

## CONTROL OF HEAVY LOADS

Computer Based Training Module



### ABSTRACT

This CBT provides a detailed, comprehensive, nuclear industry generic overview of the requirements for the Control of Heavy Loads applicable to nuclear power stations. The primary learning objective of this CBT is for the trainee to become familiar with the design basis for nuclear power station Control of Heavy Loads, related major equipment such as cranes, hoists, rigging equipment, and important design documents applicable to PWR and BWR plant designs. There are no prerequisite CBTs that need to be completed prior to taking this CBT.



### INTENDED AUDIENCE

1. Experienced nuclear plant civil/structural engineers who are developing expertise in the Control of Heavy Loads
2. Site engineering Managers or Supervisors, or others who require a high-level understanding related to Control of Heavy Loads



### DURATION

- 3.5 hours (approx.)
- An additional 8-12 hours for completing reading materials provided within the CBT

## TERMINAL LEARNING OBJECTIVES

1. LIST the key regulatory guidance documents issued in the 1980s that defined the requirements for the handling of heavy loads.
2. DEFINE the key terms related to the control of heavy loads.
3. STATE the major requirements that were specified in the regulatory guidance documents for the handling of heavy loads.
4. IDENTIFY the plant areas where safe load paths and control of heavy loads are required.
5. LIST the alternatives used for safe movement of heavy loads over safety-related Systems, Structures, and Components (SSCs).
6. LIST the key regulatory and industry guidance documents issued in the 1990s and 2000s.
7. DESCRIBE the clarifications provided in regulatory and industry guidance documents issued in the 1990s and 2000s.
8. EXPLAIN the need for additional guidance on control of heavy loads subsequent to the issuance of Generic Letter 85-11.
9. STATE the types of commitments to heavy load handling measures that must be described in the UFSAR and implemented in plant procedures.
10. IDENTIFY the parameters that must be limited in procedures to ensure load drop analyses remain bounded.
11. DESCRIBE the plant processes that shall be employed to evaluate changes in heavy load handling measures and/or new heavy loads.
12. DESCRIBE the key criteria for crane design, specified by Regulatory and Industry Guidance documents to control heavy loads.
13. DEFINE the terms critical load, maximum critical load, and design-rated load.
14. DISCUSS available alternatives acceptable to the NRC in lieu of meeting the NUREG-0554 single-failure-proof requirements.
15. DIFFERENTIATE between when to upgrade to a single-failure-proof crane versus performing a load drop analysis, as well as, when is it beneficial to perform each option.
16. LIST the key Regulatory and Industry Guidance Documents that provide the requirements for performing load drop analyses associated with the movement of heavy loads.
17. IDENTIFY the key requirements provided in the Regulatory and Industry documents for performing load drop analyses.
18. IDENTIFY the additional guidance for load drop analyses that the NRC provided when they endorsed the use of NEI 08-05.
19. DESCRIBE the design, testing and inspection requirements for “below the hook” (not including the hook) components associated with special lifting devices, slings and rigging.
20. IDENTIFY three significant events that occurred at nuclear power plants due to deficiencies in control of heavy loads programs.
21. DESCRIBE the primary deficiencies in nuclear industry control of heavy loads programs that have led to significant events.

## KEY INDUSTRY DOCUMENTS

1. ANSI B30.2-1976 Overhead and Gantry Cranes
2. ANSI B30.9-1971 Slings
3. ANSI N14.6-1993 Special Lifting Devices
4. ASME NOG-1-2010 Section 1000 Construction of Overhead and Gantry Cranes
5. INPO IER L2-14-26 Fatality Temp Lift Assembly Failure
6. INPO SEN 250 Improper Rigging Injury
7. INPO TR5-45 Crane Lifting Rigging Events
8. NEI 08-05 Control of Heavy Loads Initiative
9. NRC Bulletin 96-02 Movement of Heavy Loads Over Fuel
10. NRC Generic Letter 85-11 Phase II Completion for Control of Heavy Loads
11. NRC Generic Safety Issue 186 Risk and Consequences of Heavy Load Drops
12. NRC GL 80-113 Control of Heavy Loads
13. NRC NUREG 0554 Single Failure Proof Cranes
14. NRC NUREG 0612 Heavy Loads Technical Activity A-36 Resolution
15. NRC NUREG 1774 Crane Operating Experience 1968-2002
16. NRC RIS 2005-25 Heavy Loads Control Guidelines with Attachment 1
17. NRC RIS 2005-25 Heavy Loads Guidelines Supplement 1