

Preventing crane rigging failures

Crane rigging failures have caused serious injuries and fatalities on B.C. construction sites. Rigging (fibre or wire ropes, chains, slings, attachments, etc.) that can lift thousands of kilograms may fail catastrophically. This bulletin provides an overview of how rigging failures typically happen and how to reduce the risks.

What are the hazards?

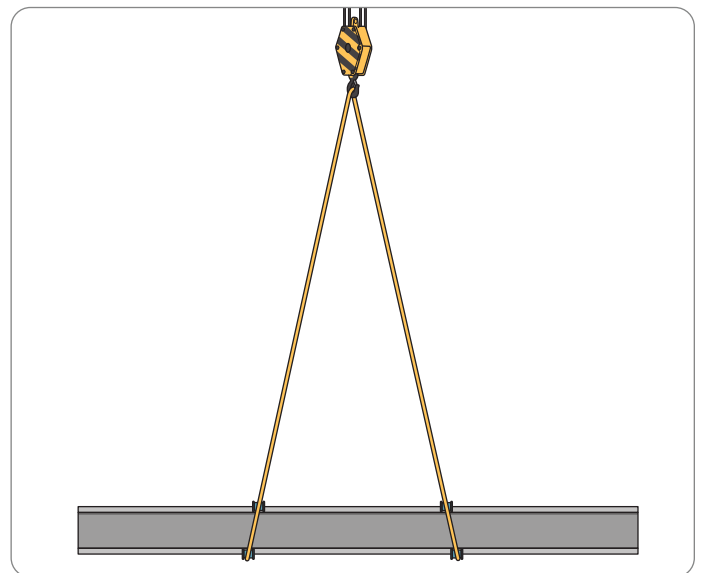
- Sharp edges of suspended loads can damage rigging.
- If a load shifts, the rigging may fail or the load may fall from the rigging.
- A suspended load can fail if it has insufficient structural integrity for the forces imposed on it during a lift.

Responsibilities

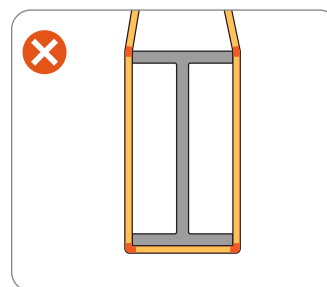
Everyone involved in moving a load with a crane has a role to play in preventing rigging failures.

Employers must:

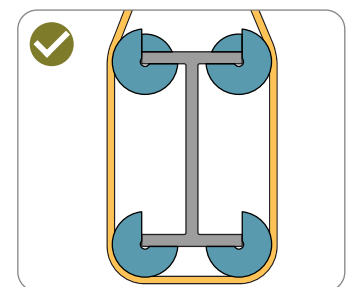
- Provide the information, instruction, training, and supervision necessary to ensure that crane operators and riggers:
 - Plan the lift.
 - Rig and lift items safely.
- Ensure rigging and slinging work is done by, or under the direct supervision of, qualified workers familiar with the rigging to be used.
- Ensure the lifting attachment(s) and/or the load can withstand the forces applied to them during the lift.
- Ensure the health and safety of all workers.



A beam suspended from a crane by a sling.



Incorrect: Cross-section view of the beam with the sling supporting it. Red marks indicate the parts of the sling that may be damaged by the sharp edges of the beam.



Correct: Cross-section view of the beam with sling/edge protectors to increase the edge radius to at least the minimum required by the sling manufacturer.

How to reduce the risks

- **Design** the load to have:
 - Designated lifting points (e.g., lifting lugs) that enable the load to withstand the forces imposed by the lift.
 - Areas with sufficiently rounded corners (edge radius) to prevent damage to the rigging.
- **Plan** the lift and lift to the plan. When creating your plan:
 - Follow an engineer's instructions (if available) for how to rig and lift the load.
 - Ensure the slings and the load will not be overstressed by the rigging configuration. Fragile loads may need additional support.
 - Ensure the rigging configuration will not allow the load to shift.
 - Enforce an appropriately sized exclusion zone below the load during lifting to ensure worker safety in case of a rigging failure.
 - Ensure plans and practices are communicated with the prime contractor, other employers at the worksite, and all workers who could be affected by a rigging failure.
- **Train** workers on the hazards and how to control them.
 - Ensure riggers are qualified. Under the Regulation, *qualified* means being "knowledgeable of the work, the hazards involved and the means to control the hazards, by reason of education, training, experience or a combination thereof."
- **Inspect** slings and items to be lifted.
 - Perform required inspections of rigging to ensure it is safe for use.
 - Ensure rigging is marked appropriately with the load limit.

- **Use** slings properly and protect them from damage.
 - Use effective edge protection (e.g., curved, magnetic sling protectors) that will increase the edge radius to the required amount.
 - Random materials (such as pieces of fabric) may not protect the slings from loads with sharp edges. Under the Web Sling and Tie Down Association (WSTDA) standard, a sharp edge on a synthetic-fibre sling is defined as 7/8" (2.2 cm) radius or less.
 - Ensure rigging is used in accordance with the manufacturer's instructions.

Regulatory requirements and standards

OHS Regulation

- [Section 4.3, Safe machinery and equipment](#)
- [Section 14.38, Safe lifting](#)
- [Section 15.2, Qualified riggers](#)
- [Section 15.30, Standards](#)
- [Section 15.39, Sharp edges](#)
- [Section 15.40, Slinging loads](#)

Standards

- [ASME B30.9-2006 Slings](#)
- [ASME B30.10-1999 Hooks](#)
- [ASME B30.20-1993 Below-the-Hook Lifting Devices](#)
- [ASME B30.26-2004 Rigging Hardware](#)
- [WSTDA RS-1 \(2019\) Recommended Standard Specification for Synthetic Polyester Roundslings](#)

For more information

[Safe Work Practices](#) (BC Crane Safety)