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1. Purpose

This program has been developed with reference to Parts 3, 6, and 21 of the Alberta Occupational Health and Safety (OH&S) Code to establish guidelines to help eliminate incidents and prevent losses related to the use of cranes, hoists, and lifting devices.

Cranes, hoists, and lifting devices are extraordinarily useful tools which allow for heavy objects and materials to be moved efficiently; however, they can present a significant hazard when operated incorrectly or improperly maintained.

2. Scope

This Cranes, Hoists, and Lifting Devices Program applies to:

- all operational activities and persons responsible for the operation, use, maintenance, and/or handling of any crane, hoist, and/or lifting device under the auspices of, or on property belonging to, the University of Calgary (University); and
- lifting devices, including cranes and hoists with a rated load capacity of greater than 2,000 kilograms (kg) as well as those with a rated load capacity of less than 2,000 kg.

3. Responsibilities

Supervisors are responsible for:

- being familiar with the Cranes, Hoists, and Lifting Devices Program;
- ensuring workers are familiar with and follow this Program;
- only allowing competent, trained, and certified workers to operate devices;
- ensuring all major structural, mechanical, and electrical components of a lifting device are permanently identified with their specific make and model number;
- ensuring every lifting device has a permanent label showing the manufacturer's name, rated load capacity, model number, serial number, year of manufacture and shipment date;
- ensuring that if a lifting device is not commercially manufactured, it is certified by a professional engineer as well as permanently labelled with the rated load capacity;
- ensuring that a paper or electronic log book is set up for every lifting device on the work site and each entry identifies or is signed by the person doing the work;
- ensuring that at all times, all mobile cranes, tower cranes, and boom trucks have load charts showing the rated load capacity of the equipment as well as all permitted boom angles and radii;
- ensuring that all personnel involved in the lift are provided with all information required to accurately determine the weight of the load to be lifted;
- ensuring that a lift calculation is completed for any lift exceeding 75% of a crane's rated capacity;
- ensuring that work is arranged so that a load does not pass over workers; unless it is impossible to do so and then all workers must be pre-warned;
- ensuring that if two or more lifting devices are being operated and there is potential for collision, procedures are developed to prevent collisions;
- ensuring that whenever hand signals are required to ensure a safe hoisting operation, a competent signaller is designated in accordance with Section 191 of the OH&S Code to perform all signals;
- completing a Hazard Assessment and Control Form (HACF) prior to any work being undertaken;
- reviewing and updating the HACF post-incident or when changes to the operation are implemented (e.g. new equipment or process introduced);
- ensuring devices are included in a preventative maintenance program; and
- maintaining training records in personnel files.

Workers are responsible for:

- being familiar with and following this Program;
- demonstrating competency in equipment operation, knowledge of load charts, and ability to use established signals for hoisting operations;
- moving loads using a signaler as per Section 191 of the OH&S Code;
- reviewing all recent entries in the log book before operating any lifting device;
- never moving a load or any piece of equipment if there is any doubt as to the safety of the workers close to the lift or any doubt that the working conditions are safe;
- never passing a load over workers; unless there is no other alternative and all workers have been pre-warned;
- keeping the load positioned as close to the ground as possible when travelling with the load;
- participating in required training and reviewing the HACF; and
- following all health and safety standards, rules and regulations; and reporting all hazardous conditions to their supervisor immediately.

Contractors are responsible for:

- following the University's Cranes, Hoists, and Lifting Devices Program where the requirements exceed a Contractor's Program and/or the OH&S Code;
- honouring the University's contractual requirements;
- employing competent and qualified workers;
- having documentation available to indicate that all crane, hoist, and lifting device operators have received training and currently possess valid certification sufficient to meet Alberta OH&S Regulation 15(1) through 15(5); and
- providing appropriate equipment to complete work activities. If a situation arises where the Contractor cannot provide appropriate equipment, written approval must be obtained from Risk Management prior to the use of any equipment owned by the University.

