

Work scope details:

Title: Disassemble 5MW Klystron

Work Scope Summary: - The work involves the disassembly of Thales and CETD 5MW klystrons and their components. This includes tasks related to hoisting and rigging, elevated work, and material handling. The process requires preparing and lifting lead shielding, the klystron itself, the magnet, and the socket off of the tank and placing them into storage containers or stands according to manufacturer instructions.

Key Work Scope Components: - Disassembly of Thales and CETD 5MW klystrons - Hoisting and rigging operations - Elevated work procedures - Material handling tasks - Preparation and lifting of lead shielding, klystron, magnet, and socket

Relevant previous events and lessons learned:

Event Title	Event Summary	Lessons Learned	Reference Link
Failure of Material Handling Device Reinforces Need for Appropriate Pre-Use Inspections	Technicians were using a material handling device (hoist) to dismantle a mock-up workstation. A 150-pound pulley assembly fell ~8 feet due to the failure of a shackle-bolt assembly.	Ensure appropriate pre-use inspections of material handling devices to prevent equipment failure.	Link
Problem Identified During Hoisting and Rigging of Excess Equipment	On February 25, 2021, employees at the Advanced Test Reactor Complex building ATR-662 faced management concerns due to inadequate work documentation for hoisting and rigging activities. A safety step-back was initiated, and it was determined that the work should have been performed under a Documented Maintenance activity.	Proper work documentation and planning are crucial for safe hoisting and rigging operations.	Link
Rigging Failure Led to Worker Being Crushed by Steel Plate	A NIOSH report details an incident where a rigging failure led to a worker being crushed by a steel plate during a hoisting and material handling operation. The incident occurred while disassembling temporary steel shielding.	Rigging failures can lead to severe injuries; ensure proper rigging techniques and equipment checks.	Link
Worker Injured by Falling Lead Shielding	In June 2024, a worker at a nuclear facility was seriously injured by a falling section of lead shielding during elevated work due to a miscommunication that caused premature load release.	Effective communication is essential during rigging operations to prevent premature load release.	Link

Fatal Injuries During Disassembly and Rigging	A maintenance worker suffered fatal injuries when heavy equipment shifted and fell during disassembly and rigging for hoisting at a government research facility in December 2022. The load was improperly secured.	Proper securing of loads is critical to prevent material handling mishaps.	Link
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Missing Hazards:

Hazard	Missing or Inadequate Mitigation in Current Work Control Document	Recommended Mitigation for Revision	Reference link	SBMS Link
Failure of material handling devices	No specific mention of eliminating handling tasks or analysis of operations to identify elimination opportunities	Conduct a thorough analysis of operations to identify and eliminate unnecessary material handling tasks	HSSE World	Link
Inadequate work documentation for hoisting and rigging	Lack of detailed job safety analysis and periodic training for best practices in handling lifting and rigging equipment	Implement detailed job safety analysis and periodic training sessions for workers on best practices in hoisting and rigging	The Driller	Link
Rigging failure	No specific controls mentioned for rigging failure	Develop and implement a comprehensive rigging failure prevention plan, including regular inspections and maintenance	Weblio	Link
Miscommunication during rigging operations	No specific controls mentioned for communication during rigging operations	Establish clear communication protocols and training for rigging operations to prevent miscommunication	Weblio	Link
Improper securing of loads	Lack of detailed procedures for securing loads properly	Develop detailed procedures and training for proper load securing techniques	OSHA	Link

Lack of proper PPE	General mention of PPE without specifying types or conditions	Specify types of PPE required for different tasks and conditions, and ensure availability and training for proper use	Weblio	Link
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Failure mode analysis:

Current control	Failure mode of the control	Effect of Failure	Cause of Failure	Recommended action
Written permits for the work activity	Permit not obtained or incomplete	Unauthorized work leading to safety hazards	Oversight or miscommunication	Implement a checklist to ensure all permits are obtained and reviewed before work begins
Precautions, step warnings, Hold Points	Steps not followed or ignored	Increased risk of accidents or equipment damage	Lack of training or awareness	Conduct mandatory training sessions and regular audits to ensure compliance
Personal Protective Equipment (PPE)	PPE not worn or inadequate	Increased risk of injury	Complacency or lack of availability	Enforce strict PPE policies and ensure availability of appropriate PPE
Work instructions for information	Instructions not followed or misunderstood	Incorrect disassembly leading to equipment damage	Poor communication or unclear instructions	Simplify and clarify instructions, and conduct pre-job briefings
ORNL subject area requirements	Requirements not met	Non-compliance with safety standards	Lack of awareness or updates	Regularly update and communicate requirements to all personnel
Manual Material Handling	Improper lifting techniques	Injury or equipment damage	Lack of training or ergonomic assessment	Provide ergonomic training and use lifting aids
Team Lifting	Poor coordination among team members	Injury or dropped loads	Lack of communication or planning	Conduct team coordination exercises and assign clear roles
Hoisting and Rigging	Equipment failure or improper use	Dropped loads or equipment damage	Inadequate maintenance or operator error	Regular equipment inspections and operator training

Elevated Work	Fall from height	Serious injury or fatality	Lack of fall protection or training	Ensure use of fall protection equipment and conduct safety drills
Emergency Response	Inadequate response to emergencies	Escalation of incidents	Lack of training or unclear procedures	Develop and practice emergency response plans regularly