

## 1.0 INTRODUCTION

This standard defines the procedures and controls for Rigging and Lifting in a manner that complies with New Brunswick Regulation 91-191 under the Occupational Health and Safety Act and relevant codes and requirements for the Province of New Brunswick.

## 2.0 SCOPE

This document applies to all personnel performing rigging and lifting operations on behalf of NB Power.

Cranes and hoisting apparatus include overhead and mobile cranes, gantry cranes, monorails, jibs, and hoists. Will be covered by a new crane document\*\*\*

## 3.0 REFERENCES

NB OHS Regulation 91-191	New Brunswick Occupational Health and Safety Regulation 91-191 Part XV: Material Handling Equipment and Personnel Carrying Equipment
CSA B167-16	Overhead Cranes, gantry cranes, monorails, hoists, and jib cranes
CSA Z150-98	Safety Code on Mobile Cranes
ASME B30	Safety Standard for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings
NB Power Corporate Safety Manual	Hoisting and Rigging Ropes, Slings, and Chains Cranes, Derricks, Mobile Hoisting Equipment and Aerial Devices (including those with hoisting capabilities)
Rigging Handbook	The complete pocket field reference

## 4.0 FORMS

1372	Critical Lift Plan (located on the Hard Hat Site)
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## 5.0 TERMS AND DEFINITIONS

Competent Person	A person who is qualified, based on knowledge, training and experience, to do the work assigned in a manner that will ensure the health and safety of persons
Below-the-hook Lifting Device	Below-the-hook lifting devices are devices that are used for attaching loads to the hoist (examples: spreader or lifting beams, pallet lifters, plate clamps). The devices may contain components such as slings, hooks, rigging equipment, and lifting attachments.
Critical Lift	A critical lift is any lift that has been designated a critical lift using the criteria in Form 1372 Critical Lift Plan. See <i>Appendix B Section 1: Critical Lift Plan</i> for an example. Or covered in a standard operating procedure (work method)

Critical Lift Plan	A critical lift plan is a documented plan or procedure that describes controls and requirements that will help ensure that the critical lift is performed safely. The level of detail in the critical lift plan should reflect the complexity of the lift. Use form 1372 Critical Lift Plan.
Lift Coordinator	A competent rigger appointed to support the coordination of a critical lift.
Load	A load is anything below the hook, including any below-the-hook lifting devices such as spreader beams, pallet lifters, and material handling baskets.
Load Drop Zone	A Load Drop Zone is the area below a suspended load that presents a high risk to personnel safety if the load drops while they are in that area.  The edge of the Load Drop Zone must be a distance from the load that is equal to the height of the load from the floor or 10 feet, whichever is less, plus the height of the load.  Horizontal pulls will create “line of fire” hazards so additional barricades are required when applying horizontal forces
Load Hold	A Load Hold consists of hoisting the load approximately 1 inch off its support and stopping long enough to check that the: <ul style="list-style-type: none"> <li>• load is level and secure over center of gravity (load stability)</li> <li>• rigging is proper and adequate</li> <li>• Sling loading is even for all legs</li> <li>• load brake on the hoisting apparatus is working.</li> </ul> A Load Hold that confirms all four items listed above is required for all lifts. For critical lifts, a 1 to 2 minute Load Hold is recommended; however, the Lift Coordinator may specify a longer Load Hold depending on the complexity and criticality of the lift.
Competent Rigger	Any person performing rigging and lifting must be able to prove competency through up-to-date training records and/or competency assessment.
Competent Signal Person	A competent Signal Person is an assigned individual who is a competent Rigger.
Rigging Equipment	Rigging equipment is any device used to attach a load to a crane or hoisting apparatus ( <i>examples</i> : slings, shackles, eyebolts, lifting lugs, special lifting devices or tools used for specific jobs).
Safe Lift Zone	A safe lift zone is the area established outside the Load Drop Zone that is occupied by personnel involved in the lift. Personnel not involved in the lift are not permitted within this area. A safe lift zone must be established for all lifts and must be barricaded and

	sign-posted or tagged. For areas where it is not feasible to use barrier tape, a sentry must be in place to prevent unauthorized access at all possible entry points.
Sentry	A person stationed to prevent the passage of personnel within a defined area. E.g. Safe Lift Zone
Suspended Load	A load is considered to be suspended when the rigging equipment is under tension even if there is still contact between the load and the floor or ground.
Tag Line	Tag lines are ropes attached to a suspended load to control, spin and rotate the load from a safe distance.

