Cranes, Hoists, and Rigging Safety

BRIEF

Policy Summary
The Cranes, Hoists, and Rigging Safety Program at Berkeley Lab ensures that employees who work with cranes, hoists, and rigging are able to move material safely to avoid injury, property damage, delays, and hazardous-material releases. Certain "restricted" lifts (e.g., high-consequence/high-value lifts) are limited to operators who have specialized training or are professional riggers.

Who Should Read This Policy
Berkeley Lab employees, casual and participating visitors, affiliates, and subcontractors who could be performing work that may include the use of cranes, hoists, and/or rigging.

To Read the Full Policy, Go To:
The POLICY tab on this wiki page

Contact Information
Crane Safety Subject Matter Expert
EH&S Division

POLICY

A. Purpose
Persons involved in crane or hoist operations at Lawrence Berkeley National Laboratory (Berkeley Lab) must:

- Be aware of the hazards related to the equipment and the load
- Know the methods for controlling those hazards
- Follow the proper operating procedures applicable to the type of lift and equipment
The designated operator must be qualified and authorized to use specific equipment. Crane, hoist, and rigging equipment must be procured through the Facilities Division or from a Berkeley Lab–approved vendor, as well as properly inspected, tested, and maintained.

B. Persons Affected

This policy applies to Berkeley Lab employees, casual and participating visitors, affiliates, and subcontractors who could be performing work that may include the use of cranes, hoists, and/or rigging.

C. Exceptions

Operation of cranes and rigging used in the course of construction or demolition is covered by the Berkeley Lab Construction Safety Program (Program 8.0) and is in accordance with the applicable requirements of 29 CFR 1926 Subpart CC.

D. Policy Statement

1. Customer Management evaluates the need for moving materials and determines whether a crane lift is the best option. Should a crane lift be required, review the Cranes, Hoisting, and Rigging Program, Work Process A, General Requirements for Crane Operation.

2. Supervisor determines if there is a crane available for the lift. Should a crane be needed that is not currently available, review the Cranes, Hoisting, and Rigging Program, Work Process B, Procurement and Maintenance of Cranes and Hoisting and Rigging Equipment.

3. Operator verifies that he or she is authorized. Operators’ supervisors and crane managers ensure crane operators are trained and qualified according to the Cranes, Hoisting, and Rigging Program, Work Process C, Authorization and Qualification to Use Cranes, prior to authorizing use.


5. If a mobile crane will be used, supervisors and operators review the Cranes, Hoisting, and Rigging Program, Work Process E, Mobile Cranes.

6. For all lifts, regardless of crane type, operators validate and perform inspections according to the Cranes, Hoisting, and Rigging Program, Work Process F, Crane Inspections.

7. Once all equipment has passed inspection, operators and rigging personnel follow applicable requirements in the Cranes, Hoisting, and Rigging Program, Work Process G, Rigging and Other Below-the-Hook Devices and Fixtures.

8. Operators perform the lift as trained, with assistance from other appropriately trained personnel.

E. Roles and Responsibilities

Managers, supervisors, and employees have the responsibility to adhere to the provisions of this policy.

<table>
<thead>
<tr>
<th>Role</th>
<th>Responsibility</th>
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<tbody>
<tr>
<td>Supervisors and Work Leads</td>
<td>• Ensure that personnel know how to safely operate cranes and hoists, and how to move objects safely</td>
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<td>• Ensure that only formally trained and certified employees may operate a crane or hoist</td>
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<td>• Enforce the use of safe lifting techniques</td>
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<td>• Maintain lifting equipment in good mechanical and operating condition</td>
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</table>
### Crane Manager

A Berkeley Lab employee must be identified as the Crane Manager for each Berkeley Lab-owned crane or hoist, unless it is locked out.

- Identifies oneself, in writing, as the Crane Manager to the Environment, Health & Safety (EH&S) Division Crane Safety Subject Matter Expert (SME) at cranesafety@lbl.gov or Mail Stop 75B0101
- Possesses a valid certificate for the operation of the crane in question
- Controls the use of the crane, and limits use of the crane to qualified operators
- Maintains control of any keys or other mechanisms for limiting crane use
- Maintains any logbooks used in lieu of inspection tags
- Limits crane use to previously authorized operators
  - A qualified backup Crane Manager who has been identified to the Crane Safety SME may issue new crane authorizations in the absence of the Crane Manager.
- Notifies the EH&S Crane Safety SME (cranesafety@lbl.gov, Mail Stop 75B0101) of any change

