

STANDARD OPERATING PROCEDURE

**Hoisting Large Components
Using Cranes, Boom Trucks, or Equipment**

Document Number: 960C-SOP-402

Original Approval Date: Nov 30, 2009

Revision Number: 2

Page 1 of 8

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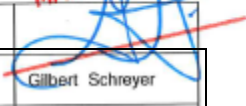
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HOISTING LARGE COMPONENTS USING CRANES, BOOM TRUCKS, OR EQUIPMENT

Gilbert Schreyer
MAR 03 2022

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|--|----------------------------------|-------------------------------|
| Hoisting Large Components Using Cranes, Boom Trucks, or Equipment | | Document Number: 960C-SOP-402 |
| Original Approval Date: Nov 30, 2009 | Revision Number: 2 | Page 2 of 8 |
| Latest Revision Date: Mar 02, 2022 | Next Revision Date: Mar 02, 2025 | Document Approval Level: 4 |

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The following is a step by step procedure on how to complete a specific task or meet a facility specific requirement. Standard Operating Procedures (SOPs) are written for all identified critical tasks. By virtue of the hazard or complexity associated with critical tasks it is paramount that the SOP be followed as written. SOPs contain a listing of high-level hazards associated with the task, for detailed hazard analysis reference the applicable Task Hazard Assessments. SOPs do not replace the requirements contained in the company Standards, Codes, and Processes nor does it replace the need to comply with required legislation. Section 8.0 references documentation that the worker shall understand before work commences.

1.0 PURPOSE

- To establish a company standard to safely and effectively carry out work as it applies to the safe operation of cranes, boom trucks, excavators or loaders when hoisting large components.

2.0 SCOPE AND APPLICATION

- This document applies to all company Heavy Construction Mining operations. Ensure all site-specific requirements are being met or exceeded before performing the task.

3.0 HAZARDS AND CONTROLS

- Pinching, crushing and line of fire hazards.
 - Ensure everyone involved in the task is aware of the pinching, crushing and line of fire hazards which can include but is not limited to loads falling, rigging breaking and assembling rigging.
 - Wear gloves while handling rigging. Do not put fingers or hands in between cables and lifting points or lugs.
 - Never stand or pass underneath or between a suspended load whether the load is moving or stationary. Do not pass loads over workers or other personnel.
 - Ensure operators and ground personnel are equipped with visual or auditory means of communicating with each other.
 - Tagline(s) must be used to control suspended loads.
 - The load must be carried as close to the ground as possible and should be close to the lifting device.
 - If the lifting device has a boom the boom should be as high as possible while still ensuring the load does not swing.
 - A warning must be sounded when hoisting is about to commence, or the entire crane is about to be set in motion.
- Rigging or equipment failure.
 - Prior to the lift, a competent rigger must inspect rigging equipment for damages and defects.
 - Make sure all rigging, including shackles, hooks and slings are rated and/or exceed the lifting capacity required for the load to be lifted.
 - All personnel will maintain an adequate safe distance from suspended loads. No worker shall stand or pass under a suspended load.

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| | | |
|--|----------------------------------|-------------------------------|
| Hoisting Large Components Using Cranes, Boom Trucks, or Equipment | | Document Number: 960C-SOP-402 |
| Original Approval Date: Nov 30, 2009 | Revision Number: 2 | Page 3 of 8 |
| Latest Revision Date: Mar 02, 2022 | Next Revision Date: Mar 02, 2025 | Document Approval Level: 4 |

