



UMBC OFFICE OF ENVIRONMENTAL SAFETY AND HEALTH (ESH) WRITTEN PLAN	TITLE: Crane and Hoist Program
DATE CREATED: 10/2023	REVISION: 1.0

I. PURPOSE

The purpose of this procedure is to establish minimum requirements and necessary precautions to ensure safe operation of all cranes, hoists, and other rigging devices used to lift and hoist material at UMBC.

This procedure has additionally been established to ensure compliance with Occupational Safety and Health Administration (OSHA) 1910.179 – Overhead and Gantry Cranes.

II. SCOPE

This procedure applies to all UMBC employees, student employees, as well as full-time and part-time students that operate a crane, hoist, or other rigging device at UMBC.

The equipment that this procedure applies to includes all overhead and gantry cranes, including semi-gantry, cantilever gantry, wall cranes, bridge cranes, electric hoists, manual hoists, pneumatic hoists, chains and slings, and other hoisting equipment that have similar fundamental characteristics.

This procedure does not apply to:

- Mobile cranes
- Tower cranes
- Engine hoists
- Powered industrial trucks, aerial lifts, or other similar equipment covered in other Environmental Safety and Health (ESH) procedures or plans.

III. DEFINITIONS

- *Bridge* - means the part of a crane consisting of girders, trucks, end ties, footwalks, and drive mechanism which carries the trolley or trolleys.
- *Bridge Crane* - crane with bridge mounted on tracks, which enables three-dimensional handling.
- *Bridge travel* - crane movement in a direction parallel to the crane runway.
- *Crane* - a machine for lifting and lowering a load and moving it horizontally, with the hoisting mechanism an essential part of the machine. Cranes whether fixed or mobile are driven manually or by power.
- *Designated Person* - selected or assigned by the Department/Division Head, or designated representative, as being qualified to perform specific duties.
- *Drum* - is the cylindrical member around which the ropes are wound for raising or lowering the load.
- *Floor-Operated Crane* - means a crane which is pendant- or nonconductive rope-controlled by an operator on the floor or an independent platform.
- *Frequent Inspection* - an inspection of the equipment conducted in daily to monthly intervals.
- *Gantry Crane* - means a crane similar to an overhead crane except that the bridge for carrying the trolley or trolleys is rigidly supported on two or more legs running on fixed rails or other runway.
- *Hand-Held Hoist* - lever operated roller chain hoist.
- *Hoist* - an apparatus, which may be part of a crane, exerting a force for lifting or lowering.
- *Load* – the total superimposed weight on the load block or hook.
- *Overhead crane* - means a crane with a movable bridge carrying a movable or fixed hoisting mechanism and traveling on an overhead fixed runway structure.
- *Pawl* – a device used to hold machinery against undesired rotation by engaging a ratchet.
- *Pendant* – controls suspended from an electric hoist.
- *Periodic inspection* - an inspection of the equipment conducted during 1 to 12 month intervals.
- *Power-Operated Crane* - means a crane whose mechanism is driven by electric, air, hydraulic, or internal combustion means.
- *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).

- *Semi Gantry Crane* - is a gantry crane with one end of the bridge rigidly supported on one or more legs that run on a fixed rail or runway, the other end of the bridge being supported by a truck running on an elevated rail or runway.
- *Sheave* – a grooved wheel or pulley used with a rope or chain to change direction and point of application of the pulling force.
- *Slip clutch* – is a clutch that will slip when the torque is too great.
- *Stop* - is a device to limit travel of a trolley or crane bridge. This device normally is attached to a fixed structure and normally does not have energy absorbing ability.
- *Trolley* - is the unit which travels on the bridge rails and carries the hoisting mechanism.
- *Trolley travel* - defined as the trolley movement at right angles to the crane runway.
- *Unattended* - a condition in which the operator of a hoist is not at the operating control devices (pendant station or hand chain). However, if the control devices are within an unobstructed distance of 26 ft. (8.0 m) and within sight of the operator, the hoist should be considered attended.