### Employees (Operators, Riggers, and Helpers)

- Maintain training and medical qualification
- Safely operate cranes
- Possess a valid Berkeley Lab Crane Operator's License
- Are certified by an independent certification agency as competent and qualified operators of mobile cranes with a greater-than-two-ton capacity
- Follows all established safety regulations related to safe lifting and handling techniques

### Mechanical Engineering Designee

- Reviews and approves Engineering Safety Notes for lifting fixtures and high-consequence/high-value lifts/moves using overhead cranes on behalf of the Engineering Division Director and for the Mechanical Engineering Subcommittee of the Safety Advisory Committee
- Approves reasonable engineering alternatives not in conflict with Berkeley Lab's Environment, Safety & Health Standards Set
- Furnishes guidance to Berkeley Lab staff

### Responsible Designer

- Incorporates the requirements of the Cranes, Hoists, and Rigging Safety program into the design of lifting fixtures and procedures
- Initiates the required proof testing
- Obtains design approval by means of an Engineering Safety Note

### Customer Management

- Defines and requests any lift/move
- Determines which lifts are high-consequence/high-value lifts/moves
- Writes lifting procedures where required
- Provides technical information on relevant characteristics of the apparatus, including special lifting fixtures when required
- Assigns someone to represent the customer during planning and coordination of all aspects of the job being performed
- Provides suggestions on rigging and moving
- Ensures that lifting devices and lifting fixtures are properly documented and inspected, and that they are used and maintained safely
- Requests the Facilities Division to prepare the Engineering Safety Note, and to manage the move on the Work Request as needed
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</table>
| **Facilities Division Structural Engineering Group Designee** | • Evaluates building floor loading, lifting fixtures, and lifting devices for structural adequacy  
• Reviews and approves Engineering Safety Notes for high-consequence/high-value lifts/moves using mobile cranes, forklifts, and jack and roll devices on behalf of the Facilities Division and the Mechanical Engineering Subcommittee of the Safety Advisory Committee  
• Establishes design parameters for all cranes and hoists  
• Provides guidance on wind loading for outdoor lifts/moves  
• Provides Berkeley Lab staff with guidance on lift-related matters |
| **Facilities Division Rigging Supervisor** | • Provides guidance and supervision for routine lifts when requested  
• Participates in the development and review of high-consequence/high-value lifts/moves  
• Participates in pre-lift meetings |
| **Facilities Division Crane Maintenance Vendor** | • Arranges for all inspection, testing, and certification of cranes, hoists, and rigging  
• Arranges for the testing and certification of lifting devices and lifting fixtures |
| **Facilities Division Maintenance Manager** | • Establishes the scope of work for the Facilities Division Crane Maintenance Vendor  
• Follows technical advice from the Facilities Division Crane Maintenance Vendor to ensure that Laboratory purchases of crane, hoist, and rigging equipment, components, and devices are traceable (through documentation) to a reputable U.S. manufacturer |
| **EH&S Division Crane Safety SME** | • Manages the Cranes, Hoists, and Rigging Safety program  
• Reviews Engineering Safety Notes for high-consequence/high-value lifts/moves  
• Conforms to Cranes, Hoists, and Rigging Safety program requirements  
• Participates in pre-lift meetings for high-consequence/high-value lifts/moves  
• Notifies the Facilities Division Crane Maintenance Vendor to lock all cranes and hoists that do not have an official Crane Manager |
| **Person In Charge** | • Handles high-consequence/high-value lifts/moves in a safe manner |
| **Procurement** | • Ensures that approved vendors who sell hoisting equipment ordered by divisions have provided manufacturer certification that equipment is authentic and has been load tested at 200% of rated capacity |

**F. Definitions/Acronyms**

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<th>Term</th>
<th>Definition</th>
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Lawrence Berkeley National Laboratory. The official or current version is located in the online LBNL Requirements and Policies Manual. Printed or exported versions are not official. Users are responsible for working with the latest approved revision.
Crane | A machine used for lifting and lowering a load vertically and moving it horizontally; a hoisting mechanism is an integral part of this machine

Engineering Note | A detailed description of a (fixture) design that can include a detailed description of protection of the load, rigging, and method(s) of transport for a high-consequence/high-value lift

High-Consequence/High-Value Lift/Move | Lifts that, if failed, could:
- Cause damage in excess of $500,000
- Routine movements of shielding blocks by members of the professional rigging crew are excepted from this requirement.
- Cause significant work delay or programmatic impact
- Cause undetectable damage resulting in future operational or safety problems
- Result in significant release of radioactivity or other undesirable conditions
- Present a potentially unacceptable risk of personnel injury or property damage

In addition, any lift/move that requires the simultaneous use of both the main and auxiliary hoists of a given crane or the simultaneous use of two cranes shall be considered a high-consequence/high-value lift/move.

