7.0 Rigging

### 7.1. Safe Working Load Limits

- Maximum load rating of the rigging must be legibly indicated on the rigging:
  - If markings cannot be placed on rigging, load ratings must be available to the workers on the worksite.
- Prior to any lift, always check the load ratings for each rigging component.
- Rigging must not be subjected to a load more than:
  - 10% of the breaking strength of the weakest part of the rigging for workers being raised or lowered
  - 20% of the breaking strength of the weakest part of the rigging for all other lifts

**Note:** Within Saskatchewan, a sling must be capable of supporting at least ten times the maximum load to which the sling, fittings and attachments may be subjected when lifting workers and five times the maximum load for all other cases.

## 7.2. Safety Factors

- Rigging components must be rated relative to their ultimate breaking strength in accordance with the following safety factors:

Component	Safety Factors
Running lines	3.5 to 1
Non-rotating hoist lines	5 to 1
Tugger lines/blocks for pulling	3 to 1
Pendant lines/guy lines	3 to 1
Winch lines	2 to 1

**Note:** Rigging components or hoisting lines that are used in any towing operation must not be used for any hoisting operation.

## 7.3. Safety Hooks and Latches

- If a hook is used in any circumstances during which dislodgement could injure workers, the hook must be replaced with:

- a hook with a safety latch;
- an anchor-type shackle with a bolt, nut and retaining pin; or
- a “moused” hook (i.e., wrapping of soft wire, rope, etc.).



## 7.4. Inspection

- All rigging, and components of riggings, must be inspected prior to each use to ensure they are functional and safe.
- Rigging equipment must be removed from service if:
  - damage is above manufacturer’s tolerances;
  - chemical damage, including melting or charring;
  - electrical arc contact has occurred;
  - broken or worn stitching;
  - evidence of the rope structure being distorted because of bulging, kinking, bird caging or any other form of damage;
  - cracked, broken, corroded, or distorted fittings; and/or
  - load hooks are opened more than 15% of the normal throat opening, are 10° out of the plane or if any dimension has been reduced by more than 10%.

## 7.5. Rigging Repair

- The use of makeshift fittings or attachments is not permitted. Welding repairs to rigging, chains and fittings must be certified safe for use by a professional engineer.

## 8.0 Safe Operating Practices

**Note:** Manufacturer's instructions must be at the worksite and available to the operator.

**Note:** The weight of the load being lifted must be accurately determined and communicated to the operator and any person rigging the load. This weight must not exceed the safe working load (SWL) of the weakest rated rigging component being used. Prior to any lift, always check the load ratings for each rigging component.

### 8.1. Critical Lifts and Lift Plans

- Critical lift plans (CPC-ALL-HSE-FRM-2129 or contractor equivalent) are required for lifts meeting any of the following critical lift criteria:
  - lift exceeding 75% of the crane's rated capacity, as shown on the load charts for the crane configuration to be used;
  - lift of a person in a work platform suspended by a crane;
  - lift of a load over or between energized, high voltage electrical conductors;
  - lift over live process equipment or piping.
- Within British Columbia, the following situations are also considered critical lifts:
  - lift in which the centre of gravity of the load or sling leg length changes during the lift;
  - lift involving two cranes if the load on any one crane or hoist is greater than 75% of the rated capacity;
  - lift involving simultaneous use of more than two lifting devices;
- Critical lift plans must include the following information at a minimum:
  - rigging details;
  - wind speed limitations;
  - maximum hoist line speed;
  - maximum crane travel speed, if applicable;
  - load distribution; and
  - the need for and position of signalers.
- Written critical lift plans must be completed by a qualified person and discussed with all workers at a pre-job safety meeting. This meeting must be repeated whenever there is a change in the people or equipment involved in the critical lift.
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### 8.2. General Operating Practices

**Note:** The lifting device operator must be in full control of the equipment and not perform any other duties while operating the equipment.

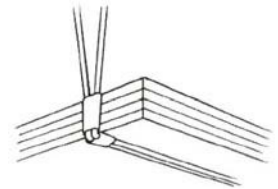
**Note:** Never allow personnel to work under suspended loads and do not lift loads over workers.

**Note:** During critical lifts, only members of the immediate lift team are allowed in the proximity of the crane while the critical lift is in progress.

