UON Key Risk Area: KRA 3.8

Overhead Travelling Crane Safety

1. Purpose

To provide guidelines for the operation and management of overhead travelling cranes including bridge and gantry cranes installed in University buildings to ensure that staff, students, conjoints and contractors are not placed at risk from the operation of the crane.

2. Scope

This document applies to all Faculties, Divisions, and organisational units of the University of Newcastle and its controlled entities.

3. Definitions

In the context of this document, the following definitions apply:

- **Crane:** Any certified powered equipment designed specifically for lifting loads exceeding 500kg above head height and which is a fixed item.
- **Crane Operator:** A certified person who has control of the operation of the crane including all slinging and lifting functions.
- **Dogman:** A certified person empowered to apply slinging techniques including the selection and inspection of lifting equipment.
- **Lifting Equipment:** Any device which is used to connect a load to a crane and which does not form part of the load, e.g. wire rope, slings and hooks.
- **SWL:** Safe Working Load as shown on the crane, slings and other lifting equipment.
- **Routine Lift:** Work that is covered by a standard operating procedure (SOP) or checklist and does not require a Permit to Work. Routine work nominally involves medium to high frequency tasks.
- **Non Routine Lift:** Any activity that is outside the regular operations of the crane in that location. Non-routine work is not normally covered by an SOP or checklist. It generally involves low to medium frequency tasks with medium to high levels of risk and the work may require a Permit to Work depending on the risks identified in an initial risk assessment for the work.

- **Competent Person:** A person who has, through a combination of training, education and experience, knowledge and skills enabling that person to correctly perform a specified task.
- **Leaders/Supervisors:** Any member of the University who is responsible for supervising staff and/or undergraduate or postgraduate students and/or for leading research projects.
- **Workers:** As defined in the NSW Work Health & Safety Act 2011, workers include employees, conjoints, students on work experience, contractors, sub-contractors and their employees. Staff, conjoints, students on work experience, and contractors may be referred to collectively as workers, or separately as staff, conjoints, students, or contractors.

4. Responsibilities

4.1 Infrastructure and Facilities Services (IFS)

- Maintain a register of all overhead travelling cranes installed in UON buildings;
- Arrange for competent contractors to undertake routine servicing and repairs for each crane and associated lifting equipment and maintain records of these services;
- Facilitate the Permit to Work process for Non Routine Lifts.

4.2 Leaders/Supervisors

- Maintain records of routine inspections of lifting equipment;
- Ensure that SOPs for routine lifting tasks are in place and reviewed periodically to ensure they remain current;
- Ensure that all operators of cranes and associated lifting equipment receive the appropriate training and instruction so that they are competent to undertake the work;
- Maintain records of certificates of competency for all crane operators and dogmen;
- Ensure that risk assessments are conducted for all non-routine lifts and that where necessary a Permit to Work is issued;
- Monitor compliance with the SOPs and where non-compliance is noted discuss with the operator and/or dogman to assess whether further training is required;
- Cease operation of a task if personnel or equipment are at risk and review the SOP to assess whether amendments are required.

4.3 Crane Operators

- Ensure that they have the appropriate training and competency to operate the crane in a safe manner;

- Ensure the SOPs for the work are followed;
- Conduct pre and post lift inspections of the crane and lifting equipment;
- Ensure there are appropriate access restrictions in place to prevent entry to the area by any persons not involved in the lift;
- Report any maintenance needs that are identified to the Leader/Supervisor.

4.4 Dogman

- Ensure that they have the appropriate training and competency to carry out the work;
- Ensure that the SOPs are followed for the work so that lifting of materials is conducted safely;
- Calculate the load (mass, shape and centre of gravity) to be lifted;
- Assess the appropriate safe lifting technique including the type and suitability of slings, chains, spreader beams or equaliser beams, connection points and grips and shackles;
- Inspect the lifting gear prior to use to verify that it is in good condition and remove it from service if defects are found and report the matter to the Leader/Supervisor.

