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Purpose

The purpose of this document is to prevent injuries to humans and property damage from crane and hoist and rigging failures. This document explains the duties and responsibilities of a crane and hoist operator. There are many types of crane and hoists, and associated rigging used at Tufts University for lifting and moving materials. Tufts University's policy is to maintain a safe workplace for its employees; therefore, it cannot be overemphasized that only qualified and permitted individuals shall operate these devices. The safety rules and guidance in this TRAINING apply to all operations at Tufts University involving the use of crane and hoist installed in or attached to buildings and to all Tufts University employees. Students, Visitors and Contractors are not allowed to operate any Tufts University crane and hoists.

See Attachments 1 through 5 for specific guidance.

Definitions

**Abnormal Operating Conditions** - Environmental conditions that are unfavorable, harmful, or detrimental to or for the operation of a crane and hoist, such as excessively high or low ambient temperatures, exposure to weather, corrosive fumes, dust laden or moisture laden atmospheres, and hazardous locations.

**ANSI** – American National Standards Institute

**Chain Crane and hoist** – A crane and hoists used for lower capacity, lighter duty applications and for projects in which cost is a primary deciding factor.

**Control Pendant** – A device that gives an operator precise control over the motions of the crane.

**Crane** – A machine for lifting and lowering a load and moving it horizontally with the hoisting integral part of the machine. Cranes whether fixed or mobile are driven manually or by power.

**Crane Aisle** - The portion of the building aisle in which the crane operates, defined by the crane span and the continuous length of the crane runway.

**Crane and Hoist Chain** – The load bearing chain in a crane and hoist.

**Electrification System** - The various parts of the crane structure that supply and apply electricity to the trolley crane and hoist.

**Emergency Stop Switch** – A manually or automatically operated electric switch to cut off electric power independently of the regular operating controls.

**Hoist** - A mechanical unit that is used for lifting and lowering a load via a hook or lifting attachment

**Load** - The total superimposed weight on the crane and hoist load block or hook.

**Load block** – Is the assembly of hook or shackle, swivel, bearing, sheaves, pins, and frame suspended by the hoisting rope.
Power-Operated Crane – A crane whose mechanism is driven by electric, air, hydraulic or internal combustion means.

Power Supply - The electrical service available in the building for which the crane is being designed

Radio Remote Control - The radio control performs exactly like the pendant but operates using a radio frequency.

Rated capacity of a Sling - The rated capacity varies depending upon the type of the sling, the size of the sling, and type of hitch. Consult with the slings manufacturer. NOTE: Older slings must be used with additional caution. Sling charts are generally based on new slings.

Rated load - The maximum load for which a crane or individual hoist is designed and built by the manufacturer and shown on the equipment nameplate(s).

Sling - Is an assembly which connects the load to the material handling equipment. This can be wire rope, synthetic in materials. See OSHA Guidance on Safe Sling Use at https://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9834

Tag Line - Rope to steady and direct the load one lifted

Trolley - The unit which travels on the bridge rails and carries the hoisting mechanism.

Trolley Travel - The trolley movement perpendicular to the crane runway

Responsibilities

Supervisors are responsible for:

- Ensuring that employees under their supervision receive the required training and are permitted to operate the crane and hoist in their areas.

- Ensuring that crane and hoisting equipment is inspected and tested monthly by a responsible individual and that rigging equipment is inspected annually.

Operators are responsible for:

- Operating crane and hoisting equipment safely.

- Conducting functional tests prior to using the equipment.

- Selecting and using rigging equipment appropriately.

- Having a valid operator's permit on their person while operating crane and hoists or crane and hoists.
Tufts Facilities Services is responsible for:

- Performing annual maintenance and inspection of all Tufts University crane and hoists that are not covered by a program with maintenance responsibility.
- Conducting periodic and special load tests of crane and hoists.
- Maintaining written records of inspections and tests, and providing copies of all inspections and test results to facility managers and building coordinators who have crane and hoist on file.
- Inspecting and load testing crane and hoist following modification or extensive repairs (e.g., a replaced cable or hook, or structural modification.)
- Scheduling a non-destructive test and inspection for crane and hoist hooks at the time of the periodic load test, and testing and inspecting before use new replacement hooks and other hooks suspected of having been overloaded. The evaluation, inspection, and testing may include, but are not limited to visual, dye penetrant, and magnetic particle techniques referenced in ASME B30.10 (Hooks, Inspection and Testing.)
- Maintaining all manuals for crane and hoists in a central file for reference.