## 6.0 **ROLES AND RESPONSIBILITIES**

### 6.1 **Employer**

- Take every reasonable precaution to ensure health and safety on your worksite
- Comply with legislation as documented in NBP Health & Safety Management System
- Ensure employees understand and comply with safety (legislation and internal processes)
- Maintain equipment and use it as recommended by the manufacture
- Advise and control hazards (eliminate, substitute or control)
- Provide training and supervision
- Provide PPE
- Conduct workplace inspections and field visits
- Report accidents and investigate causes
- Cooperate with WorksafeNB, Total H&S, JHSC

### 6.2 **Supervisor**

- ensure rigging and lifting equipment inspections are performed as per NB Power and Provincial Regulations
  - have equipment repaired as required
  - assign a lift coordinator as required
  - ensure a tailboard conference/pre-job brief is performed with all personnel involved with a lift.
  - Ensure employees are competent in the tasks they are asked to perform.
  - The supervisor could be any of the roles outline below (Competent Rigger, Lift Coordinator, Competent Signal Person or Sentry).
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## 6.3 Competent Rigger

- Perform assessment of the lift to determine if the lift is critical and a lift plan must be documented
- perform rigging in accordance with this document, their training and the Rigging Handbook
- plan the lift (calculation of weight, center of gravity) and select the appropriate rigging equipment which are all clearly labelled for capacities including monorails.
- prepare and review critical lift plans as required
- inspect the rigging equipment before and after use (Annual and before use)
- verify that rigging equipment and attachments are properly applied to the load and secured to the hooks of the hoisting apparatus
- ensure all rigging aspects are accounted for (hitch selection, angle of choke, D/d ratios, angle of loading, drift and block loading, share of load, etc.)
- ensure that the rigging is protected from potential damage (example: use softeners when slings may be damaged by edges, corners, or abrasive surfaces)
- attach tag lines to the load, as required
- barricade, sign-post and tag the lift zone in accordance with Health & Safety Standard on Barrier Tape or site specific procedure where that procedure meets or exceeds the H&S Standard.
- monitor the rigging equipment during the lift for any signs of failure or damage.

## 6.4 Lift Coordinator

- review and approve Critical Lift Plans
- ensure the safe execution of a critical lift
- provide oversight during a critical lift
- determine the Safe Lift Zone to be used for the lift and determine the area to be evacuated, including lower elevations and structures as required
- ensure that all personnel have been evacuated from the Safe Lift Zone
- ensure that the Safe Lift Zone is established, barricaded and sign-posted or tagged in accordance with Health & Safety Standard on Barrier Tape or site specific procedure where that procedure meets or exceeds the H&S Standard, as identified in the Critical Lift Plan.

## 6.5 Competent Signal Person

- the competent rigger can perform this duty however if line of sight is a challenge and additional competent rigger may need to be dedicated to giving signals
  - must be readily identifiable and clearly visible (a designated hi-vis vest must be worn)
  - direct the movement of a load when the Crane Operator's vision is restricted
  - verify that rigging equipment and attachments are properly applied to the load and secured to the hooks of the hoisting apparatus
  - ensure the travel path of the crane and load are clear before signaling to move the load
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- use standard hand signals as per the Rigging Handbook.

## 6.6 Sentry

- when a barrier is not possible, a sentry may be needed
- positioned at access points to the Safe Lift Zone to ensure personnel not associated with the lift do not enter the Safe Lift Zone as identified in the Critical Lift Plan or in lift zones of non-critical lifts where the use of barrier tape and tags are not feasible.
- provide support to the Lift Coordinator as requested.

## 7.0 STANDARD

This section covers the requirements related to inspection of the hoisting and lifting equipment, and execution of the lift.

### 7.1 Inspections

An inspection of all hoisting apparatus ensures that the apparatus remains in a safe operating condition and applicable legislation and industry standards are met.

#### 7.1.1 Annual Inspections

As a minimum, all rigging equipment including manual chain-falls, must be inspected annually. Findings of the inspections must be documented in a logbook for all equipment with 2 tons capacity and above. For equipment below 2 tons, the inspection must still be recorded and must be available upon request. Inspection requirements are per manufacturer's recommendations, Regulation 91-191 and applicable standards.

