

STANDARD OPERATING PROCEDURE

CRANE OPERATION - SHOP BRIDGE & JIB CRANE

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Page 1 of 11

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FEB 24 2022

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CRANE OPERATION - SHOP BRIDGE & JIB CRANE		Document Number: 960C-SOP-403
Original Approval Date: OCT 10, 2012	Revision Number: 3	Page 2 of 11
Latest Revision Date: FEB 22, 2022	Next Revision Date: FEB 22, 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 operating shop bridge and jib type cranes.

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

- Overhead crane(s) failing and/or malfunctioning due to improper inspection and/or use:
 - Overhead crane(s) will only be operated by designated personnel or by trainees under the direct supervision of a designated person. Always operate the crane(s) within manufacturer's specifications.
 - Competent and qualified workers will conduct inspections on the crane(s) to ensure the equipment is in safe operating condition, all inspections will be documented.
 - Overhead crane(s) must be inspected on an annual, periodic, and pre use frequency. Annual inspections will be completed by a competent third-party engineering company and/or equipment manufacturer. Frequency of inspections may increase depending on crane use.
 - Do not operate the overhead crane(s) if it is found to be defective and/or damaged. The operator will lock/tag out, and report to the supervisor.
 - Do not block, adjust, or disconnect limit switches.
- Overloading the crane resulting in catastrophic failure:
 - Know the weights of components/parts to be lifted and/or suspended, always refer to OEM procedures for component/part information.
 - Read and understand the manufactures manual. Know, and understand the capacity limits of the overhead cranes. Never exceed the cranes marked safe working limits (SWL).
 - Do not shock load the crane. If you suspect the crane or its components have been shock loaded, it must be removed from service, inspected by a qualified person and re-certified for lifting.

STANDARD OPERATING PROCEDURE

CRANE OPERATION - SHOP BRIDGE & JIB CRANE

Document Number: 960C-SOP-403

Original Approval Date: OCT 10, 2012

Revision Number: 3

Page 3 of 11

Latest Revision Date: FEB 22, 2022

Next Revision Date: FEB 22, 2025

Document Approval Level: 4

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- Unsecure rigging and rigging failure resulting in personal injury and/or property damage:
 - Thoroughly inspect all rigging components prior to use (e.g. lifting eyes, shackles, slings, and cables, etc.).
 - Ensure all rigging, including shackles, hooks and slings are rated and/or exceed the lifting capacity required for the load to be lifted. Use softeners over sharp edges and as needed.
 - Secure unused sling legs to the hook. Do not drag slings or leave loose materials on a load being hoisted.
 - Place the sling eye onto the hoisting hook and ensure the safety latch is closed. Do not load the hook tip or hammer a sling into place.
- Crushing, line of fire and pinch point hazards (striking people, objects, machines, or structures while maneuvering and making lifts):
 - Workers must inspect the travel path/area and remove all debris, unnecessary tools, and parts from the immediate work area prior to crane use. Only make the lift if there is adequate space to maneuver the load safely.
 - Do not side load Position the hook directly over the center of gravity so that the line of pull is vertical.
 - Use spotters in congested areas.
 - Flagging and tagging should be used to identify the lifting area. Workers are responsible to ensure the flagging/tagging remain in place while the hazards are still present. Refer to 960C-SOP-004-FlaggingTagging and Barricading Hazardous Areas.
 - Do not work under suspended loads; Keep fingers, hands, and limbs away from pinch points and line of fire hazards.
 - Do not pass/carry loads over people. Operators are responsible to clear the area prior to making the lift.
 - Tagline(s) will be used when handling suspended loads. Tag lines can move suddenly, unexpectedly, and very forcefully. Always handle them with gloves. Never wrap a tag line around your wrist or forearm or in any other manner where you cannot instantly release your grip.
 - Never leave a suspended load unattended.
 - Ensure the load is stable prior to unhooking the rigging.
- Unclear communication resulting in personal injury and/or property damage:

STANDARD OPERATING PROCEDURE

CRANE OPERATION - SHOP BRIDGE & JIB CRANE		Document Number: 960C-SOP-403
Original Approval Date: OCT 10, 2012	Revision Number: 3	Page 4 of 11
Latest Revision Date: FEB 22, 2022	Next Revision Date: FEB 22, 2025	Document Approval Level: 4

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- Confirm method of communication (radio or hand signals). Discuss the signals prior to operating the overhead crane. Crane operators will not respond to unclear signals.
- Crane operator will STOP immediately if operator loses sight of primary spotter.
- Crane operators will only follow signals from primary spotter unless a STOP signal is issued.
- Follow 962C-SOP-008 - Signaling Equipment.
- Collision between two overhead bridge trolleys on the same rails/tracks:
 - The operator must check and confirm the direction of travel prior to moving the bridge trolley.
 - Overhead crane(s) operating on rails, tracks or trolleys will be equipped with a positive stop or limiting device, The purpose is to prevent the overhead crane(s) from overrunning its safe movement limits or contacting other cranes on the same rail, track, or trolley.

