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13.0 OVERHEAD & GANTRY CRANES; CRANES AND MONORAILS

13.1 Scope

This Hanford Site Hoisting and Rigging Manual (HSHRM) chapter applies to the marking, construction, installation, inspection, testing, maintenance and operation of the following overhead and gantry cranes, including semi-gantry, cantilever gantry, wall cranes, bridge cranes, monorail and jib cranes, and others having the same fundamental characteristics. These cranes may be top-running, under-running, single- or double-girder. Hoist units and trolleys are most commonly electric powered, but can be air powered or hand-chain operated. These cranes may be cab operated, pulpit operated, floor operated, or remotely operated. Such cranes are grouped together because all have trolleys and similar travel characteristics.

The proper and safe use of overhead gantry cranes, monorail and jib cranes is governed by the American Society of Mechanical Engineers (ASME) standards and the Occupational Safety and Health Administration (OSHA) regulations. This chapter implements required criteria from the following standards:

- ASME B30.2, *Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist)*
- ASME B30.17, *Cranes and Monorails (with Underhung Trolley or Bridge)*
- OSHA 29 CFR 1910.179, *Overhead and Gantry Cranes*
- OSHA 29 CFR 1926 Subpart CC, Section 1926.1438, *Overhead and Gantry Cranes* (only applies to temporarily installed cranes)

This section implements the following criteria and the applicable national standards and/or federal specifications that are mandatory requirements for each item.

- ASME B30.2, *Overhead and Gantry Cranes (Top Running Bridge, Single or Multiple Girder, Top Running Trolley Hoist)*:
 - Chapter 2-1, *General Construction and Installation*
 - Chapter 2-2, *Inspection and Testing*
 - Chapter 2-3, *Operator Training and Operation*
 - Chapter 2-4, *Maintenance Training and Maintenance*
- ASME B30.17, *Cranes and Monorails (with Underhung Trolley or Bridge)*:
 - Chapter 17-1, *General Construction and Installation*
 - Chapter 17-2, *Inspection and Testing*
 - Chapter 17-3, *Operator Training and Operation*
 - Chapter 17-4, *Maintenance Training and Maintenance*

13.2 Accessing Requirements

- a. To access ASME standards, choose one of the following options:

- [IHS Engineering Standards, Regulations and Technical Specifications](#). The contractor must have paid for access to the specific standard.
- Purchase standards directly from [ASME](#).
- b. To access OSHA standards, go to the following links:
 - [OSHA 29 CFR 1910.179, Overhead and Gantry Cranes](#)
 - [OSHA 29 CFR 1926, Subpart CC, Cranes and Derricks in Construction](#) (or see Attachment 4)

13.3 Implementation

Contractors shall comply with OSHA, ASME, this HSHRM, and the manufacturers' requirements. Users of this HSHRM are responsible to implement all applicable requirements. If standards conflict, the user shall adhere to the standard containing the most stringent requirements. In most cases, ASME standards provide the most comprehensive information.

Users should contact a Hanford Site Hoisting and Rigging Committee (HHRC) representative or send an [email](#) requesting a formal interpretation. See Appendix C, *Interpretations*, for the process to be followed. Notify the HHRC if any inconsistent standards are identified.

This HSHRM does not intend to require retrofitting of existing equipment. However, when any hoisting or rigging equipment is modified, its performance requirements shall be reviewed relative to the requirements within the current HSHRM. The need to meet the current requirements shall be evaluated by a qualified person selected by the owner (user). Recommended changes shall be made by the owner (user).

The responsible engineer may invoke ASME NOG-1, *Rules for Construction of Overhead and Gantry Cranes (Top Running Bridge, Multiple Girder)*, for cranes used at nuclear facilities. ASME NOG-1 applies to the design, manufacture, testing, inspection, shipment, storage, and erection of overhead and gantry cranes (Top Running Bridge, Multiple Girder).

The responsible engineer may invoke ASME NUM-1, *Rules for Construction of Cranes, Monorails, and Hoists (with Bridge or Trolley or Hoist of the Underhung Type)* for cranes used at nuclear facilities. ASME NUM-1 applies to the design, manufacture, testing, inspection, shipment, storage, and erection of monorails and hoists (with Bridge or Trolley or Hoist of the Underhung Type).

13.4 Inconsistent Standards

No inconsistencies among standards are currently identified.

13.5 Hanford Specific Requirements and Practices

CAUTION: *Working on or under a suspended load is prohibited, except when the load can be supported by blocking or cribbing, can be securely braced, or can be supported substantially by some other means that would prevent the load from moving. Some loads being lifted and set in place may require special handling control measures such as inspecting, landing, setting, or controlling the load, that may require personnel to position their hands or other body parts under the load when no other method is feasible. These special handling control activities MUST BE APPROVED by management and industrial safety PRIOR TO BEING PERFORMED.*

13.5.1 Load Test Weight

The load-test weight should be within a tolerance of +0 percent, -5 percent and shall be traceable to a recognized standard or verified by engineering calculations. Load tests shall never be less than minimum requirements defined in the applicable ASME Standard. Any one of the following options will meet this requirement:

- Use a calibrated (+0 percent, -5 percent) load-measuring device during the load test
- Determine the test load with a calibrated load-measuring device before the test
- Calculate the test load based on known unit weights and dimensions of the test fixture
- Dimensions and calculations have been checked (signed and dated) by a qualified engineer and determined to be accurate within tolerance (+0 percent, -5 percent)

13.5.2 Load Test Report

After the test is completed, the load-test report shall be signed and dated by the person in charge of conducting the load test. The person in charge shall ensure that the test is placed in the crane maintenance file.