For equipment not in regular use and when a period of greater than one year has passed since its last use, the annual inspection must be performed prior to use.

Any additional inspections required by local procedures, the manufacturer, applicable standards such as CSA, or by provincial regulations must be performed by a competent person. In addition, if a competent person deems a more frequent inspection is required due to inspection findings, operating conditions or for any other reason, those inspections must also be performed and recorded in a logbook for equipment 2 tons and above and in a report for equipment below 2 tons.

#### 7.1.2 Pre-Use Inspections

All hoisting apparatus (rigging) must have a pre-use inspection performed by a competent person. Findings must be documented in the equipment logbook for equipment 2 tons and above.

### 7.2 Equipment Deficiencies

If a deficiency of a hoisting apparatus is discovered during an annual or pre-use inspection, or at any time during operation of the equipment and, the deficiency impacts the safe operation of the equipment, it must be corrected immediately, or arrangements must be made to have it repaired or replaced.

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If the equipment is unsafe for use, it must be immediately removed from service and tagged as inoperable. Report deficiencies to your supervisor.

### 7.3 Performing a Lift

1. Determine if the lift to be performed meets the criteria for a Critical Lift as per Section 1 of Form 1372. See *Appendix B Section 1* for an example. If yes, see section 7.4 and document lift plan with Form 1372.
    - o If the lift does not meet the criteria for a Critical Lift, Form 1372 can still be used as part of safe work planning.
  2. Ensure a tailboard conference/pre-job brief is performed with all personnel involved with the lift including the crane operator.
  3. If personnel must be positioned within the load drop zone, review and discuss the requirements of *Appendix A* as part of the tailboard conference/pre-job brief. Note: Never be under a suspended load
  4. For drift and block loads ensure “line of fire” is well understood and avoided by all involved. Ensure barriers are established appropriately and all lifting anchors/equipment are selected for the safe working load.
  5. Confirm the load to be lifted is within the rated lifting capacity identified on the equipment taking into account the working load limit of the equipment will change (Likely decrease) depending on the configuration.
  6. Confirm travel ways are clear of obstruction. If visibility of the travel path or load is restricted, have a Competent Signal Person present to guide the movement of the load.
  7. Plan the lift and select the appropriate rigging, when the lift is not covered by a critical lift plan or procedure.
  8. Confirm the crane or hoisting equipment has a current annual inspection, if applicable.
  9. Perform a pre-use inspection on the hoisting apparatus and make note of the findings in the logbook for all hoisting equipment 2 tons and above.
  10. Perform a pre-use inspection of the rigging equipment. Remove any defective equipment from service.
  11. Visually inspect the load lift points or lugs for wear, cracks, damage, or distortion and consider the need for a non-destructive examination.
  12. Rig the load in accordance with the latest version of the Rigging Handbook.
  13. Ensure the rigging is protected from potential damage (*example*: use softeners when slings may be damaged by edges, corners, or abrasive surfaces).
  14. Check all rigging equipment and attachments to ensure they are properly applied to the load and secured to the hook of the hoisting apparatus.
  15. Attach tag lines to the load as required and when necessary. Tag lines are essential to reduce the need for access to the load drop zone. Tag lines are to be used to prevent spin or rotate in a safe manner. Excessive force is not to be applied to tag lines.
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16. Check the laydown area where the load will be placed to ensure it is ready to accept the load.
17. Establish a Safe Lift Zone that is outside the Load Drop Zone and have it barricaded and sign-posted/tagged
  - For lifts where it is not feasible to use barrier tape (i.e. outside in adverse weather conditions), ensure sentries are utilized to prevent access by personnel not involved with the lift.
  - Alternatively, rope can be used to identify the Safe Lift Zone and barricaded area as well.
18. Ensure that personnel not involved with the lift are evacuated from the Safe Lift Zone and Load Drop Zone including lower elevations, if applicable
19. Where a signal person is utilized, establish clear lines of sight and the method of communication with the Competent Crane Operator. If hand signals are the method of communication, use the industry standard hand signals for overhead cranes
20. Ensure the Competent Signal Person, when used, is readily identifiable (wearing a designated vest)
21. Check that the travel path of the crane and load are clear before signaling to move the load. If the view of the load is partially obstructed, obtain assistance from other Competent Signal Persons, as required.
22. Do not carry a load over a person or let anyone walk under a suspended load.
  - If working under a load is the ONLY option, a Deviation from WorkSafeNB will be required. Contact the Total Health & Safety Group for assistance.
23. Perform a load hold t prior to lifting and travelling the load to its destination.

