Chapter 41: **Hoisting and Rigging**

**Equipment Requirements**

1 Purpose

The purpose of these requirements is to ensure that hoisting and rigging equipment is safe to operate. They cover purchase and fabrication, identification and registration, and inspection, testing, and maintenance of hoisting and rigging equipment. They apply to workers (as *operators*), equipment custodians, the hoisting and rigging inspector, the *crane and hoist inspector*, and Facilities and Operations Crane Maintenance.

*Note* Hoisting and rigging equipment is defined as cranes, hoists, miscellaneous and below-the-hook lifting devices, and wire rope slings and bridleis. This definition includes rigging hooks but excludes other rigging hardware and accessories.

2 Requirements

2.1 Purchase and Fabrication

All purchased and SLAC-fabricated hoisting and rigging equipment must meet all applicable standards and regulations (see Chapter 41, “Hoisting and Rigging”, Section 6.1, “External Requirements”). The purchasing of new equipment must follow the process specified in Hoisting and Rigging: Purchasing Procedure.

2.2 Review of Conformance

To ensure new hoisting and rigging equipment meets applicable standards, all such equipment must undergo a review of conformance (Hoisting and Rigging: Review of Conformance Form). This process ensures that the equipment is properly evaluated, tested, inspected, and registered by qualified personnel before being placed into service. An identification number (see Section 2.3) and SLAC inspection tag indicates a review of conformance is on file for existing equipment. If either is missing the relevant records must be checked and a review of conformance completed if none is on file.

2.3 Identification and Registration

For tracking purposes, all hoisting and rigging equipment must be marked with a unique identification number:
For cranes, hoists, and miscellaneous lifting devices, the identification number, referred to as the CRN, is assigned by the crane and hoist inspector when the item is added to the Crane Information Database (CID).

For other hoisting and rigging equipment, the identification number, referred to as the RIG, is assigned by the hoisting and rigging inspector when the item is added to the Rigging Equipment Database (RED).

The identification label, tag, or marking must be durable and legible.

Note Permanent assemblies (such as wire-rope sling or bridle with rigging hooks) require only a single identification number.

2.4 Inspection

Initial, pre-use/frequent, and periodic inspections are required for all hoisting and rigging equipment. Requirements are summarized below and listed in Table 1 in terms of

- Types of inspection (initial, pre-use/frequent, and periodic) maintenance, and testing (operational and load testing)
- Responsibilities (person who ensures that the inspection was performed and person performing the inspection)

Details on how to conduct the inspections may be found in 8 CCR 5031, the applicable standard from the American Society of Mechanical Engineers (ASME) B30 series (ASME B30), or other standards referenced in Department of Energy Standard 1090, “Hoisting and Rigging” (DOE-STD-1090).

Inspection tags are affixed to equipment upon successful completion of initial and periodic inspections. Only equipment bearing a current SLAC hoisting and rigging inspection tag may be used.

2.4.1 Initial

Before initial use, all new, reinstalled, modified, or repaired hoisting and rigging equipment must be inspected by a qualified inspector. Inspections of repaired and modified cranes may be limited to the provisions affected by the alteration, repair, or modification as determined by a qualified person. Dated and signed inspection reports must be kept on file and be readily available. For new equipment, the initial inspection is performed as part of the review of conformance.

2.4.2 Pre-use / Frequent

A pre-use/frequent inspection must be performed by the operator either at the beginning of each shift that the crane, hoist, or miscellaneous lifting device will be used or, for other equipment, before each use.

2.4.3 Periodic

A qualified inspector or person must perform and document a periodic inspection appropriate for the equipment type on all in service hoisting and rigging equipment.
2.5 Testing

Requirements and procedures for testing hoisting and rigging equipment vary with the type of equipment and may be found in 8 CCR 5020–5028, the applicable standard from the American Society of Mechanical Engineers (ASME) B30 series (ASME B30), or other standards referenced in DOE-STD-1090 and third-party standards referenced in it. Specifically:

- All testing must be performed in accordance with the recommendations of the manufacturer or a qualified person.
- Operational tests are required following maintenance or servicing of cranes, hoists, and miscellaneous lifting devices.
- Documented load tests are required:
  - As part of the initial inspection
  - For any hoisting and rigging equipment, including rigging hardware and accessories, used in critical lifts
  - All cranes and hoists where load-bearing parts have been altered or repaired
  - All below-the-hook lifting devices where load bearing parts have been altered or repaired

2.6 Maintenance

All cranes must be maintained according to the schedule in Table 1.

- **Maintenance and repair of cranes, hoists, and miscellaneous lifting devices** is the responsibility of the Facilities Crane Maintenance Group and may only be performed by qualified personnel. Third-party maintenance must be coordinated through the group. All maintenance records and documentation will be maintained by the group.

- **Maintenance and repair of all other hoisting and rigging equipment** is the responsibility of the line organization, and must be coordinated through the hoisting and rigging inspector.