Hoist | A device that applies a force for lifting and lowering

Lifting Device | A device used below the hoisting hook, other than slings, for attaching loads to a hoist. Such devices are arranged into four categories:
- Structural and Mechanical Lifting Devices (e.g., spreader bars, plate clamps, gripping devices, etc.)
- Vacuum Lifting Devices
- Close Proximity Lifting Magnets
- Remotely Operated Lifting Magnets

Lifting Fixture | A fixture used below the hoisting hook that is designed and engineered for lifting a specific item

Mobile Crane | A crane system fixed to a vehicle (typically a truck)

Overhead Crane | At Berkeley Lab, a crane system fixed to a structure, including but not limited to bridge cranes, monorail cranes, gantry cranes, and jib cranes

Rigging | Both the hardware and equipment used to safely attach a load to a hook or lifting device, or the method or process of safely attaching a load to a hook by means of adequately rated and properly applied slings and related hardware

G. Recordkeeping Requirements
- LBNL Crane Inventory
- Crane Inspections
- Rigging Inspections
- Crane Load Testing
- Crane Maintenance
- Training
- Medical Evaluations
- Program Effectiveness Review and Assurance
H. Implementing Documents

<table>
<thead>
<tr>
<th>Document number</th>
<th>PUB-3000 reference</th>
<th>Title</th>
<th>Type</th>
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<tbody>
<tr>
<td>07.07.008.001</td>
<td>Ch. 27</td>
<td>Cranes, Hoists, and Rigging</td>
<td>Program</td>
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<tr>
<td>07.07.008.002</td>
<td>Ch. 27, Work Process A</td>
<td>General Requirements for Crane Operation</td>
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<td>Authorization and Qualification to Use Cranes,</td>
<td>Work Process</td>
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<td>Work Process</td>
</tr>
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<td>07.07.025.001</td>
<td></td>
<td>Forklift and Other Powered Industrial Trucks Program</td>
<td>Program</td>
</tr>
</tbody>
</table>

I. Contact Information

Crane Safety Subject Matter Expert
EH&S Division

J. Revision History

<table>
<thead>
<tr>
<th>Date</th>
<th>Revision</th>
<th>By whom</th>
<th>Revision Description</th>
<th>Section(s) affected</th>
<th>Change Type</th>
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<tr>
<td>1/16/2015</td>
<td>1.2</td>
<td>M. Wisherop</td>
<td>Revised to be in sync with minor changes to ES&amp;H Manual program</td>
<td>A and E</td>
<td>Minor</td>
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<tr>
<td>9/10/2013</td>
<td>1.1</td>
<td>M. Wisherop</td>
<td>Reviewed 8/28/13</td>
<td>Contact Info, ImpDocs, SRD, Next Review date</td>
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<tr>
<td>1/2/2012</td>
<td>1</td>
<td>M. Wisherop</td>
<td>Re-write for wiki</td>
<td>all</td>
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DOCUMENT INFORMATION

<table>
<thead>
<tr>
<th>Title: Cranes, Hoists, and Rigging Safety</th>
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<tbody>
<tr>
<td>Document number: 07.07.008.000</td>
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<td>Revision number: 1.2</td>
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Publication date: 1/16/2015
Effective date: 1/16/2015
Next review date: 1/16/2018
Policy Area: Industrial Hygiene and Safety
RPM Section (home) ESH
RPM Section (cross-reference) none

Source Requirements Documents

- 10 CFR 851.23, Safety and Health Standards
- 29 CFR 1910, Occupational Safety and Health Standards for General Industry, Subpart N — Materials Handling and Storage, Paragraphs:
  - 1910.179, Overhead and Gantry Crane
  - 1910.180, Crawler, Locomotive and Truck Cranes
  - 1910.184, Slings
- 29 CFR 1926, Occupational Safety and Health Standards for Construction, 1926 Subpart CC, Paragraph 1926.251, Rigging Equipment for Material Handling

Other Driving Requirements

- California Code of Regulations, Title 8, Subchapter 4, Construction Safety Orders (as it pertains to cranes used in construction work)

Implementing Documents

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