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: Overhead Crane Operator training; 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 Limiting Devices

- Motion detectors, proximity sensors, limit or travel switches, or other equally effective means.

STANDARD OPERATING PROCEDURE

CRANE OPERATION - SHOP BRIDGE & JIB CRANE

Document Number: 960C-SOP-403

Original Approval Date: OCT 10, 2012

Revision Number: 3

Page 5 of 11

Latest Revision Date: FEB 22, 2022

Next Revision Date: FEB 22, 2025

Document Approval Level: 4

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5.5 Line of fire Hazard

- Travel path of a moving object or the release of hazardous energy intersects with an individual's body. Three major categories of line of fire incidents are caught-in or between incidents, struck-by incidents, and released energy incidents.

5.6 Pinch Point

- Any point where it is possible for a body part to be caught between moving and stationary portions of equipment and/or load.

5.7 Shock Load

- A sudden application of force or release of load. Any shock load requires the lifting device to be removed from service and re-certified for further lifting applications.

5.8 Side pulling / Side Loading

- Side loading occurs whenever the center of gravity of a load is not located directly under the crane hoist. This condition can happen if an operator attempts to lift a load that is not properly centered or if a hoist applies a horizontal force to a load that is not already suspended.

5.9 Slewing

- The angular movement of a crane boom or crane jib in a horizontal plane.

6.0 PROCEDURE

6.1 General Information

- 1) Supervisors must ensure workers are competent and qualified to operate the overhead bridge or jib cranes.
- 2) Overhead crane(s) will only be operated by designated personnel or by trainees under the direct supervision of a designated person. Always operate the crane(s) within manufacturers specifications.
- 3) Conduct a pre-use inspection on overhead crane (overhead bridge or jib cranes), document the inspection in the logbook. If deficiencies and/or damage is found during the inspection, stop, tagout the crane and report it to the supervisor immediately. Only designated, trained, and qualified technicians will perform repairs and/or maintenance on overhead cranes.
 - a) Check operating controls,
 - b) Check that brake and clutches are functioning properly,
 - c) Ensure limit devise are operating correctly,
 - d) Ensure hoist lines are spooled correctly and sheaves are free,
 - e) Inspect wire rope for damage,
 - f) Inspect hooks and latches deformation and damage, cracks, and wear,
 - g) Inspect swivels for freedom of rotation.

6.2 Operating Overhead Bridge Crane(s)

- 1) Operators must be familiar with the overhead bridge crane operating controls.

STANDARD OPERATING PROCEDURE

CRANE OPERATION - SHOP BRIDGE & JIB CRANE		Document Number: 960C-SOP-403
Original Approval Date: OCT 10, 2012	Revision Number: 3	Page 6 of 11
Latest Revision Date: FEB 22, 2022	Next Revision Date: FEB 22, 2025	Document Approval Level: 4

*This document is not controlled if printed. *

- 2) Flag and tag area if required. Use effective communication with crew members on the shop floor.
- 3) Confirm the weight of the load, inspect rigging, and ensure it is adequate for the lift. Damaged and/or defective rigging must be removed from service and disposed of immediately. Use softeners over sharp edges and as needed.
- 4) Complete visual inspection of the travel path. Ensure all ground personnel are clear and there are no obstructions prior to moving the crane/load.
- 5) Position the hook directly over the center of gravity so that the line of pull is vertical.
- 6) Operate the overhead crane(s) at slow and controlled speed, avoid sudden stops and quick starts. The operator will not leave the controls while a load is suspended.
- 7) Use a spotter if required,
 - a) Confirm method of communication (radio or hand signals),
 - b) Discuss the signals prior to operating the overhead crane,
 - c) Crane operators will not respond to unclear signals,
 - d) Crane operator will STOP immediately if operator loses sight of primary spotter,
 - e) Crane operators will only follow signals from primary spotter unless a STOP signal is issued.
- 8) Tagline(s) will be used when handling suspended loads.
- 9) Ensure the load is stable prior to unhooking the rigging.
- 10) Ensure remote controls are turned off and placed in a non-congested, conspicuous area away from hazards when not in use.
- 11) Clean & organize the area, inspect all tools, rigging and material prior to placing back in the proper location. Report all items found with deficiencies. Ensure crane is positioned in the staging area with the hook in a raised position.