Environment Health & Safety is responsible for:

- periodically auditing recordkeeping to verify the documents meet or exceed the requirements listed in Parts 3, 6, and 21 of the Alberta OH&S Code;
- reviewing and updating the Cranes, Hoists, and Lifting Devices Program as necessary; and
- providing support to supervisors, workers, and contractors.

4. Training and Competency

All workers must successfully pass a training course provided by a certified organization relevant for the device, before being authorized to operate any devices.

An operator must be able to demonstrate competency in:

- selecting appropriate equipment;
- limitations of the equipment;
- conducting inspections, and basic mechanical and maintenance requirements;
- operating equipment in accordance with manufacturer recommendations;
- loading and unloading the equipment;
- hazards associated with equipment operation, including the equipment and surrounding area;
- reading and understanding lift plans;
- maintaining equipment and operator log books;
- selecting appropriate boom, jib, and crane configurations;
- determining the number of parts of line required;
- properly using load charts;
- securing the device when unattended; and

- understanding and using signals.

5. Hazard Assessment

The HACF should be completed by the supervisor with participation from workers as necessary prior to any operating activities. All workers should review the completed HACF. An assessment of the work area for any potential hazards should be completed by the worker prior to any operating activities.

Some common hazards associated with the use of cranes, hoists, and lifting devices include:

- exposure to moving parts;
- travelling with loads;
- falling or failing loads;
- swinging loads;
- critical lifts;
- environmental hazards; and
- overhead power lines.

6. Log Books

Log books are an efficient means of communication between all people who operate or perform work on cranes, hoists, and lifting devices. An individual electronic or paper log book must be kept with each crane, hoist, and lifting device at all times and operators must make themselves familiar with the contents of the log book before operating the equipment. Log books are not required for manually operated hoists.

Log books must:

- be accessible, up-to-date, ready for use, and kept with the device;
- be signed by or identify the person performing the log book entry;
- contain a record of the date and time any inspections or work was performed on the device;
- contain a record of the length of time in lifting service (hours of service) as per manufacturer recommendations;
- contain a record of all defects or deficiencies and the date they were detected;
- contain a record of all pre-use inspections, examinations, tests, and checks performed on the device;
- contain a record of all repairs or modifications performed;
- contain a record of all accidents, incidents, and shock loading incidents which may affect safe operation of the device;
- be readily available for inspection by an OH&S officer upon request; and
- be transferred to the new owner if the device is transferred or sold.

7. Inspections

Inspections provide an efficient and effective way to help control hazards that come from working with cranes, hoists, and lifting devices. Governing legislation and manufacturer recommendations provide an outline as to when inspections must be performed on devices that are in regular use. No device is to be put into initial operation until it has been thoroughly inspected and any defects and hazards eliminated.

Before operating any device, the operator is to perform and document in the log book a pre-use inspection of both the equipment and the surrounding area, including date, time, and weather conditions, to ensure the equipment is in safe operating condition as well as to make sure that no worker will be in danger when the equipment is started. When the device is in operation, the operator should complete visual inspections of the equipment and surrounding area to verify hazardous situations are not developing.

If an inspection uncovers any current or potential hazards, the supervisor must be notified immediately and the equipment must not be operated until the problem has been resolved and/or the equipment has been inspected and approved for service.

Cranes, hoists, and lifting devices must be included in a preventative maintenance program.

8. Repairs and Modifications

In addition to preventative maintenance, structural repairs and modifications are often required to maintain and ensure the safe use of cranes, hoists, and lifting devices. All repairs and modifications to the structure and components must be made only under the direction of a professional engineer who must then certify that the quality and workmanship of the components has been restored to no less than their original capacity.

The log book must contain reference to each repair and modification made and the component itself must be marked.

9. Tag and Hoisting Lines

Tag lines must be used if workers are in danger because of the movement of a load being lifted, lowered, or moved.

