

<b>Number:</b>	OH&S 18.27.1
<b>Revision Date:</b>	2014.01.28
<b>Crane Safety Procedures</b>	

Printed copies of this document are uncontrolled.

## 1. PURPOSE

- 1.1. These procedures provide the University requirements for the operation and management of overhead travelling cranes and Gantry cranes installed in University buildings.

This includes the requirements for ensuring that people are not placed at risk from the operation of the crane.

## 2. SCOPE

- 2.1 These procedures apply to all employees and students and contractors working on near, or from an overhead or gantry cranes.

## 3. APPLICABLE LEGISLATION AND SUPPORTING DOCUMENTS



- 3.1. Work Safe BC regulation Part 14 Cranes and Hoists  
 3.2. Work Safe BC Regulation Part 15 Rigging  
 3.3. ANSI/ASME B30.10 – 2011 Overhead Gantry Cranes



## 4. PRECAUTIONS

### **POTENTIAL HEALTH & SAFETY HAZARDS**

HAZARD		TO PROTECT YOURSELF
<b>PINCH POINTS</b> There are gears and exposed moving parts on machinery.		Use LOCK-OUT procedures when performing maintenance or conducting any work within 12" of an exposed pinch point. NEVER put your hands or feet near an exposed pinch point or gears!
<b>HIGH SOUND LEVELS</b> Sound levels exceed 85 dB		<b>HEARING PROTECTION</b> is required when working in designated areas.
<b>FOOT INJURY</b>		Approved protective footwear is needed when there is the risk of foot injury due to slipping, uneven terrain, abrasion, crushing potential, temperature extremes, corrosive substances, puncture hazards, electrical shock and any other recognizable hazard

## 5. PERSONAL PROTECTIVE EQUIPMENT

	Safety glasses must be worn at all times in work area!
	Work Boots must be worn at all times when working in an area where there is risk of serious foot injury due materials falling onto the foot.

	<p>Work Gloves should be worn when there is a risk of hand injury during the course of work tasks.</p>
	<p>Hard hats must be worn when working in an environment where there is a risk of objects falling from above or where there is a high risk of striking your head on objects.</p>

## 6. ROLES AND RESPONSIBILITIES

### 6.1 Dean of Trades & Technology

The Dean of Trades and Technology shall keep a register of cranes and will arrange all statutory work, routine servicing and repairs of each crane and maintain the records of these services and of any replacement components. This includes the body, all operating equipment, controllers, all ropes, chains and slings to the hook, and the hook.

### 6.2 Trades Safety Committee

The Trades Safety Committee for the area that uses the crane shall ensure that the safe operating procedures are in place and maintained to permit the safe operation of the crane, and that instruction and direction is made available to permit the operators of the equipment and other users of the space to undertake the activities without risk.

### 6.3 Crane Operators

Persons operating the crane shall ensure that they have the appropriate training and skills to operate the crane in a safe manner. Crane operators have the responsibility to plan the crane use, undertake pre and post lift inspections and generally have control over the crane operation. They shall ensure there are appropriate restrictions to access of the site by the public and other persons not involved in the lift. The crane operator shall ensure that the “correct slinging and lifting procedures are undertaken prior to any lift” The crane operator shall report to the Trades safety committee and the Dean of Trades if there is any maintenance needs.

### 6.4 Trainers/Instructors

Trainers/Instructors shall ensure that activities required for all demonstrations involving the use of the crane and lifting gear are developed in consultation with the appropriate crane operator. Procedures are to be documented. Trainers with an appropriate certification and competency may assume both the teaching and operational roles.

## 7. REQUIREMENTS

This procedure sets out the guidelines for routine lifts with overhead cranes and hoists. If a load does not have fixed lifting points and is not the subject of a pre-approved SOP (e.g. routine work) and / or the weight of the load is unknown, then the Instructor shall be consulted to provide direction on safe methods to lift.

Minimum PPE shall include enclosed safety footwear (steel toed boots), safety hard hat, eye protection and gloves. Riggers gloves are recommended for added protection against pinch points, cuts abrasions, etc.