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- The perimeter of the work area (exclusion zone) is to be closed off with barricade tape and tagged to prevent unauthorized personnel from entering.
- Use only approved lifting points and lifting eyes. When using lifting eyes on equipment, inspect before use. Ensure they have been approved by the manufacturer or an engineer as a lifting point.
- All load bearing components of cranes must have an annual certification via nondestructive testing.
- All equipment used for lifting must be equipped with load charts. Operators must be competent in the use of the load charts. All information necessary to determine the weight of the load must be provided.
- Only competent personnel may operate cranes and equipment as well as setup rigging.
- Ensure all cranes, including boom trucks, have an anti-two block device, as well as a positive boom stop and boom stop limit device if there is a potential for the boom to fall over backward.
- Poor communication leading to unstable lift and shifting load.
 - Develop and review a communication plan before the lift. Ensure all personnel understand the hand signals being used (if required).
 - Ensure all personnel involved have adequate communication and that communication is verified before the lift.
 - Designate a primary spotter with clear view of the load and clear communication with the crane or equipment operator.
 - Crane or equipment operator will take signals only from the primary spotter unless an emergency stop signal is provided.
- Lift failure while hoisting / raising heavy equipment with crane or equipment.
 - Inspect equipment, crane and rigging before use. Do not use defective or damaged equipment or rigging.
 - Verify all weights and specifications of equipment being lifted. Confirm the crane, rigging parts, and configuration are rated and/or exceeds the lifting capacity required for the load to be lifted.
 - Verify equipment is clean of all material.
 - Lift equipment at approved lifting points.
 - Do not pull on an angle or drag materials with the crane.
 - The crane or equipment operator will not leave the controls when there is a suspended load.
 - The hoist rope shall:
 - not be wrapped around the load;
 - not be kinked;
 - not be twisted around each other when there are multi-part lines;
 - be over the centre of gravity of the load to prevent swinging and side-loading.
- Contact with overhead hazards and powerlines.
 - Confirm there are no overhead hazards or powerlines in the lift area.
 - If a lift is required near a powerline an additional formal hazard assessment and encroachment permit must be completed. Contact the power authority to isolate powerlines.
 - Designate a spotter to monitor the equipment / crane proximity to the overhead hazard or powerline.

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| | | |
|--|----------------------------------|-------------------------------|
| Hoisting Large Components Using Cranes, Boom Trucks, or Equipment | | Document Number: 960C-SOP-402 |
| Original Approval Date: Nov 30, 2009 | Revision Number: 2 | Page 4 of 8 |
| Latest Revision Date: Mar 02, 2022 | Next Revision Date: Mar 02, 2025 | Document Approval Level: 4 |

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- Uncontrolled or unintended movement of crane, equipment or load.
 - Only competent operators may operate lifting devices. All lifts will be done in smooth and controlled manner.
 - Ensure the lift area and swing area are free of obstructions.
 - Never exceed the machines lifting capabilities, refer to load charts in the crane or equipment. (If required refer to Critical Lift criteria.)
 - Only use equipment rated for the weight of the load.
 - To reduce the likelihood of a suspended load swinging or moving uncontrollably the hoisting line must be positioned over the load's center of gravity.
 - Ensure lifting equipment is on stable ground prior to executing any lift.
 - Ensure lifting equipment has adequate traction for the ground conditions.
 - Outriggers must be fully extended and set on load bearing floats or pads that are adequate size, strength and rigidity.
 - Cranes must be level.
 - Ground personnel must maintain a safe distance from any suspended load. An exclusion zone may be used to prevent workers from entering the lift area. Ensure workers are aware of lifting operations.

4.0 CHECKLIST

- Attend all preparatory meetings (IE: daily PSI; job scope; review of JSA's and SOP's for the job).
- Complete FLRA cards before starting the work.
- Ensure all personnel involved in the task are aware of the hazards and the controls to be used, as identified in the SOP's; JSA's; and FLRA's
- Conduct a pre-job inspection of all equipment to be worked on and tools to be used.
- Standard of Training required for working on this job: On-the job training.**

5.0 DEFINITIONS

5.1 Company

Means North American Construction Group Ltd. (NACG) and all directly or indirectly owned subsidiary companies, including joint ventures.

5.2 Company Personnel

Includes the Company's employees, officers, directors, agents, associates, consultants/contractors, temporary employees and third-party processors.

5.3 HSE

Refers to the Health, Safety & Environment department

5.4 Exclusion Zone

Restricted area that prevents access to personnel.

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| | | |
|--|----------------------------------|-------------------------------|
| Hoisting Large Components Using Cranes, Boom Trucks, or Equipment | | Document Number: 960C-SOP-402 |
| Original Approval Date: Nov 30, 2009 | Revision Number: 2 | Page 5 of 8 |
| Latest Revision Date: Mar 02, 2022 | Next Revision Date: Mar 02, 2025 | Document Approval Level: 4 |

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5.5 Anti-Two Block Device

A device attached to a crane which prevents the lower load block or hook assembly from contacting the upper load block or boom point.