IV. PROCEDURE

General Requirements

- Only personnel authorized by their manager or department head shall be permitted to operate a crane, hoist or other rigging device. Managers shall retain a current list of authorized crane operators in their respective departments or areas.
- All personnel in the general vicinity of an active crane operation shall wear appropriate PPE, including hard hats and safety glasses. Gloves shall be worn by any rigging personnel.
- Crane operators shall familiarize themselves with the equipment operator's manual prior to operation of any crane or rigging device.
- Any crane, hoist, or rigging device that presents a safety concern, fails an inspection, or operates outside of its intended function, shall be taken out of service. The equipment shall be clearly tagged as out of service and shall have the power physically disconnected or locked out to prevent unauthorized or accidental operation.

Crane and Hoist Design Requirements

- Cranes and hoists shall be designed and installed in compliance with manufacturer's specifications, and the requirements of ASME/ANSI B30 standards, as well as the Crane Manufacturers Association of America standards (CMAA-70 and CMAA-74).
- Cranes and hoists may only be modified or re-rated under the analysis and certification of a qualified engineer or the equipment manufacturer.

- The rated load capacity of the crane and/or hoist and the associated structure shall be marked on all sides, and in a manner so it is clearly visible from the floor level.

Crane Inspection and Servicing Requirements

Managers or department heads whose departments have authority or ownership of a crane, hoist, or other rigging device, shall arrange to have a preventative maintenance and service schedule with a third-party service provider that meets or exceeds regulatory requirements and the specifications set by the manufacturer.

OSHA classifies inspections of cranes and hoists into two general categories:

- **Frequent Inspection** – These occur on a daily to monthly basis.
- **Periodic Inspection**– These inspections occur every 1 to 12 months.
 - The frequency of periodic inspection depends on how heavily the crane or hoist is used. For cranes that do not undergo heavy use, an annual (12 month) inspection is sufficient. Contact ESH with questions about periodic inspection frequency.

Frequent Inspection

- The following items shall be inspected ***daily (or before each use)*** by a designated individual or the crane operator:
 - Functional operating mechanisms – Checked for maladjustment.
 - Hydraulic and air system components (valves, lines, tanks, drain pumps) – Checked for deterioration or degradation.
 - Crane hooks – Checked for cracks and other deformations.
- The following items shall be inspected ***monthly*** by a designated individual or the crane operator:
 - Rope and end connections – checked for broken strands or excessive wear.
 - Hoist chains and end connections – checked for distortion, excessive wear, or anything else that could interfere with proper function or cause them to stretch beyond manufacturer’s recommendations.

All frequent (daily/pre-use and monthly) inspections shall be documented utilizing the Appendix A: UMBC Crane and Hoist Frequent Inspection Checklist and retained with the department with authority or ownership of the crane or hoist.

Periodic Inspection

A periodic inspection is intended to be a more detailed inspection to look for defects, excessive wear, or compliance issues. Periodic inspections shall be completed for all new, repaired, or modified cranes prior to placing into service.

Periodic inspections shall be completed by a third-party service provider or technician who is qualified to perform installation, maintenance, and repair of cranes.

Intermittent Use

If a crane is not operated for more than 30 days, it must undergo a frequent (daily/pre-use and monthly) inspection. Cranes that sit idle for over six months must undergo a periodic as well as a frequent (daily/pre-use and monthly) inspection before returning to service.

Load Testing

- Newly installed cranes and hoists 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 cranes and hoists shall be load tested to 125% of the new capacity if the new rating is greater than the previous rated capacity.
- Fixed cranes or hoists that have had major modifications or repair shall be load tested to 125% of the rated capacity.
- Cranes and hoists that have been overloaded shall be inspected prior to being returned to service.
- Personnel platforms, baskets, and rigging suspended from a crane or hoist hook shall be load tested initially, then re-tested annually thereafter or at each new job site.

Rules of Operation

Pre-Operation Inspection

A frequent (daily/pre-use) inspection shall be performed by the operator prior to operation and documented using the Appendix A: UMBC Crane and Hoist Frequent Inspection Checklist.