5. Procedure

5.1 Risk Assessment

Before carrying out any operation with an overhead crane, a risk assessment will be undertaken using the UON Risk Assessment Checklist (see UON HSP 4.1 Risk Management) giving consideration to the following:

- Task to be carried out;
- Range of methods by which the task can be done and the appropriateness of using the crane rather than another method;
- Hazards involved with the lift and the associated risks;
- Equipment to be used for the lift such as slings, spreader bars and hooks with appropriate ratings;
- Proposed route of travel while a load is suspended; Clear space and location for setting down the load;
- Possible results of a failure of the crane or gear;
- Possibility of persons entering the lift zone;
- Location and type of warning signs and barricading required;

- Exposure to energised busbars or other equipment;
- Emergency procedures;
- Other activities that may be occurring in the space that could pose a safety risk;
- All other risks associated with the activities that the lift is being used for that do not relate directly to the use of the crane e.g. manual handling.

5.2 Pre-Operational Checks

Prior to the task commencing the operator and dogman will conduct a pre-operational check which will include the following items of equipment:

- Hooks;
- Chains;
- Ropes;
- Slings;
- SWL is visible on the crane and lifting equipment;
- All buttons operational on the control;
- Hoist brake;
- Check the weight and centre of gravity of the load to ensure it does not exceed the SWL and that it can be slung safely;
- Ensure that the load is suspended safely before commencing the lift.

See Attachment 1 for an example of a Pre-Operational Checklist and Attachment 2, 3 and 4 for Inspection Guides for Chains, Wire Ropes and Slings.

5.3 Standard Operating Procedures (SOPs)

SOPs will be developed for all routine tasks where a travelling overhead crane is used. SOPs are developed following a risk assessment for the task so that all the potential hazards can be identified and appropriate risk controls selected. The following requirements apply to the development of SOPs:

- Completed in consultation with the workers who will be carrying out the task e.g. crane operators and dogmen;
- The SOP will describe the lift to be undertaken and the equipment and method that will be used;
- All workers who will be required to carry out the task described in the SOP will be given specific instructions in its use and must have been deemed competent prior to performing the lift according to the SOP;

- The SOP will be available at the crane site and must be reviewed on a regular basis to ensure currency and understanding;
- Where a failure or other error is identified in the SOP, the SOP will be reviewed and updated.

5.4 Non-Routine Lifts

If the proposed lift is not covered by an SOP or if the initial risk assessment prior to the job commencing indicates that there are hazards not covered by the SOP, the work will not proceed and the following actions will be taken:

- The risk assessment will be reviewed and a Safe Work Method Statement (SWMS) or Job Safety Analysis (JSA) will be developed;
- The SWMS or JSA will be reviewed and signed off by the Leader/Supervisor for the area;
- The Leader/Supervisor will prepare and issue a Permit to Work in consultation with the crane operator and the dogman which will be signed off by all the workers involved with the task (refer to the IFS Permit to Work Procedure);
- When the task has been completed, the area will be inspected and if it has been returned to safe normal function the Permit to Work will be signed off by all involved.

5.5. Defective Equipment

If equipment is found to be damaged during the pre-operational check, or if a fault is identified during operation the following action will be taken:

- The equipment will be tagged as ‘Out of Service’ with an ‘Out of Service’ tag;
- The matter will be reported to the Leader/Supervisor for the area;
- The hazard will be reported through the UON online Incident Management System;
- The Leader/Supervisor for the area will be responsible for arranging inspection and repair of the item of lifting equipment that was found to be defective, or its removal from site if repair is not possible.

5.6 Document Management

The following documents will be maintained at the location where the crane is installed:

- Risk assessments;
- Standard Operating Procedures;
- Inspection records;
- Defect records;
- Load testing records for ropes and slings;

- Maintenance records for cranes.

6. References

NSW Work Health and Safety Regulations 2011.