#### **7.4 Performing a Critical Lift**

1. Once it has been determined that the lift to be performed meets the criteria for a Critical Lift, as per Section 1 of Form 1372, or see *Appendix B Section 1* for an example, identify a Competent Rigger to act as the Lift Coordinator. The Lift Coordinator must be present for the lift.
  2. Develop a safe lift plan utilizing form 1372. See *Appendix B* for an example.
  3. If an engineered lift assembly will be used for the lift, ensure that an approved engineering document is available.
  4. Establish the Safe Lift Zone and install barriers and Sentry(s) as identified in the Critical Lift Plan. This may include the evacuation of lower elevations.
  5. Perform a tailboard conference/pre-job brief and ensure that all personnel involved with the lift are included and sign onto the Critical Lift Plan and tailboard conference/pre-job brief.
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6. If the lift is to be performed by a Contractor, ensure that their lift plan is sufficiently detailed to meet the full intent of the Critical Lift Plan. If it is not, it must be modified, or an NB Power Critical Lift plan must be used.
7. Perform the lift as per the Safe Lift Plan, Form 1372.

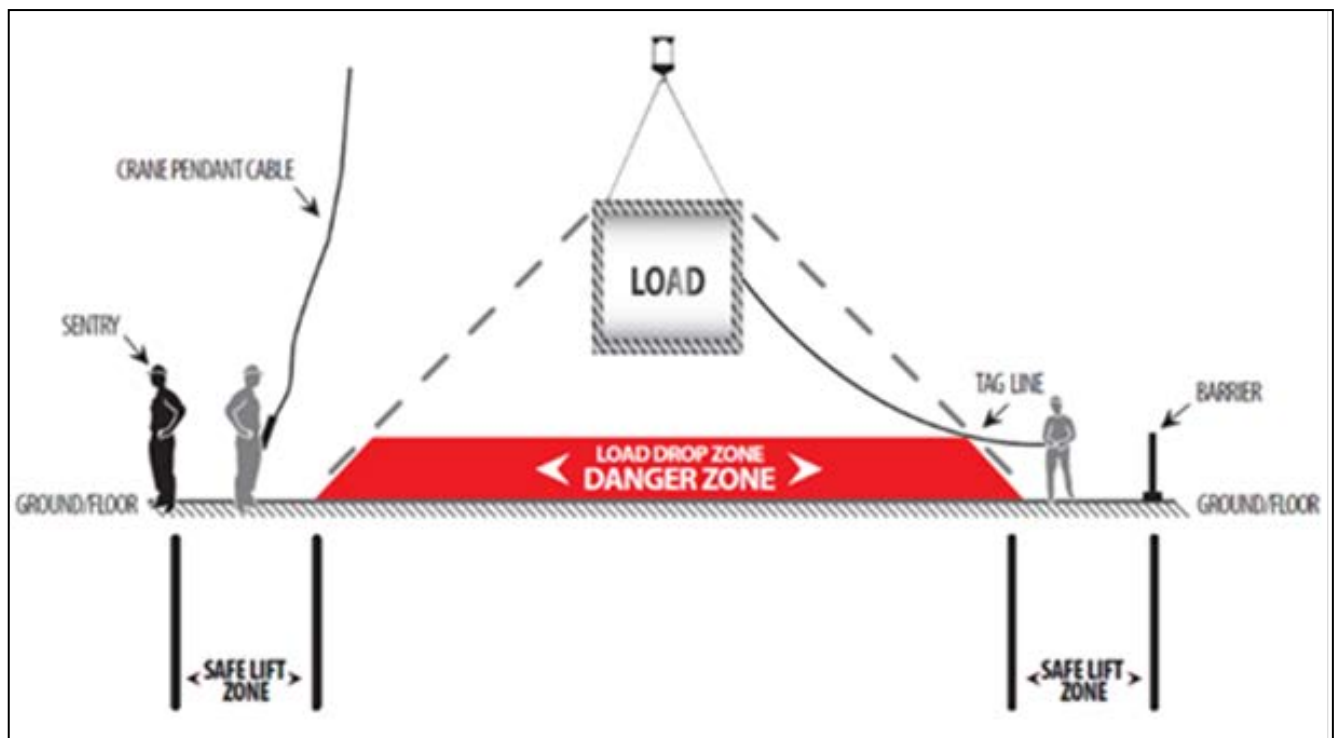
### NOTES:

For any lift where entry into the Load Drop Zone is necessary, access must be granted by Supervisor Approval. The Load Drop Zone is restricted to personnel involved in the lift and must be avoided whenever possible to reduce the risk to personnel. Refer to *Appendix A* for more information and guidance.