Rigging the Load

- Determine appropriate size and number of slings and associated components.
- Pad sharp edges on loads to prevent sling wear.
- Ensure slings and hooks are in good operating condition with no excessive wear.
- Determine load's center of gravity and ensure rigging maintains a level position during movement.
- Once slings are in place, lift the load slightly to test rigging and balance. Adjust as necessary.

- Use a tagline when loads will be moved for long distances or otherwise require control.

Lifting and Lowering the Load

- The crane operator and signal person must be able to communicate at all times. This can be achieved through audio (voice or handheld radio), or if audio communication is not possible, hand signals may be used.
- Sudden starts and stops should be avoided to prevent shock load. Ease the load up/down by slowly accelerating and decelerating.
- All personnel shall stand clear of a load while it is being lifted, lowered or transported. The area of travel must remain clear of obstructions at all times.
- Suspended loads shall never be left unattended.
- Operators may not engage in other tasks or distracting activity while operating a crane, hoist or other rigging device.
- Operators must obey the signals or audible commands of the signal person at all times.

Training Requirements

Crane and hoist operators at UMBC shall receive initial training prior to independently performing operator duties.

Training may be provided either by a third-party or by an employee who possesses sufficient knowledge and experience to be able to provide training that satisfies the curriculum requirements. The training shall conform to American Society of Mechanical Engineers (ASME) B30 standards and consist of classroom instruction in addition to hands-on training under the observation of a trained instructor or crane operator.

The training curriculum shall consist of the following:

- Function of all major crane components and assemblies
- Minimum qualifications and requirements for a crane operator
- Crane inspection requirements and methods
- Rules of safe crane operation
- Precise spotting of loads and precision lifts
- Hand signaling
- Basis rigging procedures

Retraining shall be required under the following circumstances:

- The operator is observed to be using the equipment in an unsafe manner, or in a manner that deviates from appropriate operating procedures.
- Following any operator-involved accident or near-miss.
- The operator is assigned to a different type of equipment.
- A condition or change in the workplace renders current training inaccurate, irrelevant, or no longer provides the necessary knowledge for safe and competent operation of the equipment.

Recordkeeping

All records of inspections, service, and operator training shall be retained for three (3) years with the department which has authority or ownership of the crane and its operation.

V. ROLES AND RESPONSIBILITIES

Area Managers, Deans, Department Heads, Supervisors

- Be familiar with the provisions and requirements of this procedure.
- Ensure cranes, hoists, and rigging devices within their areas are inspected, serviced, and maintained as needed to ensure continued safe and functional operation.
- Ensure employee compliance with this procedure as well as employee understanding of roles and responsibilities for performing operator, rigging, or signalperson duties.
- Ensure employees receive required training prior to crane, hoist or rigging device operation, as well as receive retraining when deemed necessary.
- Ensure employees are provided with and use appropriate personal protective equipment.

Environmental Safety and Health

- Provide subject matter and technical guidance as needed to ensure departmental compliance and safe operation of cranes, hoists and related equipment.
- Perform periodic auditing and review of this procedure to ensure continued effectiveness and applicability.
- Follow up, investigate, and facilitate correction of any reported safety concerns, incidents, or near-misses as it pertains to the operation of cranes, hoists, or rigging devices at UMBC.

Employees

- Adhere to this procedure when operating a crane, hoist, or rigging device at UMBC.
- Clearly understand all roles and responsibilities for performing operation, rigging, or signalperson duties.

- Ensure completion of all necessary training.
- Perform and document inspections of cranes, hoists, and rigging devices in their areas of responsibility.
- Ensure all necessary PPE and other appropriate safety equipment is in place when working with or around cranes, hoists, or rigging devices.
- Promptly report any safety concerns, accidents, or near-misses to supervision and Environmental Safety and Health.

VI. REFERENCES

- UMBC Policy VI-13.00.01 - Environmental Safety and Health Management and Enforcement
- UMBC ESH Procedure - General Safety Rules for UMBC Employees
- Crane and Hoist Frequent Inspection Checklist