13.5.3 Crane Maintenance Files

The crane maintenance file is a compilation of various documents and records relating to operation, maintenance, inspection, testing, evaluation, and repair of the equipment. The file may be centrally located or proportioned into satellite holding areas. The methods selected for establishing adequate information retention and retrieval shall be determined by the equipment custodian, who is the responsible person for ensuring that a safe and reliable maintenance program is in place.

13.5.3.1 Intent of Maintenance Files

The crane maintenance file shall contain, as a minimum, the required current dated periodic inspection records and other documentation to provide the user with evidence of a safe and reliable maintenance program. Inspection records should be retained in a format and location that provides for ease in accessibility. Maintenance file information should provide a source for comparing present conditions with past conditions to determine whether existing conditions show a trending pattern of wear, deterioration, or other comparable factors that may compromise safe, continued use of the equipment. Length of record retention shall be determined by the equipment custodian's established maintenance program.

13.5.3.2 Maintenance File Contents

Maintenance files shall contain the following documentation, as applicable:

1. Periodic inspection records
2. Load test reports
3. Documentation of altered, replaced, or repaired load-sustaining parts
4. Records of special inspections on safety-related items such as brakes, hooks, ropes, hydraulic/pneumatic cylinders, and hydraulic/pneumatic pressure relief valves
5. Copies of waivers, exemptions, hostile environment plans, or similar documentation applicable to the equipment (to include manufacturer's safety bulletins, safety alerts, and product recall information)
6. Documentation for replacement ropes (see Chapter 8.0, *Wire Rope*)
7. Wire rope manufacturer's certification for replacement ropes

13.5.3.3 Periodic Inspection Tag

Cranes used at Hanford shall be tagged by any one of the following methods to indicate the next periodic inspection due date. See example in Figure 13-1. See Attachment 13-1 for a Sample Overhead Crane Daily Inspection Checklist.

1. Institute a comprehensive marking program (such as color coding) to indicate when the next inspection is required
2. Mark each crane with a tag that indicates when the next periodic inspection is required

13.5.3.4 Load – Test Tag (Proof Test)

Maintenance files contain the proof test (load test) report for the crane. Proof tests shall never be less than the minimum requirements defined in the ASME B30 standards. A tag indicating date of load test may be affixed to the device for filed verification. See example in Figure 13-2.

Figure 13-1: Example of a Periodic Inspection Tag

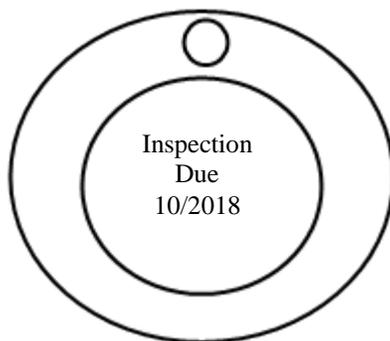
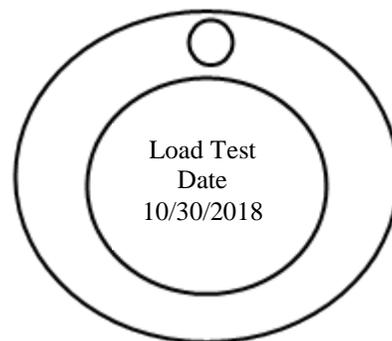


Figure 13-2: Example of a Load Test Tag



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ATTACHMENT 13-1: SAMPLE OVERHEAD CRANES DAILY INSPECTION CHECKLIST

BLDG: _____ LOCATION: _____ CRANE #: _____ DATE: / / BY: _____

COMPONENT	N/A	OK	FAULTY	COMMENTS
Main Hoist				
Controls				
Push Buttons				
Sounds Normal				
Movement Smooth				
Brakes Positive				
Upper Limit				
Lower Limit				
Upper and Lower Blocks				
Sheaves				
Rope and Connections				
Proper Drum Spooling				
Hooks				
Auxiliary Hoist				
Controls				
Pushbuttons				
Sounds Normal				
Movement Smooth				
Brakes Positive				
Upper Limit				
Lower Limit				
Upper and Lower Blocks				
Sheaves				
Rope and Connections				
Proper Drum Spooling				
Hooks				
Trolley				
Controls/Pushbutton				
Travels Smooth				
Sounds Normal				
Brakes Positive				
Trolley and Bridge Obstruction				
Housekeeping				
Ladders and Landings				
Oil Leaks				
Operation of Brakes				
Loose Parts				
Keepers in Place				
Lubrication Requirements				
Fire Extinguisher Locations				
Retaining Latch(es) in Place				
Hooks Swivel Freely				
Obvious Hook Deformations				
Bridge				
Controls/Pushbuttons				
Travels Smooth				
Sounds Normal				
Brakes Positive				
Limits Working				
Alarms				
Lights				
Rigging Capacity				

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