If a lift occurs over or near an opening in the floor, evacuate lower elevations.

If there is a grating, concrete floor or other civil structure between the elevations, evaluate the consequences of a load drop and consider evacuation of the lower elevations. Load bearing calculations may need to be performed for structural flooring and grating to determine if evacuations are necessary. Otherwise, for safety precautions, the lower elevations must be evacuated.

Roles within lifting activities can be dynamic, such as utilizing a competent rigger to also be a competent signal person or operator.





**8.0 Training Requirements**

Anyone performing rigging must be competent including successfully having completed a minimum of a two-day rigging course with theory and practical testing. Competency can be verified every three years by either refresher training or competency verification.

**9.0 Reference Documents**

Form #1372 Critical Lift Plan

**10.0 APPENDICES**

Appendix A: Working in the Load Drop Zone

Appendix B: Form 1372 Critical Lift Plan.

*R. Condon*

Director of Total  
Health & Safety

**DOCUMENT APPROVAL/REVISION RECORD**

<b>Revision #</b>	<b>Date yyyy/mm/dd</b>	<b>Revision Summary</b>	<b>Author</b>	<b>Reviewed By</b>	<b>Approved By</b>
New	2020/07/15	New Standard	Sarah Riche	Nancy Allen Hercules Georgiadis	Robin Condon
1	2021/12/30	Sect.1- Changed wording in Introduction. Sect.2- Changed wording in Scope. Sect 3-Changeed reference Sect. 5-Changed definition of competent person, removed crane inspector definition, removed Personal Carrying device definition, removed	Lifting & Rigging Review Committee.	Lifting & Rigging Review Committee.	Robin Condon

		<p>competent crane operator definition. Sect. 6.2 and 6.3 were removed. Sect 6.4-Roles and responsibilities of Competent Rigger were expanded. Sect 7.1.1- Changes to Annual Inspection Sect. 7.1.2- Content change. Change in Appendix B-Safe Lift Plan-Content and layout/format.</p>			
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**Appendix A: Working in a Load Drop Zone or Line of Fire**

At times, it is necessary to enter into the Load Drop Zone or line of fire due to the nature of the lift and/or pull.

Examples of these situations can be, but not limited to:

- proper control cannot be maintained with tag line and personnel must be near the suspended load to guide it into place;
- operation of a small hoist or manual chain-fall requires the crane operator to be inside the Load Drop Zone
- physical location of the load is restrictive and requires close proximity during the lift and landing

When it is necessary to be within the Load Drop Zone (or line of fire), the following conditions must be met:

- Personnel must have permission from the Workgroup Supervisor/Project Lead or delegate (*example: Lift Coordinator for Critical Lifts*).
- The number of personnel within the Load Drop Zone must be limited to the number of workers required to complete the task safely.
- The required task must have been evaluated to verify that personnel including any body part will not be under the suspended load at any time. If it is determined that personnel including any body part will need to be directly under the load to perform their task it must be approved through a deviation from WorkSafe NB by contacting Total Health & Safety.
- Continuous and unobstructed pathways must be established and checked clear for anyone allowed in the Load Drop Zone. Hazards must have been identified and precautions taken to prevent an employee from tripping or falling under the load.
- the use of tag lines must have been evaluated as ineffective for the final landing of the lift application in use.

- the bottom of the load should be as close to the landing point as possible before personnel guide the load with their hands.
- If in the path of “line of fire” due to horizontal forces; physical barriers must be used (e.g. cages).
- hazards to all body parts and the potential for their inclusion in pinch points must have been evaluated and eliminated/controlled.