6.3 Jib Cranes

- 1) Operators must be familiar with the crane(s) operating controls.
- 2) Complete visual inspection of the swing area of the jib crane. Ensure all ground personnel are clear and there are no obstructions prior to moving the jib crane/load.
- 3) Confirm the weight of the load, inspect rigging, and ensure it is adequate for the lift. Damaged and/or defective rigging must be removed from service and disposed of immediately. Use softeners over sharp edges and as needed.
- 4) Position the jib arm so that the jib crane hook is directly over the center of the load.
- 5) Operate the jib crane(s) at slow and controlled speed, avoid sudden stops and quick starts.

STANDARD OPERATING PROCEDURE

CRANE OPERATION - SHOP BRIDGE & JIB CRANE		Document Number: 960C-SOP-403
Original Approval Date: OCT 10, 2012	Revision Number: 3	Page 7 of 11
Latest Revision Date: FEB 22, 2022	Next Revision Date: FEB 22, 2025	Document Approval Level: 4

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- 6) Ensure the load is stable prior to unhooking the rigging.
- 7) Clean & organize the area, inspect all tools, rigging and material prior to placing back in the proper location. Report all items found with deficiencies. Ensure jib crane is positioned in the staging area with the hook raised to the top of the hoist.

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.
- For any load reaching or exceeding 75% of a crane(s) rated capacity, lift calculations will be completed by a competent person so that relevant and applicable factors have been considered and calculated. Review 950C-C-008 Cranes Hoists and Rigging Code for more detail.
- When two or more cranes/hooks are used to lift one load, a lift plan and/or JSA will be developed to detail the operation and lift sequence. (refer to 950C-C-008 Cranes Hoists and Rigging Code).

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
- 950C-C-022 - General Housekeeping Code
- 950C-C-049 - PPE - General Code
- 960C-SOP-004 - Flagging, Tagging and Barricading Hazardous areas
- 960C-SOP-022 Dropped Object Prevention
- 962C-SOP-008 - Signaling Equipment
- 999C-F-032 - Overhead Crane Inspection
- 999C-F-033-R2 Lift Plan Calculations - Critical Lift - Overhead Cranes

9.0 APPENDICES

- Appendix A – Common Hand Signals for Controlling Overhead Bridge Cranes
- Appendix B – Example of Overhead Bridge & Jib Cranes

STANDARD OPERATING PROCEDURE

CRANE OPERATION - SHOP BRIDGE & JIB CRANE

Document Number: 960C-SOP-403

Original Approval Date: OCT 10, 2012

Revision Number: 3

Page 8 of 11

Latest Revision Date: FEB 22, 2022

Next Revision Date: FEB 22, 2025

Document Approval Level: 4

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Appendix A Common Hand Signals for Controlling Overhead Bridge Cranes

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Revision Number: 3

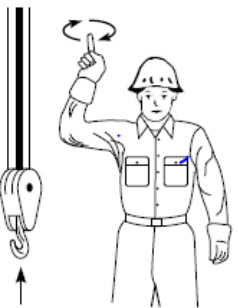
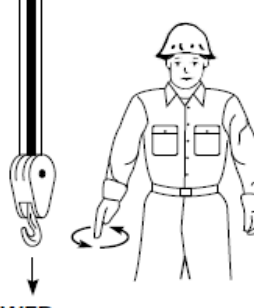
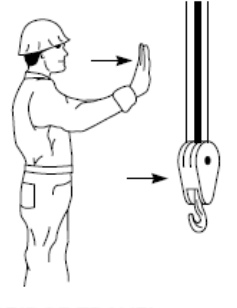


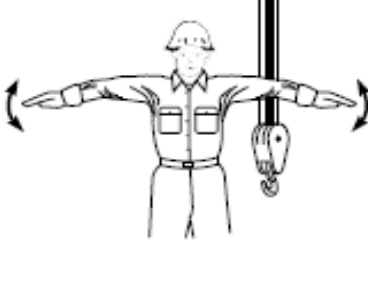
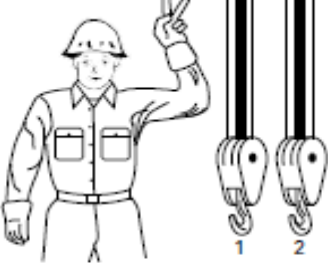