5.6 Critical Lift Criteria

Certain hoisting or lifting operation's, are recognized as having increased levels of risk to personnel or property. Certain criteria as determined by the company may categorize a lift as "Critical". A lift that exceeds the rated capacity of the lifting device, lifts that require the use of two cranes simultaneously, and other criteria found in 950C-C-008 – Cranes, Hoists and Rigging Code could deem a lift critical. Lifting or hoisting operations meeting any of these criteria shall have a lift plan tailored to each operation to manage varying conditions or hazards. Refer to 950C-C-008 for specifications.

6.0 PROCEDURE

- 1) Review 950C-C-008 - Cranes, Hoists and Rigging Code Critical Lift Criteria. If the lift meets any of the criteria the specifications outlined therein must be followed.
- 2) Review 962C-SOP-027 Lifting with Excavators if using an excavator for lifting activities.
- 3) Complete a hazard assessment prior to all lifting operations. Identify hazards and the controls to be utilized. Communicate the findings to all personnel involved in the lifting operation.
- 4) Confirm all lifting equipment has current annual inspection.
- 5) Confirm the equipment to be used for the lift is rated and recommended by the manufacturer for the size, weight and type of lift to be executed.
- 6) Confirm there is no overhead hazards or powerlines.
- 7) Complete an inspection of all equipment and rigging. Remove from service and tagout any defective or damaged equipment and rigging. Notify supervisor.
- 8) Establish an exclusion zone to prevent access to unauthorized personnel.
- 9) Position the lifting equipment as close to the load as practical. Ensure the lifting equipment is on stable level ground. Utilize all safety and stability features of the equipment such as outriggers.
- 10) Rig the components using rigging that is rated and recommended for the lift.
- 11) Identify spotters and the primary spotter. Review signal requirements and communication methods.
- 12) Designate personnel to control the tagline(s).
- 13) Ensure tagline(s) are securely attached to the load.
- 14) Centre the lifting hook over the load and centre of gravity of the component being lifted.
- 15) Connect all rigging.
- 16) Ensure all personnel are clear of the load before initiating the lift.
- 17) When safe to do so, execute the lift.
- 18) If any of the conditions pertaining to a safe lift are deemed unsafe the operator must cease operations until the condition is made safe.

6.1 Walking Cranes or Equipment Carrying Loads (General Requirements)

- 1) A hazard assessment specific to the task of walking the crane or equipment will be completed by all persons involved in the move.
- 2) If an operator has reason to believe that the equipment or a load is hazardous, they must stop and immediately correct the problem and/or report it to their supervisor.

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| | | |
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- 3) Secure any loose materials that may be in the crane cab (i.e. grease tubes, spray cans, etc.) that may interfere with the movement of controls and pedals.
- 4) Ensure that there are no loose materials on the crane prior to movement.
- 5) The supervisor and operator will ensure the safety of the surrounding area (utilities, stability, and other contractors/equipment).
- 6) The support surfaces must be verified (i.e. docks, ramps, etc.).
- 7) Mobile equipment is not to be moved under any circumstances without being given direction from ground personnel (signaler) and they must ensure all movements are visually checked before equipment moves. Where cranes are traveling in reverse, a spotter must be used, and remain in the clear view of the signaler. If working in congested areas, additional spotters may be required at the rear of the crane to ensure adequate clearances are maintained.
- 8) Ensure mirrors are clean and adjusted.
- 9) An effective and functioning audible warning device (back up alarm) must be present.
- 10) While turning the crane, the signaler must ensure clearance prior to rotating or turning the crane.
- 11) Where traveling with a suspended load, the operator must keep the load as close to the ground or grade as possible and rigged to control load swing. All crew members must be aware of the crane traveling with a suspended load and maintain a safe distance. Traveling with suspended loads must be within load chart ratings.

7.0 NOTES

If this task is to be done by a method different than described in this SOP, the work must **STOP** and the alternate method must be **DOCUMENTED** with an adequate hazard assessment tool such as a JSA. The document must be **APPROVED** by a supervisor before such procedures are implemented.