**Note:** Do not operate lifting equipment in severe weather.



- Before operating a particular lifting device, the operator must be trained on the operation of that device and familiar with all recent entries in its log book.
- Pre-use inspections must be completed including confirming that safety devices installed on the lifting equipment are operational.
- Confirm the weight of the load, radius of lift and the load chart prior to lifting. Refer to equipment load charts. Do not lift a load which exceeds the rated capacity of the lifting device or rigging.
- When required, ensure lift plans are completed as part of the hazard assessment process and discussed with all workers.
- Determine the size, weight, configuration and balance of the load so it can be arranged on the sling so it will not slip or fall off.
  - When using multiple slings, arrange the load so it is equally divided amongst the slings.
  - Do not lift loads using one leg of a multi-leg sling until unused legs are secured.
  - Protect slings and straps from damage where slings contact sharp objects or may be exposed to bending.
  - Be aware of sling angles. Avoid sling angles less than 30°; angles greater than 45° are recommended. Use spreader bars to increase angles.
- All rigging must be installed and inspected by a competent person prior to use.
- Install flagging or barricading to prevent unauthorized entry within lifting operation area.
- Ensure a signalman is present when the lift operator does not have a full view of the entire operation.
  - Only one person should provide signals to the lift operator except to warn of a hazardous situation. Use the standard signal system (Industry Recommended Practice 12) or signals provided in the provincial OHS code/regulation.
  - For blind lifts, radio communication or another equally effective method must be used.
- Use tag lines on loads. Avoid tying the tag line to the lifting gear.
  - When using tag lines, the line must be long enough to properly control the load and used in a way that prevents the load from striking the worker controlling the tag line.
  - Workers guiding loads must have an identified escape route during the lift.
- Make sure the load is not bolted or clamped to the surface before attempting a lift.
- Do not drag loads along the ground. Position the hook directly over the load and seat the sling squarely on the hook bowl.
- Guard against shock loading by taking up the slack slowly. Always keep hands clear of rigging as the slack is taken up
- Never side load, back load or tip load a hook unless the hook has been specifically designed for that purpose.
- Never allow anyone to ride the load or any other rigging equipment. Keep personnel away and clear of the load while the load is being hoisted.
- Never leave a load suspended in the air. Before landing a load, check the lay down area to ensure adequate size and ability to hold the load.



- Store slings in a designated storage area when not in use.

### 8.3. Suspended Personnel Baskets

- All personnel baskets must be commercially manufactured or designed and certified by a professional engineer.
- Suspended personnel baskets must be inspected prior to use.
- A secondary safety device must be attached between the basket and the hoist line above the hook assembly.
- Workers in the personnel basket must use fall protection equipment in accordance with ConocoPhillips' Fall Protection SOP.

## 9.0 Document Retention

Records must be retained in accordance with ConocoPhillips' Document Retention Schedule.

Record	Owner	Classification	Retention
Inspection Records	Operations	EF04	Disposition of Equipment + 10 years
Log books	Operations	EF05	10 years
Training Records	Operations	HR06	Termination of employment + 7 years
Critical Lift Plans	Operations	HE11	2 years

## Appendix A – Definitions

Terms that are important to understanding the HSE Management System are defined below:

<b>Competent Operator (Saskatchewan Only)</b>	A worker successfully completing a training program meeting the requirements of the Occupational Health and Safety regulations.
<b>Hoists</b>	Equipment designed to lift and lower loads.
<b>Lifting Devices</b>	All equipment, including hoists and cranes that are designed to lift loads, lower loads and move loads horizontally.
<b>Maximum Load Rating</b>	Is the maximum weight that a piece of rigging is authorized by the manufacturer or a professional engineer to support. It is also known by a variety of other terms such as working load limit (WLL), safe working load (SWL), rated load value, resultant safe working load, rated capacity and maximum working load.
<b>Mobile Crane</b>	A crane mounted on a crawler tractor, truck or similar carrier that can move freely under the crane's own power, without being restricted, to a predetermined path.
<b>Overhead Travelling Crane</b>	A crane on parallel elevated runways and consisting of one or more trolleys operating from a bridge. Operation of the travelling crane is limited to the area between the runways. This includes bridge, jib, monorail and gantry cranes.
<b>Qualified Operator (Saskatchewan Only)</b>	The holder of a journeyman's certificate in the crane and hoist operator trade, holder of a proficiency certificate in a sub trade of the crane and hoist operator trade, or an apprentice working under the direct supervision of a journeyman or certificate holder.
<b>Rigging</b>	Any combination of rope, wire rope, cable, chain, sling, sheave, hook and associated fittings used in hoisting operations.
<b>Tower Crane</b>	Crane mounted on a tower that can rotate on the axis of the tower.