Tufts Environmental Health & Safety is responsible for:

- Conducting training for all crane and hoist operators or providing qualified instructor including qualified supervisor
- Issuing permits to crane and hoist Operators
- Interpreting crane and hoist safety rules and standards.

Safe Operating Requirements

Crane and Hoist Operators

You must be trained and tested before you can operate an overhead crane and hoist. Upon passing this test and meeting other operator requirements (including demonstrating proficiency in running the crane and hoist) a permit will be issued to you. It is to be carried by you or be available upon request. Crane and hoist operators must renew their permit annually by satisfying the requirements described above.
Permit (see Attachment 4)

CRANE AND HOIST OPERATOR PERMIT

Date Issued: MM/DD/YYYY________________
Date Expiring: MM/DD/YYYY________________

Operator’s Name: _______________________________ Employee Number: _______________________________

Above named is authorized to operate: SEE list below (Trainer to initial for each authorized equipment)

Operator: _______________________________
Print / Sign & Date

Crane and Hoist

<table>
<thead>
<tr>
<th>Operation</th>
<th>Bldg</th>
<th>Area</th>
<th>Hoist or Crane &amp; Type</th>
<th>Lifting Mfr</th>
<th>Model/Type</th>
<th>SN</th>
<th>Ton</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

X = NOT Authorized

Trainer: _______________________________
Print / Sign & Date

General Safety Rules

Operators shall comply with the following rules while operating the crane and hoist:

- Do not engage in any practice that will divert your attention while operating the crane and hoist.

- Respond to signals only from the person who is directing the lift, or any appointed signal person. Obey a stop signal at all times, no matter who gives it.

- Do not move a load over people. People shall not be placed in jeopardy by being under a suspended load. Also, do not work under a suspended load unless the load is supported by blocks, jacks, or a solid footing that will safely support the entire weight. Have a crane and hoist operator remain at the controls or lock open and tag the main electrical disconnect switch.

- Ensure that the rated load capacity of a crane and hoist, or any sling or fitting is not exceeded. Know the weight of the object being lifted, do not guess.

- Check that all controls are in the OFF position before closing the main-line disconnect switch.
NOTE: Good electrical practices: When operating the main-line disconnect switch, use one hand to operate the switch while the other is placed behind your back and turn your head to look away from the switch. This protects your eyes from any arc flash and possible electric shock should there be an unlikely short circuit.

- If spring-loaded reels are provided to lift pendants clear off the work area, ease the pendant up into the stop to prevent damaging the wire.

- Avoid side pulls. These can cause the crane and hoist to slip out of the drum groove, overload the lift capacity and/or damage crane and hoist.

- To prevent shock loading by avoiding sudden stops or starts. Shock loading can occur when a suspended load is accelerated or decelerated quickly, and can overload the crane and hoist.

Operation Rules

Pre-operational Test

At the start of each work shift, operators shall do the following steps before making lifts with any crane and hoist:

1. Test the upper-limit switch. Slowly raise the unloaded hook block until the limit switch trips.
2. Visually inspect the hook, load lines, trolley, and bridge as much as possible from the operator's station; in most instances, this will be the floor of the building.
3. Test the lower-limit switch.
4. Test all direction and speed controls for both bridge and trolley travel.
5. Test all bridge and trolley limit switches, where provided, if operation will bring the equipment in close proximity to the limit switches.
6. Test the pendant emergency stop.
7. Test the crane and hoist brake to verify there is no drift without a load.
8. Test the crane and hoist travel on the track/monorail.