Specific maintenance and repair requirements for hoisting and rigging equipment may be found in 8 CCR 5033, the applicable standard from the American Society of Mechanical Engineers (ASME) B30 series (ASME B30), or other standards referenced in DOE-STD-1090.

2.7 Manufacturer-provided Lift Points

All lift points designed for and installed on engineered or manufactured equipment are considered part of the equipment and are acceptable for their intended use. The load owner must ensure that manufacturer-supplied lift points:

- Meet manufacturer’s pre-operational inspection, testing, and maintenance criteria
- Be inspected by a qualified person before initial use
- Be used in accordance with manufacturer’s instructions. In the absence of such information, further qualified technical support may be needed.
2.8 Approval to Use a Forklift as a Hoist

A forklift may only be used as a hoist with an approved attachment in place. To be approved:

- A written procedure for the lift must be developed and approved
- A safety analysis must be performed by a qualified engineer
- A data plate must be affixed to the forklift specifying load analysis

Note: Free rigging, or the direct attachment to or placement of rigging equipment (such as slings, shackles, or rings) onto the tines of a powered industrial truck for a below-the-tines (forks) lift, is prohibited at SLAC. Commercially available attachments can only be used if they have passed the review of conformance and are within the rated capacity as specified on the forklift data plate.

See Hoisting and Rigging: Forklift Attachment Approval Procedure.

2.9 Rented Equipment

All rented equipment must conform to applicable Cal/OSHA requirements (specifically, 8 CCR 1500–1962 and 8 CCR 4884–5049).
### Table 1 Inspection, Testing, and Maintenance Requirements

<table>
<thead>
<tr>
<th>Type</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial Inspection¹</td>
<td></td>
</tr>
<tr>
<td>Cranes, hoists, and miscellaneous lifting devices</td>
<td>Initial</td>
</tr>
<tr>
<td>Miscellaneous lifting devices (such as portable A-frames)</td>
<td>After disassembly and reassembly</td>
</tr>
<tr>
<td>Below-the-hook lifting devices</td>
<td>Initial</td>
</tr>
<tr>
<td>Wire rope and chain slings</td>
<td>Initial</td>
</tr>
<tr>
<td>Synthetic slings</td>
<td>Initial</td>
</tr>
<tr>
<td>Rigging hardware and accessories for critical lifts</td>
<td>Initial</td>
</tr>
<tr>
<td>Rigging hardware and accessories</td>
<td>Initial</td>
</tr>
<tr>
<td>Rigging hooks</td>
<td>Initial</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Type</th>
<th>Equipment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-use Inspection</td>
<td></td>
</tr>
<tr>
<td>Cranes, hoists, and miscellaneous lifting devices²</td>
<td>Each shift used</td>
</tr>
<tr>
<td>Below-the-hook lifting devices³</td>
<td>Before each use</td>
</tr>
<tr>
<td>All slings</td>
<td>Before each use</td>
</tr>
<tr>
<td>Rigging hardware and accessories for critical lifts</td>
<td>Before each use</td>
</tr>
<tr>
<td>Rigging hardware and accessories</td>
<td>Before each use</td>
</tr>
<tr>
<td>Rigging hooks</td>
<td>Before each use</td>
</tr>
</tbody>
</table>

¹ The initial inspection is documented as part of the review of conformance. See [Hoisting and Rigging: Review of Conformance Form](#).

² Use the [Hoisting and Rigging: Crane Pre-use / Frequent Inspection Form](#).

³ See [Hoisting and Rigging: Requirements for Below-the-Hook Lifting Devices, Slings, and Rigging Hardware and Accessories](#).
<table>
<thead>
<tr>
<th>Type</th>
<th>Equipment</th>
<th>Frequency</th>
<th>Responsible Person</th>
<th>Qualified Person</th>
<th>Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Periodic Inspection</td>
<td>Cranes, hoists, and miscellaneous lifting devices</td>
<td>Four times a year (including the annual), with inspections as evenly spaced as possible, but before 750 hours of use</td>
<td>Equipment custodian</td>
<td>Crane and hoist inspector</td>
<td>CID</td>
</tr>
<tr>
<td></td>
<td>Cranes, hoists, and miscellaneous lifting devices</td>
<td>Annually (in any year in which the quadrennial load test is not performed)</td>
<td>Equipment custodian</td>
<td>Crane and hoist inspector</td>
<td>CID</td>
</tr>
<tr>
<td></td>
<td>Cranes, hoists, and miscellaneous lifting devices exceeding three tons lifting capacity</td>
<td>Annually</td>
<td>Equipment custodian</td>
<td>Third-party certifying agency</td>
<td>CID</td>
</tr>
<tr>
<td></td>
<td>Below-the-hook lifting devices</td>
<td>Annually (if in use)</td>
<td>Equipment custodian</td>
<td>Hoisting and rigging inspector</td>
<td>RED</td>
</tr>
<tr>
<td></td>
<td>Wire rope and chain slings</td>
<td>Annually (if in use)</td>
<td>Equipment custodian</td>
<td>Hoisting and rigging inspector</td>
<td>RED</td>
</tr>
<tr>
<td></td>
<td>Synthetic slings</td>
<td>Annually (if in use)</td>
<td>Equipment custodian</td>
<td>Qualified person</td>
<td>Custodian</td>
</tr>
<tr>
<td></td>
<td>Rigging hardware and accessories for critical lifts</td>
<td>Annually (if in use)</td>
<td>Equipment custodian</td>
<td>Hoisting and rigging inspector</td>
<td>RED</td>
</tr>
<tr>
<td></td>
<td>Rigging hardware and accessories</td>
<td>Annually (if in use)</td>
<td>Equipment custodian</td>
<td>Hoisting and rigging inspector</td>
<td>None</td>
</tr>
<tr>
<td></td>
<td>Rigging hooks</td>
<td>Annually (if in use)</td>
<td>Equipment custodian</td>
<td>Hoisting and rigging inspector</td>
<td>RED</td>
</tr>
</tbody>
</table>