8.0 REFERENCES

- Alberta Occupational Health and Safety Act, Regulation and Code – Part 6 Cranes, Hoists and Lifting Devices
- 950C-C-008 - Cranes, Hoists and Rigging Code
- 960C-SOP-004 - Flagging, Tagging and Barricading Hazardous Areas
- 962C-SOP-008 - Signaling Equipment
- 962C-SOP-009 - Manual Lifting and Carrying Heavy Objects
- 962C-SOP-027 - Lifting with Excavators
- 950C-C-028 - Hazardous Energy Isolation Code

9.0 APPENDICES

- Appendix A – Common Hand Signals for Lifting

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Page 7 of 8

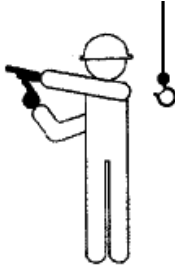
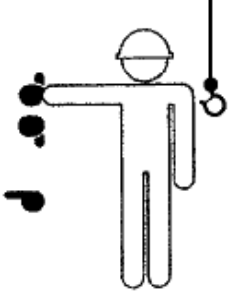

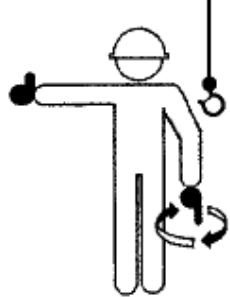
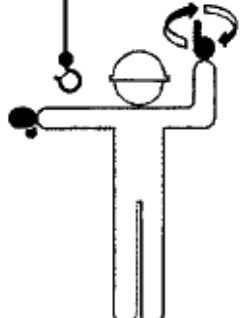
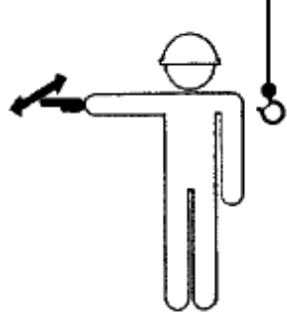
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Appendix A Common Hand Signals for Lifting

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|  <p>Move Slowly Use one hand to give any motion signal and place the other hand motionless in front of the hand giving the motion signal.</p> |  <p>Raise Boom Arm extended, fingers closed, thumb pointing upward.</p> <p>Lower Boom, Arm extended, fingers closed, thumb pointing downward</p> <p>Swing Boom Point with a finger in direction of swing of a boom</p> |  <p>Dog Everything: Clasp hands in front of the body. Means PAUSE.</p> <p>This signal can be used on potentially risky occasions such as when it has started raining, when the load doesn't fit the space for which it was planned, or when a bystander gets too close to the action.</p> |
|  <p>Raise Boom and Lower Load Arm extended, fingers closed, thumb pointing upward, other arm bent slightly with forefinger pointing down and rotate hand in horizontal circles.</p> |  <p>Lower Boom and Raise Load Arm extended, fingers closed, thumb pointing downward, other arm with forearm vertical, forefinger pointing upward and rotate the hand in horizontal circles.</p> |  <p>Emergency Stop Arm extended, palm down, move the hand rapidly right and left.</p> |

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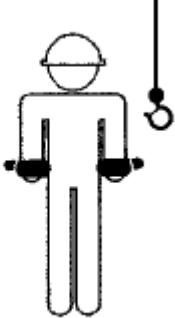
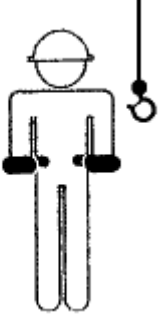
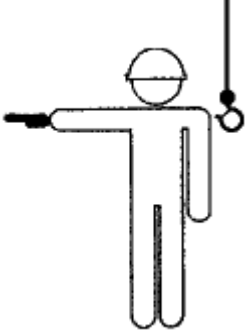

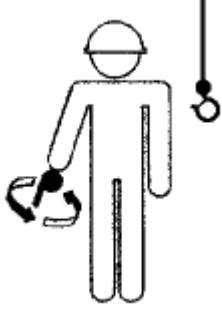
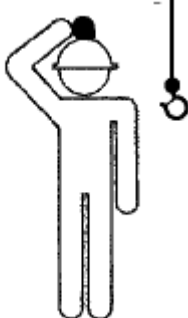
Page 8 of 8

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|---|--|---|
|  <p>Extend Boom Both fists in front of body with thumbs pointing outward.</p> |  <p>Retract Boom Both fists in front of body with thumbs pointing toward each other.</p> |  <p>Stop Arm extended, palm down, hold the position rigidly</p> |
|  <p>Hoist the Load</p> |  <p>Lower the Load</p> |  <p>Use Main Hoist</p> |