<table>
<thead>
<tr>
<th>Inspection Item</th>
<th>Description of Inspection Check Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tagged Crane and hoist or Crane and hoist</td>
<td>Check that crane and hoist or crane and hoist is not tagged with an out-of-order sign.</td>
</tr>
<tr>
<td>Control Devices</td>
<td>Test run that all motions agree with control device markings.</td>
</tr>
<tr>
<td>Brakes</td>
<td>Check that all motions do not have excessive drift and that stopping distances are normal.</td>
</tr>
<tr>
<td>--------</td>
<td>---------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Hook</td>
<td>Check for damage, cracks, nicks, gouges, deformations of the throat opening, wear on saddle or load bearing point, and twist. Refer to the manual furnished by the original manufacturer of the crane and hoist.</td>
</tr>
<tr>
<td>Hook Latch</td>
<td>If a hook latch is required, check for proper operation.</td>
</tr>
<tr>
<td>Wire Rope</td>
<td>Check for broken wires, broken strands, kinks, and any deformation or damage to the rope structure.</td>
</tr>
<tr>
<td>Reieving</td>
<td>Check that the wire rope is properly reeved and that rope parts are not twisted about each other.</td>
</tr>
<tr>
<td>Limit Switches</td>
<td>Check that the upper limit device stops lifting motion of the crane and hoist load block before striking any part of the crane and hoist or crane and hoist.</td>
</tr>
<tr>
<td>Oil Leakage</td>
<td>Check for any sign of oil leakage on the crane and hoist and on the floor area beneath the crane and hoist.</td>
</tr>
<tr>
<td>Unusual Sounds</td>
<td>Check for any unusual sounds from the crane and hoist or crane and hoist mechanism while operating the crane and hoist or crane and hoist.</td>
</tr>
<tr>
<td>Warning and Safety Labels</td>
<td>Check that warning and other safety labels are not missing and that they are legible.</td>
</tr>
<tr>
<td>Housekeeping and Lighting</td>
<td>Check area for accumulation of material, trip or slip hazards, and poor lighting.</td>
</tr>
</tbody>
</table>

**Moving a Load**

- Center the hook over the load to keep the chains from slipping out of the drum grooves and overlapping, and to prevent the load from swinging when it is lifted. Inspect the drum to verify that the chain is in the grooves.

- Use a tag line when loads must traverse long distances or otherwise be controlled. Manila rope may be used for tag lines. **NOTE:** Do not wrap the rope around your hand/s.

- Plan and check the travel path to avoid personnel and obstructions.

- Lift the load only high enough to clear the tallest obstruction in the travel path. Typically, 6-inches.

- Start and stop slowly. Avoid jerky adjustments.

- Land the load when the move is finished. Choose a safe landing.

- **Never leave suspended loads unattended.** In an emergency where the crane and hoist or crane and hoist has become inoperative, if a load must be left suspended, barricade and post signs in the surrounding area, under the load, and on all four sides. Lock open and tag the crane and hoist or crane and hoist's main electrical disconnect switch.

**Storing a Crane or Hoist**

- Remove all slings and accessories from the hook. Return rigging devices to the designated storage area.

- Raise the hook at least 2.1 m (7-ft) above the floor.

- Store the pendant away from aisles and work areas, or raise it at least 2.1 m (7-ft) above the floor.
• Place the emergency stop switch (or push button) in the OFF position.

• Check that all controls are in the OFF position before closing the main-line disconnect switch.
  o NOTE: Good electrical practices: When operating the main-line disconnect switch, use one hand to operate the stitch while the other is placed behind your back and turn your head to look away from the switch. This protects your eyes from any arc flash and possible electric shock should there be an unlikely short circuit.

• Lock the main-line disconnect switch and return the keys to the designated location.

Rigging

General Rigging Safety Requirements

Only select rigging equipment that is in good condition. All rigging equipment shall be inspected annually; defective equipment is to be removed from service and destroyed to prevent inadvertent reuse. The load capacity limits shall be stamped or affixed to all rigging components.

• Only properly tagged/labeled slings can be used All slings, regardless if made of chain, wire rope or synthetic, must be marked with a tag/label.
• Slings not or detached tags/labels must be removed from service until new tags/labels can be permanently reattached (contact manufacture).

Tufts University requires the following types of slings shall be destroyed upon discovery:

1. Nylon slings with
   • Abnormal wear.
   • Torn stitching.
   • Broken or cut fibers.
   • Discoloration or deterioration.

2. Wire-rope slings with
   • Kinking, crushing, bird-caging, or other distortions.
   • Evidence of heat damage.
   • Cracks, deformation, or worn end attachments.
   • Six randomly broken wires in a single rope lay.
   • Three broken wires in one strand of rope.
   • Hooks opened more than 15% at the throat.
   • Hooks twisted sideways more than 10deg. from the plane of the unbent hook.