## Appendix B: Form 1372 Critical Lift Plan

Location:	Date:
<b>Section 1 - Critical Lift Criteria</b>	
Check off all criteria that apply to the lift. If none of the following apply, this lift is not considered a Critical Lift and this form is not required but recommended as part of safe work planning.	
Capacity or near capacity lift > 80% Boom capacity or 95% for Stationary	<input type="checkbox"/>
Complex lift – additional planning, coordination, engineering required; more than one crane hook required, sling angles <45 °, a temporary lift assembly or other requirements	<input type="checkbox"/>
Possibility of load binding	<input type="checkbox"/>
Personnel carrying basket to lift personnel	<input type="checkbox"/>
Load drop could cause damage to critical or sensitive equipment.	<input type="checkbox"/>
Personnel or a body part will be directly under the load, including any personnel working on a lower plant elevation that could be impacted	<input type="checkbox"/>
Mobile cranes used above underground piping or tunnels	<input type="checkbox"/>
<b>Section 2 - Hoisting Apparatus Details</b>	<b>Section 3 – Load Weigth Details (lbs)</b>

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Crane or Hoisting apparatus ID #		Load	
Crane hoist used – if applicable  Main: <input type="checkbox"/> Auxiliary: <input type="checkbox"/>		Lifting beam	
		Rigging	
Capacity of Crane or Hoist (tons):		Other	
% of Crane or Hoist capacity		Total Weight (ton=lb/2000)	lbs      tons
Additional info:		Source of load data:	
<b>Section 4 – Rigging</b>			
Sling(s) Type & Size :		Sling Angle:	
Hitch Type:		Sling Hitch WLL:	
Shackle(s) Size:		Shackle(s) WLL:	
Lifting Beam WLL:			

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Are there attached rigging diagrams:	Yes: <input type="checkbox"/>	No: <input type="checkbox"/>
<b>Section 5 – Load Path / Safe Lift Zone</b>		
Describe the load path and destination including any obstacles or obstructions:		
Load Path:		
Safe Working Radius:		
Destination:		
Obstructions, Obstacles:		
Has the safe lift zone been identified?	Yes: <input type="checkbox"/>	No: <input type="checkbox"/>
Barriers and Controls to prevent unauthorized access:		
Barrier tape: <input type="checkbox"/>	Barrier Tags: <input type="checkbox"/>	Sentries: <input type="checkbox"/> PA Announcements: <input type="checkbox"/>
Other:		
<b>Section 6 – Additional information, special instructions, restrictions, rigging diagrams. Attach additional information as needed.</b>		
Entry into Load Drop Zone?	Yes: <input type="checkbox"/>	No: <input type="checkbox"/>
If yes, discuss how access will be controlled and limited.		
<b>Section 7 – Pre-lift Checklist</b>		
Pre-use inspection of crane or hoisting apparatus is complete <input type="checkbox"/>	Pre-use inspection of rigging equipment is complete <input type="checkbox"/>	
Inspect or walk down the load path or lift area <input type="checkbox"/>	Inspect lift points and connections <input type="checkbox"/>	
Softners and wear protection (if applicable) <input type="checkbox"/>	Tag Lines (if applicable) <input type="checkbox"/>	
Lay down area ready <input type="checkbox"/>	Access Control and barriers in place <input type="checkbox"/>	
Work in Load Drop Zone requirements met <input type="checkbox"/>	Pre-lift briefing conducted with all personnel involved with the lift <input type="checkbox"/>	
Load hold performed	Critical lift plan reviewed and signed <input type="checkbox"/>	
I. Load is level and secure <input type="checkbox"/>	Yearly inspection verified <input type="checkbox"/>	
II. Rigging is proper and adequate <input type="checkbox"/>		

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III. Load brake holds	<input type="checkbox"/>	
	<input type="checkbox"/>	

## Section 8 - Signatures:

Lift Coordinator (if applicable)

Name (Print)

Signature

Date: yyyy/mm/dd

Crane Operator

Name (Print)

Signature

Date: yyyy/mm/dd

Rigger #1

Name (Print)

Signature

Date: yyyy/mm/dd

Rigger #2

Name (Print)

Signature

Date: yyyy/mm/dd

Signal Person #1

Name (Print)

Signature

Date: yyyy/mm/dd

Signal Person #2

Name (Print)

Signature

Date: yyyy/mm/dd

## Section 9 – Post-Job Review / Notes

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Conduct a post-job review and make notes on documented tailboard conference/pre-job brief form