## **8. PROCEDURES**

### **8.1 Pre-operational Checks**

These shall include checks on:

- i. The Hook (look for cracks, gouges, excessive wear and correctly operating latch)
- ii. The Block (check that block is level and free from damage, wear or looseness in assembly or fittings)
- iii. Crane Chain
  - a. Elongation of links
  - b. Deformation of links
  - c. Cuts, dents or gouges
  - d. Cracks
  - e. Excessive wear
  - f. Excessive corrosion
  - g. Twists
- iv. Crane Wire Rope
  - a. Kinks
  - b. Twists
  - c. Birdcaging
  - d. Broken Wires
  - e. Excessive rust or corrosion
  - f. Excessive wear or abrasion
- v. Nylon Web Slings
  - a. Excessive wear or abrasion
  - b. Cut/penetration exceeding 15% of width
  - c. Manufacturer's label
  - d. Load rating label
  - e. Wrap thread damage
  - f. Broken or worn to stitches of load bearing splices
  - g. End fittings are excessively pitted or corroded
- vi. Safe Work Load
  - Ensure it is visible on crane and all lifting gear
- vii. Controls
  - Ensure all buttons are operational; check multiple speeds and emergency stop

### **8.2 Planning the Lift**

- i. The weight of the load shall never exceed the load capacity of the crane or lifting gear
- ii. The weight of the load must always be known and should not be lifted without this knowledge. If the weight is not known, consult the Instructor to help calculate the weight.
- iii. The centre of gravity of the load must also be known. Unless the load has designated lifting points, the Instructor shall always be consulted.
- iv. The load shall be secured at all times it is suspended.

### 8.3 General Safe Operational Rules

- i. All routine lifts should be covered in detail under an SOP or current Risk Assessment.
- ii. Ensure load is within the safe work limits of the crane and lifting gear.
- iii. Continuously check for area specific hazards. These include;
  - a. Waiting for pedestrians or mobile vehicles to leave the area of travel;
  - b. Warning signs;
  - c. Barriers
  - d. Lighting;
  - e. Traffic control;
  - f. Personal protective equipment;
- iv. When attaching shackles do not over tighten. Finger tight and back off ¼ of a turn.
- v. Hooks on chain slings should always face outward
- vi. Centre the crane over the load before starting the hoist to avoid swinging the load as it is lifted.
- vii. Always take the slack out of the lifting gear before lifting a load. Avoid shock loading.
- viii. Crane controls should be moved slowly and gradually to avoid abrupt, jerky movement of the load.
- ix. Crane hoisting ropes should be kept vertical. Cranes should not be used for side pulls.
- x. If the load does swing, correct it by moving the load in the direction of the swing when it is at the end of the arc- if it is safe to do so, i.e. potential to hit people, equipment or property.
- xi. Always keep the load as close to the ground as possible. Never raise the load any higher than necessary.
- xii. Never lower the block below the point where less than two full wraps of rope remain on the hoisting drum. Should all the rope be unwound from the drum, be sure it is rewound correctly and seated properly in the rope grooves, otherwise it will be damaged and the hoist limit switch will not operate to stop the hoist in the high position.
- xiii. Never allow anyone to walk under or place any part of their body under a raised load at any time.
- xiv. Keep unnecessary personnel out of the area when lifting. If necessary use barricading or a spotter.
- xv. Do not make lifts beyond the rated capacity of the crane, rope slings, slings, chains, etc.

- xvi. Do not operate the crane if limits switches are out of order or if ropes show signs of defect or wear.
- xvii.
- xviii. Make certain that before moving the load, load slings, load chains or other load lifting devices are fully seated in the saddle of the hook.
- xix. On all capacity or near capacity loads, the hoist brakes should be tested by returning the master switches or push button to the OFF position after raising the load a few inches off the floor. If hoist brakes do not hold, the crane should not be used.
- xx. The load should be lifted high enough to clear all obstruction and personnel.
- xxi. A load should not be left suspended unless the operator is at the mater switches or push button. Under these conditions, the load should be kept as close as possible to the floor to minimize the possibility to injury if the load should drop.
- xxii. Loads with sling hooks hanging loose should not be lifted.
- xxiii. All slings or cables should be removed from the crane hook when not in use. Dangling hooks or cables can snag objects when crane is being moved.
- xxiv. Crane Operators should not use limit switches to stop the hoist under normal operating conditions. These are emergency devices and should not be used as controls.
- xxv. Crane Operators must pay attention at all times. Never talk to, distract, or approach a Crane Operator during a lift.
- xxvi. Upper and lower limit switches should be tested at the beginning of each lift.
- xxvii. No loads should be moved or suspended over people regardless of the attachments
- xxviii. If the power goes out. The controllers must be placed in the OFF position until power has been restored.
- xxix. Never rush a lifting job
- xxx. In case of emergency, or during an inspection, repairing, cleaning or lubricating, a warning sign or signal should be displayed and the main switch should be locked in the OFF position.