3. Alloy steel chain slings with
   • Cracked, bent, or elongated links or components.
   • Cracked hooks.

4. Shackles, eye bolts, turnbuckles, or other components those are damaged or deformed.
Rigging a Load

Do the following when rigging a load:

- Visually inspect the rigging, slings and components for abnormal ware and tare
- Determine the weight of the load. Do not guess.
- Determine the proper size for slings and components.
- Do not use manila rope for rigging. Only use for a tag line when loads must traverse long distances or otherwise be controlled. NOTE: Do not wrap the rope around your hand/s.
- Determine the center of gravity and balance the load before moving it.
- Verify that shackle pins and shouldered eye bolts are installed in accordance with the manufacturer's recommendations.
- Verify that ordinary (shoulderless) eye bolts are threaded in at least 1.5 times the bolt diameter.
- Use safety crane and hoist rings (swivel eyes) as a preferred substitute for eye bolts wherever possible.
- Pad sharp edges to protect slings.
- Do not use slings, eye bolts, shackles, or hooks that have been cut, welded, brazed or otherwise repaired or modified.
- Install wire-rope clips with the base only on the live end and the U-bolt only on the dead end. Follow the manufacturer's recommendations for the spacing for each specific wire size.
- Initially lift the load only a few inches above the floor to test the rigging and balance.

Crane and Hoist Overloading

Crane and hoists or crane and hoists shall not be loaded beyond their rated capacity for normal operations. Any crane and hoist or crane and hoist suspected of having been overloaded shall be removed from service by tagging the main disconnect switch. Additionally, overloaded crane and hoists shall be inspected, repaired, load tested, and approved for use before being returned to service.

Working at Heights on Crane and Hoists

Anyone conducting maintenance or repair on crane and hoists at heights greater than 1.8 m (6 ft.) shall use fall protection. Fall protection should also be considered for heights less than 1.8 m. Fall protection includes safety harnesses that are fitted with a lifeline and securely attached to a structural member of the crane and hoist or building or properly secured safety nets.
Hand Signals

Signals to the operator shall be in accordance with the standard hand signals unless voice communications equipment (telephone, radio, or equivalent) is used. Signals shall be discernible or audible at all times. Some special operations may require addition to or modification of the basic signals. For all such cases, these special signals shall be agreed upon and thoroughly understood by both the person giving the signals and the operator, and shall not be in conflict with the standard signals.

**TABLE 2**

<table>
<thead>
<tr>
<th>TABLE 2</th>
<th>Standard Hand Signals for Controlling Overhead Crane and Hoists</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Image" /></td>
<td>CRANE AND HOIST. With forearm vertical, forefinger pointing up, move hand in small horizontal circle</td>
</tr>
<tr>
<td><img src="image2.png" alt="Image" /></td>
<td>LOWER. With arm extended downward, forefinger pointing down, move hand in small horizontal circle.</td>
</tr>
<tr>
<td><img src="image3.png" alt="Image" /></td>
<td>MOVE SLOWLY. Use one hand to give any motion signal and place other hand motionless in front of hand giving the motion signal. (Crane and hoist Slowly shown as an example.)</td>
</tr>
<tr>
<td><img src="image4.png" alt="Image" /></td>
<td>TROLLEY TRAVEL. Palm up, fingers closed, thumb pointing in direction of motion, jerk hand horizontally.</td>
</tr>
<tr>
<td><img src="image5.png" alt="Image" /></td>
<td>STOP. Arm extended, palm down, hold position rigidly.</td>
</tr>
<tr>
<td><img src="image6.png" alt="Image" /></td>
<td>EMERGENCY STOP. Arm extended, palm down, move hand rapidly right and left.</td>
</tr>
</tbody>
</table>

Inspection, Maintenance, and Testing

All tests and inspections shall be conducted in accordance with the manufacturer’s recommendations.

**Daily Inspections**

**Operational Inspections**
Monthly Tests and Inspections

- All in-service crane and hoist shall be inspected monthly and the results documented on the appropriate form.

- Defective crane and hoist shall be locked and tagged "out of service" until all defects are corrected. The inspector shall initiate corrective action by notifying the facility manager or building coordinator.