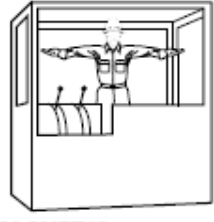
Page 9 of 11

Latest Revision Date: FEB 22, 2022

Next Revision Date: FEB 22, 2025

Document Approval Level: 4

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 <p>HOIST. With forearm vertical, forefinger pointing up, move hand in small horizontal circle.</p>	 <p>LOWER. With arm extended downward, forefinger pointing down, move hand in small horizontal circle.</p>	 <p>BRIDGE TRAVEL. Arm extended forward, hand open and slightly raised, make pushing motion in direction of travel.</p>
 <p>TROLLEY TRAVEL. Palm up, fingers closed, thumb pointing in direction of motion, jerk hand horizontally.</p>	 <p>STOP. Arm extended, palm down, move arm back and forth horizontally.</p>	 <p>EMERGENCY STOP. Both arms extended, palms down, move arms back and forth horizontally.</p>
 <p>MULTIPLE TROLLEYS. Hold up one finger for block marked "1" and two fingers for block marked "2". Regular signals follow.</p>	 <p>MOVE SLOWLY. Use one hand to give any motion signal and place other hand motionless in front of hand giving the motion signal. (Hoist slowly shown as example.)</p>	 <p>MAGNET IS DISCONNECTED. Crane operator spreads both hands apart — palms up.</p>

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CRANE OPERATION - SHOP BRIDGE & JIB CRANE		Document Number: 960C-SOP-403
Original Approval Date: OCT 10, 2012	Revision Number: 3	Page 10 of 11
Latest Revision Date: FEB 22, 2022	Next Revision Date: FEB 22, 2025	Document Approval Level: 4

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Appendix B Example of Overhead Bridge & Jib Cranes

STANDARD OPERATING PROCEDURE

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Original Approval Date: OCT 10, 2012

Revision Number: 3

Page 11 of 11

Latest Revision Date: FEB 22, 2022

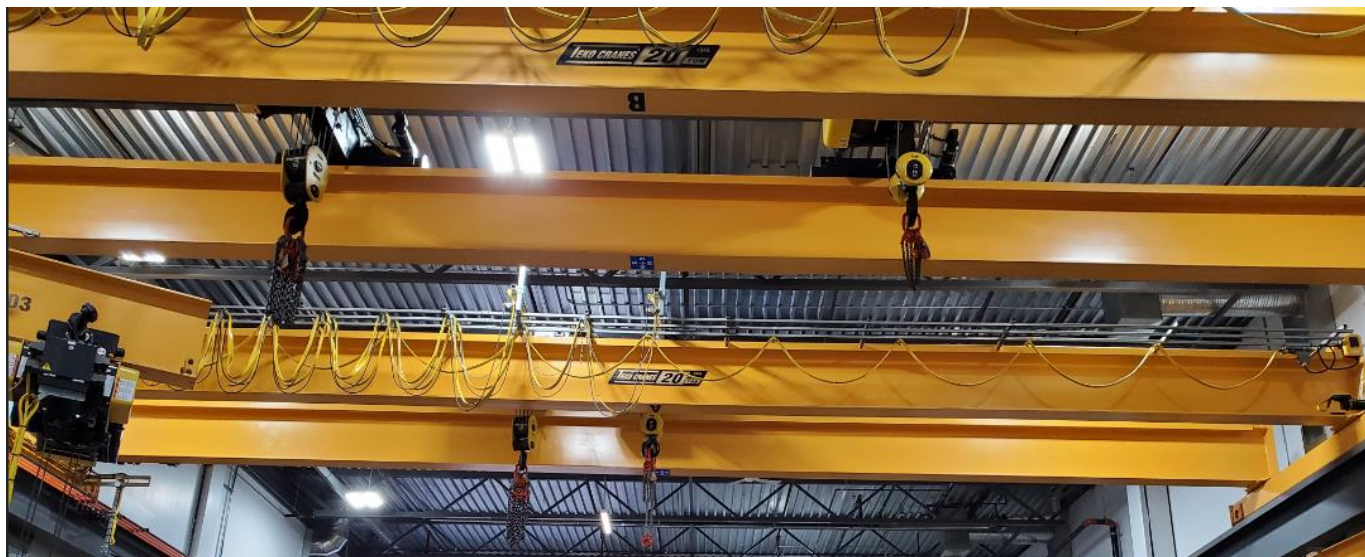
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Jib Crane



Overhead Bridge Crane