<p>| Testing                   | All cranes, hoists, and miscellaneous lifting devices                      | After maintenance or repair                                                | Facilities crane maintenance personnel | Facilities crane maintenance personnel | CID           |
| Load test                 | All cranes, hoists, and miscellaneous lifting devices for which a load-bearing part has been altered or repaired | Before initial use and before startup if crane has been idle more than six months, every four years thereafter, | Facilities crane maintenance personnel | Crane and hoist inspector               | CID           |</p>
<table>
<thead>
<tr>
<th>Type</th>
<th>Equipment</th>
<th>Frequency</th>
<th>Responsible Person</th>
<th>Qualified Person</th>
<th>Documentation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance</td>
<td>All cranes, hoists, and miscellaneous lifting devices</td>
<td>In most cases every 6–12 months</td>
<td>Facilities crane maintenance supervisor</td>
<td>Facilities crane maintenance personnel</td>
<td>CID</td>
</tr>
</tbody>
</table>
3 Forms

The following forms and systems are required by these requirements:

- Crane Information Database (CID, contact Facilities and Operations Crane Maintenance). Database for cranes, hoists, and miscellaneous lifting devices
- Rigging Equipment Database (RED, contact hoisting and rigging inspector). Database for hoisting and rigging equipment other than cranes, hoists, and miscellaneous lifting devices
- **Hoisting and Rigging: Review of Conformance Form** (SLAC-I-730-0A21J-021). Form for documenting the review of conformance required for all new hoisting and rigging equipment (including rigging hooks but excluding other rigging hardware and accessories) and any existing equipment lacking an identification number and SLAC inspection tag
- **Hoisting and Rigging: Crane Pre-use / Frequent Inspection Form** (SLAC-I-730-0A21J-056). Form for documenting the pre-use / frequent inspection required for all cranes, hoists, and miscellaneous lifting devices at the beginning of each shift
- **Hoisting and Rigging: Mobile Crane Pre-use Inspection Form** (SLAC-I-730-0A21J-030). Form for documenting the pre-use inspection required for all mobile cranes at the beginning of each shift

4 Recordkeeping

The following recordkeeping requirements apply for these requirements:

- Facilities and Operations Crane Maintenance maintains records for cranes, hoists, and miscellaneous lifting devices.
- The hoisting and rigging inspector maintains records for other equipment, such as below-the-hook lifting devices.
- The equipment custodian maintains custodian records, including pre-use inspection forms.

5 References

**SLAC Environment, Safety, and Health Manual** (SLAC-I-720-0A29Z-001)

- Chapter 41, “Hoisting and Rigging”
  - **Hoisting and Rigging: Purchasing Procedure** (SLAC-I-730-0A21C-023)
  - **Hoisting and Rigging: Forklift Attachment Approval Procedure** (SLAC-I-730-0A21C-020)
  - **Hoisting and Rigging: Requirements for Below-the-Hook Lifting Devices, Slings, and Rigging Hardware and Accessories** (SLAC-I-730-0A21S-036)

Other SLAC Documents

- [Competent and Qualified Persons and Engineers](#)

Other Documents
• Department of Energy Standard 1090, “Hoisting and Rigging” (DOE-STD-1090) and third-party standards referenced in it

• American Society of Mechanical Engineers (ASME) B30, “Safety Standards for Cableways, Cranes, Derricks, Hoists, Hooks, Jacks, and Slings” series (ASME B30)

• Title 8, California Code of Regulations, “Industrial Relations”, Division 1, “Department of Industrial Relations”, Chapter 4, “Division of Industrial Safety”, Subchapter 4, “Construction Safety Orders” (8 CCR 1500–1962)

• Title 8, California Code of Regulations, “Industrial Relations”, Division 1, “Department of Industrial Relations”, Chapter 4, “Division of Industrial Safety”, Subchapter 7, “General Industry Safety Orders”, Group 13, “Cranes and Other Hoisting Equipment” (8 CCR 4884–5049)