

# Chapter 27

## Cranes, Hoisting, and Rigging

### Contents

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Revised 08/09

#### 27.8 High-Consequence/High-Value Lifts and Moves

High-consequence/high-value lifts are parts, components, assemblies, or lifting operations designated as such by the customer (i.e., the Lab manager who requires the item to be moved) or program organizations because the effect of dropping, upset, or collision of items 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.

##### 27.8.1 High-Consequence/High-Value Lift/Move Requirements

A detailed, step-by-step procedure in the form of an Engineering Note must be prepared for each high-consequence/high-value lift/move. This requirement covers lifts and moves by forklifts as well as by cranes. A sample Engineering Note format may be obtained from the Engineering Division. While high-consequence/high-value lift procedures are customarily prepared for one-time use, general high-consequence/high-value lift procedures may be employed to accomplish routine recurrent high-consequence/high-value lift operations. For example, a general high-consequence/high-value lift procedure may be used to lift shielding blocks, or to lift a frequently lifted

Responsibility for preparing the high-consequence/high-value lift Engineering Note rests with the customer, i.e., the Lab manager who requires the item to be moved. The customer can discharge this responsibility by indicating on the Facilities Work Request that the scope of work should include preparation of the Engineering Safety Note and management of the move. It is the responsibility of the customer to notify all personnel whose approval is required early in the process. See [Section 27.8.2 \(Approval of and Changes to High-Consequence/High-Value Lift Procedures\)](#), below. Approvers have special expertise and are available to provide guidance

during the design of the lifting procedure. Please allow sufficient time for the review and approval process. There is no charge for the review and approval process.

The procedure must contain the following:

- Identification of the item to be moved
- Identification of the Lab manager or engineer who is responsible for planning the lift
- Identification of the rigging supervisor or designated qualified rigger (other than the equipment operator) who will be the person in charge (PIC) of all aspects of the lift while the load is suspended
- Special precautions
- Weight of the item
- Total hook load (all component parts of the item plus tackle and load-measuring devices)
- Determination of the center of gravity
- A list of each piece of equipment and each accessory (e.g., slings, spreader bars, yokes) to be used in the lift. Each must be identified by type and rated capacity. If a portable item to be used has no manufacturer's serial number, an LBNL identification number must be assigned and affixed to the item.
- Surveillance procedures, checkpoints, and estimated instrument readings (if used) must be listed to enable confirmation that the lift is proceeding as planned.
- Calculation of stresses to be generated in the item during lifting and determination of the adequacy and proper labeling of the attachment points of the item to be lifted. *See [Section 27.10](#) for lifting fixture requirements.*
- A rigging sketch or sketches that include the following:
  - Lifting points
  - Load vectors at all stages of the lift/move
  - Sling angles at all stages of the lift/move
  - Accessories used
  - Method(s) of attachment
  - Method of rotating about either horizontal axis, if applicable
  - Other factors affecting the capacity of the equipment or accessories
  - Identification of the capacity (or limit) of equipment and load
  - Identification of the expected load in each item of equipment and each accessory
- A load-path sketch of the load path with the expected height of the load at each point in the lift. Where appropriate, floor loading diagrams are to be included to provide for setting the load down at any point in the path if that should be necessary.
- A travel sketch, either as a part of the load-path sketch or a separate sketch, indicating the planned travel path, and lifting and travel speeds.
- Where clearances are an issue, a detailed drawing with verified dimensions that demonstrates the lift can be accomplished as planned.
- An assessment of wind loading and weather concerns for all outdoor work. Obtain assistance from the Facilities Division Structural Engineering Group for wind loading concerns.
- A checklist detailing each step of the procedure, with each step initialed by the Lab manager or engineer responsible for the planning of the lift.
- A sign-off sheet where all personnel involved in the lift verify that they are familiar with the contents of the procedure.

- Load tests and practice lifts, if required, shall be included in the procedure.
- Verification that all primary and secondary hoisting equipment is within the current inspection and test time requirements as specified in this chapter (for example, yearly periodic inspections and certification).