#### **8.4 Standard Shutdown Procedure**

- i. Lower any raised load to ground level. Chock load if necessary.
- ii. Disconnect hook from the load.

- iii. Remove all lifting gear from the load. (slings, shackles etc)
- iv. Raise crane hook up to almost maximum height. This protects chain/rope from corrosion
- v. Locate the crane to a safe position – to the far end of a building is the preferred position.
- vi. Ensure the pendant/remote is in the OFF position and placed in a designated area.
- vii. Turn power off at the main isolation switch.
- viii. Lifting gear should be checked before placed in storage, any defects shall be reported to the Tool Room attendant.
- ix. Place all lifting gear in a designated area.

### **8.5 Risk Assessment and Safe Work Procedures**

Before carrying out any operation with a crane, a risk assessment must be undertaken. The assessment shall be in writing and shall take into account the following:

- i. The task to be carried out;
- ii. The range of methods by which the task can be done and the appropriateness of using the crane rather than a safer method;
- iii. The hazards involved with the lift and the associated risks;
- iv. The equipment to be used for the lift such as slings, spreader bars and hooks with appropriate ratings;
- v. The proposed route of travel while a load is suspended;
- vi. The clear space and location of setting down the load;
- vii. The possible results of a failure of the crane or gear;
- viii. The possibility of persons entering the lifting zone;
- ix. The location and type of barriers and warning signs;
- x. Emergency procedures;
- xi. Any activities that may be occurring in the space that could pose a safety risk;

- xii. All other risks associated that the lift is being used for, that do not relate directly to the cranes use.

## **8.6 Unsafe equipment, failures, and damaged parts management**

- i. All defective equipment shall be tagged as “Out of Service” and then reported to the Tool Room Attendant and a hazard incident report sent to Health and Safety reporting the incident. It is the Tool Room Attendants responsibility to co-ordinate the lifting gear’s inspection, repair or removal from site.
- ii. **Faulty equipment must not be given to anyone to take home. Damaged equipment can be repaired by a certified repair agent or the components can be recycled. However, unless this equipment is rendered completely inoperable, a signed statement from the instructor must be obtained stating that they are aware that the equipment is unsafe for use as a lifting device. If this does not occur, the faulty equipment must be destroyed or dismembered before being disposed of in the scrap bin.**
- iii. If, at any time, a routine lift changed to a non-routine lift, stop work and consult with a qualified operator and perform Risk Assessments, as required.
- iv. All dropped loads and equipment failures that occur during lifts are deemed as incidents, and a hazard incident report shall be completed and an investigation undertaken by TRU Health and Safety and members of the Trades Safety committee before any of the associated equipment is re-used.

## **9. RECORDS/VERIFICATION OF UNDERSTANDING**

### **9.1. Records**

- 9.1.1 All records of maintenance and repairs performed on cranes will be kept in the Trades administrative office for a period of at least 7 years.

### **9.2. Verification of Understanding**

- 9.2.1. A training master log will be maintained by Trades Administrative Office of all trained workers who are qualified to operate the crane and provide safe operation training on its use.

**10. Associated Documentation**

<b>Attachment # 1 – Chain Inspection Guide</b>
<b>Attachment #2 – Wire Rope Inspection Guide</b>
<b>Attachment #3 – Nylon Web Sling Inspection Guide</b>
<b>Attachment #4 - Pre-Use Inspection Checklist</b>
<b>Attachment #5 – Guide to Standard Operating Procedures</b>
<b>Attachment #6 – Health and Safety Considerations</b>

**11 SUMMARY OF CHANGES**

Revision #	Date	Change (include section #)	Issued By
1	2014.01.28	NEW	OHS Officer