## Appendix B – Overhead Travelling Crane Inspection

### Initial Inspection

- a) Must be conducted by qualified crane inspector or professional engineer for all new, re-installed, modified or rebuilt lifting devices.

### Operational/Visual Inspection

- a) May be conducted by the operator or designate.
- b) Shall be recorded in the log book.
- c) Inspection shall identify defects, malfunctions and damage.
- d) A sample of the items to be inspected shall include, but is not limited to:
  - all functions are operational
  - systems are free of leaks
  - components are not deformed, worn or cracked
  - limit devices and brakes are functional
  - certification labels are properly attached and legible
  - labels on operator controls are present and legible
- e) Equipment shall be tagged “Out of Service” or cut up if defects are found.
- f) Defects from this inspection shall be corrected prior to use.

### Periodic Inspections

- a) Shall be conducted by a crane inspector.
- b) Shall be recorded in the log book.
- c) Shall confirm that verification of the supporting structure is suitable for the maximum rated load. Verification shall be in the form of a report or drawing bearing the stamp and signature of a professional engineer.
- d) Inspection shall identify defects, malfunctions, damage and wear in accordance with CSA B167 Clause 4.4.5.3
- e) Equipment shall be tagged “out of service” if defects are found.
- f) Defects from this inspection shall be corrected prior to use.

## Appendix C – Mobile Crane and Lifting Device Inspections

### Daily inspections

Daily inspections must include, but not be limited to, the following:

- a) all rope reeving, including load lines, jib suspension, boom hoist and mid-point suspension;
- b) all control mechanisms for incorrect and/or malfunctions interfering with proper operation;
- c) all control mechanisms for excessive wear of components and contamination by lubricants or other foreign matter;
- d) all safety devices;
- e) all air, hydraulic, lubricating and cooling systems for deterioration or leakage;
- f) electrical apparatus for malfunction, signs of excessive deterioration, dirt, icing and/or moisture accumulation;
- g) all hydraulic hoses;
- h) hooks and latches for deformation, chemical and heat damage, cracks and wear;
- i) hydraulic system for proper oil level;
- j) swivels for freedom of rotation;
- k) clutches, brakes and attachments for malfunction;
- l) outriggers and outrigger boxes;
- m) tires.

### Periodic inspections

Periodic inspections must include, but not be limited to, the following:

- a) all daily inspection items;
- b) deformed or corroded and cracked members or welds in the crane structure or boom;
- c) loose bolts, nuts, pins;
- d) cracked, worn or distorted parts such as pins, gears, rollers and locking devices;
- e) wear on brake and clutch system parts such as linings;
- f) pawls and ratchets;
- g) load, boom angle and other indicators;
- h) all power plants;
- i) hooks;
- j) all control mechanisms for excessive wear and contamination;
- k) travel steering and braking systems for malfunction;
- l) worn or damaged tires and crawler undercarriage;
- m) hoses, fittings and tubing for leakage, blistering, deformation, tight joints, excessive abrasion or scrubbing;
- n) hydraulic and pneumatic pumps and motors for loose bolts, fasteners, leaks, shaft seal leaks, unusual noises or vibration, loss of operating speed, excessive heating or loss of pressure;

- o) valves for cracks, leaks, sticking or failure;
- p) cylinders for leaking, seals, welded joints, scored, nicked, dented rods, dented case, loose, deformed rod eyes and joints;
- q) filters; and
- r) windows, horn, wipers, heater, defroster, lights, gauges, transmissions, differential, cooling, fuel, electrical system, drive belts, suspension, steering, brake systems, crawler chain, tracks, sprockets and rollers.

### **Annual inspection**

An annual inspection must be performed by a qualified person and supervised by a professional engineer. Annual inspections must include, but are not be limited to, the following:

- a) all daily and periodic inspection items including test load, if specified by the manufacturer;
- b) outrigger and outrigger boxes;
- c) rotating frame and bearing including main baseplate welds;
- d) steering knuckles;
- e) boom foot section and lattice boom;
- f) boom head;
- g) boom hoist;
- h) boom sections including sheaves, hooks, blocks and wedge sockets;
- i) teardown inspection and lubrication of the swivel hook and block assembly at least every five years; and
- j) hooknut disassembled and inspected for corrosion and wear.

**Appendix D – Revision Record**

Page#	March 11, 2014	Previous Information	Risk Assessment
ALL	Complete document re-write	Various	Legislation and CSA standard review.