Tag lines must:

- be of sufficient length to control the load;
- be used in such a way that prevents the load from striking the worker controlling the tagline;
- be used when it will allow worker separation from the load;
- be made of non-conductive synthetic rope when there is a danger of contact with energized electrical equipment; and
- never be used in situations where using them increases danger to workers.

10. Containers for Hoisting

Containers used for hoisting must be professionally manufactured and strong enough to withstand hoisting forces and forces exerted by the load. They must also:

- be designed for the purpose of lifting;
- be marked to indicate maximum load by the manufacturer; and
- not be an oil drum or similar container unless the drum is hoisted in a cage that has been designed specifically for that purpose.

11. General Safety Precautions

- never operate a crane, hoist, or lifting device that is damaged or has any actual or suspected mechanical or electrical malfunction;
- never attempt to lengthen a wire rope or repair a damaged wire rope;
- never attempt to lengthen a load chain or repair a damaged load chain;
- never use a wire rope, a load chain, any part of the hoist or load block as a ground for welding;
- never allow a welding electrode to touch a wire rope, load chain or load hook;
- never remove or obscure any instructions, warnings or warning labels on a crane, hoist, or lifting device;
- never walk under a suspended load or allow other personnel to walk under a suspended load; and
- never perform or allow any other person to perform any work on a suspended load that requires a worker to be positioned under the suspended load.

12. Equipment Specific Requirements

Further information regarding equipment specific requirements can be found in Part 6 of the OH&S Code:

- Cantilever Hoists – Section 76
- Chimney Hoists – Sections 77 through 79
- Hand-Operated Hoists – Section 80
- Materials Hoists – Sections 81 through 87
- Mobile Cranes and Boom Trucks – Sections 88 through 92
- Overhead Cranes – Sections 93 through 95
- Personnel Hoists – Section 96
- Roofer's Hoists – Section 97
- Tower and Building Shaft Hoists – Sections 98 through 99
- Tower Cranes – Sections 100 through 107
- Underground Shaft Hoists – Sections 108 through 111
- Vehicle Hoists – Sections 112 through 113
- Winching Operations – Section 114

13. Definitions

CRANES

Crane	means a lifting device that can move a load horizontally.
Boom-Type Mobile Crane	means a self-propelled crane equipped with a boom and mounted on a chassis that is supported on either rubber tires, crawler treads, or railway wheels running on railroad tracks.
Floor Operated Crane	means a crane controlled via a wireless control console by an operator on the floor, on a platform, or otherwise independent of the crane.
Gantry Crane	means a crane similar to an overhead travelling crane, except that the bridge for carrying the trolley(s) is rigidly supported on two or more movable legs running on fixed rails.
Cantilever Gantry Crane	means a gantry crane in which the bridge structure extends beyond the runway on one or both sides. Its runaway may be either on the ground or elevated.
Portal / Whirly-Type Crane	means a crane with a boom attached to a revolving crane mounted on a gantry. The boom is capable of being raised or lowered at its head. They may be fixed or mobile.
Semi-Gantry or Single Leg Crane	means a gantry crane with one end of the bridge rigidly supported on one or more movable legs which run on a fixed rail or runway system. The other end of the bridge runs on an elevated rail or runway.
Jib	means a crane with a vertical member from which extends a horizontal swinging arm carrying the hoisting mechanisms.
Travelling Jib	means a crane with the vertical member running on a track with its upper end guided by a parallel overhead track.