Annual Inspections

Facilities Services shall schedule and supervise (or perform) annual preventive maintenance (PM) and annual inspections of all crane and hoist. The annual PM and inspection shall cover

- Crane and hoisting and lowering mechanisms.
- Trolley travel or monorail travel.
- Limit switches and locking and safety devices.
- Structural members.
- Bolts or rivets.
- Sheaves and drums.
- Parts such as pins, bearings, shafts, gears, rollers, locking devices, and clamping devices.
- Brake system parts, linings, pawls, and ratchets.
- Load, wind, and other indicators over their full range.
- Gasoline, diesel, electric, or other power plants.
- Chain-drive sprockets.
- Crane and hoist hooks.
- Electrical apparatus such as controller contractors, limit switches, and push button stations.
- Wire rope.
- Crane and hoist chains.

Load Testing

- Newly installed crane and hoist shall be load tested at 125% of the rated capacity by designated personnel.
• Slings shall have appropriate test data when purchased. It is the responsibility of the purchaser to ensure that the appropriate test data are obtained and maintained.

• Re-rated crane and hoist shall be load tested to 125% of the new capacity if the new rating is greater than the previous rated capacity.

• Fixed crane and hoists or crane and hoists that have had major modifications or repair shall be load tested to 125% of the rated capacity.

• Crane and hoists that have been overloaded shall be inspected prior to being returned to service.

• Personnel platforms, baskets, and rigging suspended from a crane and hoist or crane and hoist hook shall be load tested initially, then re-tested annually thereafter or at each new job site.

• All crane and hoist with a capacity greater than 2722 kg (3 tons) should be load tested every four years to 125% of the rated capacity. Crane and hoist with a lesser capacity should be load tested every eight years to 125% of the rated capacity.

**Records**

The department shall maintain records for all crane and hoists, crane and hoist and rigging equipment.

**Crane and Hoist Safety Design Requirements**

Following are the design requirements for crane and hoist and their components:

• The design of all commercial crane and hoist shall comply with the requirements of ASME/ANSI B30 standards and Crane and hoist Manufacturer's Association of America standards (CMAA-70 and CMAA-74). Tufts University -fabricated lifting equipment shall comply with the requirements in Chapter 2.2 (Lifting Equipment) of Mechanical Engineering *Design Safety Standards* (latest edition).

• All Crane and hoist hooks shall have safety latches.

• Hooks shall not be painted (or re-painted) if the paint previously applied by the manufacturer is worn.

• Crane and hoist pendants shall have an electrical disconnect switch or button to open the main-line control circuit.

• Crane and hoist shall have a main electrical disconnect switch. This switch shall be in a separate box that is labeled with lockout capability.

• Crane and hoist bridges and crane and hoist monorails shall be labeled on both sides with the maximum capacity.

• Each crane and hoist-hook block shall be labeled with the maximum hook capacity.
• Directional signs indicating N-W-S-E shall be displayed on the bridge underside, and a corresponding directional label shall be placed on the pendant.

• A device such as an upper-limit switch or slip clutch shall be installed on all building crane and hoist. A lower-limit switch may be required when there is insufficient crane and hoist rope on the drum to reach the lowest point.

• All cab and remotely operated bridge crane and hoists shall have a motion alarm to signal bridge movement.

• All newly installed crane and hoist, or those that have been extensively repaired or rebuilt structurally, shall be load tested at 125% capacity prior to being placed into service.

• If an overload device is installed, a load test to the adjusted setting is required.

• Personnel baskets and platforms suspended from any crane and hoist shall be designed in accordance with the specifications in 29 CFR 1926.550(g).
REFERENCES

OSHA Title 29, Part 1910.179, "Overhead and Gantry Crane and hoists."

OSHA Title 29, Part 1910.184, "Slings."
https://www.osha.gov/pls/oshaweb/owadisp.show_document%3Fp_table%3DSTANDARDS%26p_id%3D9834

GUIDANCE ON SAFE SLING USE: https://www.osha.gov/dsg/guidance/slings/synth-round.html

NFPA 70, Article 610, Crane and hoist.