UON H&S Framework

UON HSP 4.1 H&S Risk Management

IFS Permit to Work Procedure

7. Attachments

1. Overhead Travelling Crane Pre-start Inspection Checklist
2. Chain Inspection Guide
3. Wire Rope Inspection Guide
4. Synthetic Sling Inspection Guide

Document Control Table

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Attachment 1. Overhead Travelling Crane Pre-start Checklist

Week commencing: **Location:**

		Mon		Tues		Wed		Thurs		Fri		Sat		Sun		
Item Check	**Checks to make**	**Good**	**Defect**	**Good**	**Defect**	**Good**	**Defect**	**Good**	**Defect**	**Good**	**Defect**	**Good**	**Defect**	**Good**	**Defect**	**Date Defect Reported**
Tag out	Has the crane been isolated															
Capacity Plate	Is plate present															
Decals	Present and clear															
Control Unit	Damaged?															
Gantry Runners	Free from obstruction															
NSEW Controls	Working order															
Crane Brakes	Working order															
End stops	Working order															
Hoist controls	Working order															
Hoist limit switches	Working order															
Hook	Undamaged / safety catch															
Attachment	Undamaged / Capacity plate															
Wire rope	Bird Caging etc?															
Drum	Free from tangles															
Lights	Working order															
Siren	Working order															
Scales	Working order															
Emergency stop	Working order															
Oil leaks	Nothing present															
Inspected By:																

Attachment 2. Chain Inspection Guide

- Inspect chain slings regularly e.g. daily or weekly depending on use.
- If necessary clean the chain before inspection.
- Inspect all links for signs of wear, twisting, stretching, nicks or gouging e.g. links that are stuck together show that the chain has been stretched.
- Cracks can be found by dusting chain with fine powder. Dust any link that is suspect and then blow the loose particles away. Dust particles left will be lodged in any cracks making them more visible.
- Any worn links should be measured for degree of wear, which must not exceed that recommended by the manufacturer.
- Note the maximum allowable wear on lifting equipment:
  - Chain wear = 10%;
  - Increase in hook opening = 5% of the original throat opening;
  - Wear in the bite of the hook is 10%.
- Inspect upper and lower terminal links and hooks for signs of wear at their load-bearing points and for any signs of distortion, and ensure ring has stretched less than 5% of its mean diameter.
- Inspect links and couplings for signs of wear at their load bearing points and for excessive play in the load pin between the body halves.
- Withdraw any chain, terminal links, hooks, shackles, rings or other equipment from service immediately if it has defects. Clearly mark the chain with an “Out of Service” tag stating that it must not be used until it has been inspected by the manufacturer.
- Destroy any chain that cannot be repaired.
- If the chain does not bear certifying tags or stamped markings it must be removed from service.
- Enter all inspection details on an inspection record card.

Attachment 3. Wire Rope Inspection Guide

Wire ropes must be inspected before each use. If a sling is subject to severe conditions the inspections should be more frequent. Send each sling for a proof load test at least every 12 months.

Look for:

- Any excessive wear such as abrasions from running over the drum or sheaves.
- Any slight discolouration that may indicate corrosion or lack of sufficient lubrication.
- Broken wires within the rope. Refer to technical specialist before use if 12 or more broken wires in a one rope lay or 4 broken wires in any strand are identified.
- Diameter reduction under load. If reduction is isolated to one area refer to technical specialist before use.
- Crushing or flattening in any section of the rope. If this occurs, consult a technical specialist.
- Shock-loading or bird-caging in any section of the rope. If this occurs, consult a technical specialist.
- High stranding or kinking. If this occurs, consult a technical specialist.

Attachment 4: Synthetic Sling Inspection Guide

Synthetic slings must be inspected before each use. If a sling is subject to severe conditions the inspections should be more frequent. Send each sling for a proof load test at least every 12 months.

Look for:

- Any excessive wear such as abrasions or cuts or contusions.
- Internal wear which is often indicated by a thickening of the sling or the presence of dirt and grit
- Damage to the protective coating of the sling.
- Damage caused by high temperatures, sunlight or chemicals (indicated by discolouration).
- Damage to the label or stitching.
- Damage to the eyes of any terminal attachments or end fittings.
- Where the sling is covered by a sleeve, the sleeve must cover the sling for the full length from eye to eye.

Discard a synthetic sling if:

- It is considered that it has lost more than 10% of its original breaking strength (send the sling to the manufacturer for regular testing).
- The label has been removed or destroyed.
- There is any damage to the sleeve or the protective coating.
- A nylon sling comes into contact with acid.
- A polyester sling comes into contact with an alkaline substance.
- A polypropylene sling comes into contact with organic solvents such as paint, coal tar or paint stripper.
- There are visible cuts on the sling.