Overhead Travelling Crane / Bridge Crane	means a crane consisting of one or more trolleys on parallel elevated runways.
Pillar Crane	means a fixed crane consisting of a vertical member with a revolving boom supported at the outer end by a tension member.
Pillar Jib	means a pillar crane carrying a trolley.
Polar Crane	means a bridge or gantry crane that travels on a circular track.
Tower Crane	means a crane in which a boom, swinging jib, or other structural member is mounted on a vertical mast or tower.
Climber Crane	means a crane erected upon and supported by a building or other structure that may be lowered or raised to different floors or levels of the building or structure.
Free Standing Crane	means a crane with a horizontally swinging boom that may be on a fixed base or mounted on rails.
Derrick	means a simple crane with lifting tackle slung from a boom.
<u>HOISTS</u>	
Hoist	means a lifting device designed to lift and lower loads.
Simple Drum Hoist	means a hoist with one or more drums controlled by manual clutches, brakes, or ratchet and pawl; powered by hand or electricity.
Electric Hoist	means an electrically powered, motor-driven hoist, having one or more drums or sheaves for a rope or chain.
Vehicle Hoist	means a device, often powered hydraulically, for raising a vehicle so that the underside is accessible for inspection or repair.
Personnel Hoist	means a lifting device designed to lift and lower employees safely and effectively.
Cantilever Hoist	means a lifting device with a hoisting mechanism and beam that extends beyond the runway structure.
Chimney Hoist	means a temporary hoist used for transporting personnel or materials during the construction of a chimney or similar structure.
Hand-Operated Hoist	means a manually operated lifting device designed to lift and lower loads.

Construction Material Hoist	means a material hoist consisting of a guiding and supporting structure and hoisting equipment that is not a permanent part of a building, structure, or other work and that is installed and used during construction, alteration, or demolition to raise and lower materials.
Tower Hoist	means a temporary elevator shaft made of scaffolding used to hoist materials during building construction work.

LIFTING DEVICES

Gin Pole	means a hand-operated derrick that has a nearly vertical pole supported by guy ropes.
A-Frame	means a rigid supporting frame in the form of a triangle or an inverted triangle used with a system of ropes and pulleys to lift heavy or awkward loads.
Winch	means a lifting device consisting of a horizontal cylinder turned by a crank on which a cable or rope winds.

14. Related Documents

- [Hazard Assessment and Control Form \(HACF\)](#)
- [University's Hazard Assessment and Control Procedure](#)

15. References and Additional Resources

- Alberta Occupational Health and Safety Act, Regulation and Code
<http://work.alberta.ca/occupational-health-safety/307.html>
- Alberta Occupational Health and Safety Code Explanation Guide
[OHS Code Explanation Guide 2009 - Alberta Human Services - Government of Alberta](#)
- University of Calgary Occupational Health and Safety Policy
<http://www.ucalgary.ca/policies/files/policies/Occupational%20Health%20and%20Safety%20Policy.pdf>
- Risk Management Email
riskmgmt@ucalgary.ca
- EH&S Website
www.ucalgary.ca/safety

Legislation and Standards

Parts 3, 6, and 21 of the Alberta OH&S Code outline requirements for the safe use of cranes, hoists, and lifting devices. Standards pertaining to these devices referenced in the OH&S Code include:

- CSA Standard CAN/CSA-Z256-M87 (R2006), *Safety Code for Material Hoists*.
- CSA Standard CAN/CSA-Z150-98 (R2004), *Safety Code on Mobile Cranes* with the exception of clauses 1.6 and 1.7.
- CSA Standard CAN/CSA Z150-98 (R2004), *Safety Code on Mobile Cranes*, clause 4.3.5.2 and 5.4.7.
- CSA Standard C22.1-06, *Canadian Electrical Code*, Part 1, Section 40.

- CSA Standard C22.2 No. 33-M1984 (R2004), *Construction and Test of Electric Cranes and Hoists*.
- CSA Standard CAN/CSA-B167-96 (R2007), *Safety Standard for Maintenance and Inspection of Overhead Cranes, Gantry Cranes, Monorails, Hoists and Trolleys*.
- CSA Standard CAN/CSA-Z185 (R2006), *Safety Code for Personnel Hoists*.
- CSA Standard Z248-04, *Code for Tower Cranes*.
- ANSI Standard ANSI/ALI ALCTV-2006, *American National Standard for Automotive Lifts – Safety Requirements for Construction, Testing, and Validation*.
- ANSI Standard ANSI/ALI ALOIM-2000, *Automotive Lifts – Safety Requirements for Operation, Inspection, and Maintenance*.