Hoosier Crane - http://www.hoosiercrane.com/contact-hoosier-crane
ATTACHMENT 1
DAILY/PRE-USE CHECKLIST AND QUARTERLY INSPECTION

CRANE AND HOIST ID: __________________ LOAD RATING: __________________

OPERATOR/INSPECTOR: __________________

DEPT./OWNER: __________________ DATE/TIME: __________________

DESCRIBE TASK/PLANNED LIFT: ____________________________________________

Crane/Crane and hoist Operator’s Daily / Pre-use Checklist
(1) Check off as appropriate)

<table>
<thead>
<tr>
<th>YES</th>
<th>NO</th>
<th>N/A</th>
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<tbody>
<tr>
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<tr>
<td>Have the crane and hoist and rigging been visually inspected and found to be safe for use prior to the beginning of any lifting work?</td>
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<tr>
<td>Are all electrically operated crane and hoist effectively grounded?</td>
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<tr>
<td>Is the load chart clearly visible to the operator?</td>
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<tr>
<td>Is the rated capacity visibly marked on the crane?</td>
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<tr>
<td>Has the load been calculated and verified to be below the limits of the crane and hoist and rigging?</td>
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<tr>
<td>Are operating controls clearly identified?</td>
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<tr>
<td>Is sufficient illumination provided for the operator to perform the work safely?</td>
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<td>Has a lift-plan of action been agreed to by the personnel involved?</td>
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<td>Is the path of the operator and stand-by/load positioning person been cleared of slip, trip, and fall obstacles?</td>
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<tr>
<td>Has the lift/travel path been secured or visually marked to prevent entry by anyone?</td>
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</tbody>
</table>

Quarterly Inspection or when idle more than one month.
(In addition to Daily/Pre Use Inspection)

<table>
<thead>
<tr>
<th>Pass</th>
<th>Fail</th>
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<tbody>
<tr>
<td></td>
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</tr>
<tr>
<td>Functional operating mechanisms have been checked for excessive wear.</td>
<td></td>
</tr>
<tr>
<td>Readily accessible ropes, brakes, friction clutches, chain drives, and other parts subject to wear have been inspected.</td>
<td></td>
</tr>
<tr>
<td>Wire rope that has been idle for a period of a month or more due to shut-down or storage of a crane is given a thorough inspection before it is placed in service. This inspection is for all types of deterioration and is performed by a qualified person whose approval is required for use of the Crane.</td>
<td></td>
</tr>
</tbody>
</table>
ATTACHMENT 2
CRANE AND HOIST OPERATOR QUALIFICATION DOCUMENTATION

Operator’s Name:

Operator’s Employee Number:

Is Authorized To Operate: (Insert Type of Crane and hoist(s) Authorized)

Restrictions: (Explanation of Restrictions)

Date Issued: (Month-Day-Year) __________ Date Expiring: (Month-Day-Year) ______________

This document confirms the Qualification of the above named employee to perform:
(Check all that apply)

☐ Operate/inspect overhead cranes and crane and hoists within their department

☐ Inspect rigging and rig loads to be suspended within their department

☐ Other:

This designation is based on evidence of safe performance of all duties related to crane/crane and
hoist operation and verification by another “Qualified Person” through:
(Check all that apply)

☐ Training – Appropriate training records (including tests) are attached.

☐ Experience – This employee has been safely performing and has demonstrated skill in crane and
hoist operation for ____________ years.

☐ Instruction – This employee has received on the job instruction from me or another employee who
is qualified, has observed this employee’s work while performing this operation, and confirms that
the employee has the knowledge to perform crane/crane and hoist work safely.

If, for any reason, as their supervisor, I think that this employee is not performing this operation safely,
this qualification will be revoked. Below are signature(s) of responsible person(s) verifying training,
experience and/or providing instruction:

Supervisor Signature: ___________________________ Date

Qualifying Person / Trainer (if not supervisor) ___________________________ Date

Employee Signature ___________________________ Date
ATTACHMENT 3

RIGGING AND EQUIPMENT ANNUAL INSPECTION CRITERIA

To “Pass Annual Inspection”, Departments must assure that all their “Below-the-Hook Lifting Devices” and associated rigging either are immediately removed from service for repair/replacement or meet the following requirements:

Structural and Mechanical Lifting Devices

The rated capacity of each lifting device must be marked on the main structure where it is visible and legible. If the lifting device comprises several items, each detachable from the assembly, each lifting device must be marked with its rated capacity. At a minimum, a nameplate, name tag, or other permanent marker must be affixed displaying the following data:

- Manufacturer or contractor’s name if fabricated on-site
- Lifting device weight, if over 100 lbs.
- Serial number (if available)
- Rated capacity
- Proof of inspection label by crane and hoist and rigging inspector

Rigging Hooks

Marking
The manufacturer’s identification must be forged, cast, or die-stamped on a low-stress and non-wearing area of the hook.

Inspecting
The operator or qualified person must visually inspect hooks daily or prior to first use, or if the hook is not in regular service. If any of the following conditions are found, remove the hook from service:

- Cracks, nicks, gouges
- Deformation
- Damage from chemicals
- Damage, engagement, or malfunction of latch (if provided)
- Evidence of heat damage
- Wear
- Hook attachment and securing means
# ATTACHMENT 4

**OPERATOR PERMIT**

<table>
<thead>
<tr>
<th>Operator's Name:</th>
<th>Employee Number:</th>
</tr>
</thead>
</table>

Above named is authorized to operate: SEE list below (Trainer to initial for each authorized equipment)

<table>
<thead>
<tr>
<th>Operation</th>
<th>Bldg</th>
<th>Area</th>
<th>Hoist or Crane &amp; Type</th>
<th>Lifting Mfgr</th>
<th>Model/Type</th>
<th>SN</th>
<th>Ton</th>
</tr>
</thead>
<tbody>
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</table>

* X = NOT Authorized

Trainer: __________________________

Print / Sign & Date

Operator: __________________________

Print / Sign & Date
ATTACHMENT 5
CRANE AND HOIST OPERATOR INSPECTION CHECKLIST

BLDG.: ______________ Room No: ______________ Campus ______________

DATE: ______________ Operator’s Name: ____________________________

Operator Inspection Checks

<table>
<thead>
<tr>
<th>✓</th>
<th>Inspection Item</th>
<th>Description of Inspection Check Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>✓</td>
<td>Tagged Crane and hoist or Crane and hoist</td>
<td>Check that crane and hoist is not tagged with an out-of-order sign.</td>
</tr>
<tr>
<td>✓</td>
<td>Control Devices</td>
<td>Test run that all motions agree with control device markings.</td>
</tr>
<tr>
<td>✓</td>
<td>Brakes</td>
<td>Check that all motions do not have excessive drift and that stopping distances are normal.</td>
</tr>
<tr>
<td>✓</td>
<td>Hook</td>
<td>Check for damage, cracks, nicks, gouges, deformations of the throat opening, wear on saddle or load bearing point, and twist. Refer to the manual furnished by the original manufacturer of the crane and hoist.</td>
</tr>
<tr>
<td>✓</td>
<td>Hook Latch</td>
<td>If a hook latch is required, check for proper operation.</td>
</tr>
<tr>
<td>✓</td>
<td>Wire Rope</td>
<td>Check for broken wires, broken strands, kinks, and any deformation or damage to the rope structure.</td>
</tr>
<tr>
<td>✓</td>
<td>Reeving</td>
<td>Check that the wire rope / chain is properly reeved and that rope/chain parts are not twisted about each other.</td>
</tr>
<tr>
<td>✓</td>
<td>Limit Switches</td>
<td>Check that the upper limit device stops lifting motion of the crane and hoist load block before striking any part of the crane and hoist.</td>
</tr>
<tr>
<td>✓</td>
<td>Oil Leakage</td>
<td>Check for any sign of oil leakage on the crane and hoist and on the floor area beneath the crane and hoist.</td>
</tr>
<tr>
<td>✓</td>
<td>Unusual Sounds</td>
<td>Check for any unusual sounds from the crane and hoist mechanism while operating the crane and hoist.</td>
</tr>
<tr>
<td>✓</td>
<td>Warning and Safety Labels</td>
<td>Check for any unusual sounds from the crane and hoist mechanism while operating the crane and hoist.</td>
</tr>
<tr>
<td>✓</td>
<td>Housekeeping and Lighting</td>
<td>Check for any unusual sounds from the crane and hoist mechanism while operating the crane and hoist.</td>
</tr>
<tr>
<td>✓</td>
<td>Safe to Operate Yes/NO?</td>
<td>The equipment is safe to operate – Yes / No</td>
</tr>
</tbody>
</table>

Operator’s Signature: ____________________________

EMERGENCY CONTACTS:

<table>
<thead>
<tr>
<th>TUPD Campus Police</th>
<th>x66911</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facilities Services</td>
<td></td>
</tr>
<tr>
<td>Supervisor</td>
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</tbody>
</table>

PLEASE FILE and RETAIN this document for inspection