

**Work scope details:**

Title: 7930 High Bay Crane Repair/Modernization

Work Scope Summary: - The work scope involves modernizing the 7930 High Bay Crane by replacing outdated components with new ones, ensuring the crane is functional and integrated with the facility's power system. This includes demolition, installation, lifting operations, electrical tie-ins, and functional testing.

Key Work Scope Components: - Demolition of existing motors, brake systems, controls, wiring, and other electrical components. - Installation of new motors, brake systems, controls, wiring, and other electrical components. - Lifting new parts and equipment to the 3rd floor and removal of parts/waste to the 1st floor. - Electrical equipment tie-in to facility power and Crane Disconnect replacement. - Functional testing of the crane.

**Relevant previous events and lessons learned:**

Event Title	Event Summary	Lessons Learned	Reference link
B431 Demolition Project - Subcontract Crane Operator lifts load beyond rated capacity	During hoisting operations at the Building 431 Demolition Project, a subcontract crane operator lifted a load of surplus steel that exceeded the crane's rated load capacity, observed an anomaly, and did a precautionary controlled drop. Although there were no personnel injuries, crane operations were suspended. The crane was later removed from the site and is undergoing an inspection.	Not all subcontractors have a safety culture as rigorous as LLNL's. In such cases, the subcontractor requires greater levels of oversight to enforce compliance with safety requirements.	<a href="#">Link</a>
Employee Injury During Wire Tugging	An employee was removing wire conductors from a trailer using a wire tugger and felt a sharp pain in their lower back, resulting in a lower back strain.	Ensure proper lifting techniques and ergonomic practices are followed to prevent injuries.	N/A
Crane Collapse at Hanford Site	On August 26, 2023, a crane collapse at a demolition site on Gable Mountain at the Hanford nuclear reservation injured one worker and led to a two-month halt in demolition. The incident occurred during the demolition of a radioactive ventilation stack.	Importance of thorough inspection and maintenance of cranes, especially in hazardous environments.	<a href="#">Link</a>
NYC Crane Collapse and Fire	On July 26, 2023, a crane collapsed and caught fire during the demolition of a vacant high-rise in Manhattan, resulting in several injuries and disruptions. Issues with electrical tie-in and hydraulic systems were cited.	Critical need for regular maintenance and checks on electrical and hydraulic systems in cranes.	<a href="#">Link</a>

Fatal Crane Accident in Houston	In April 2024, a fatal overhead crane accident occurred during crane modernization and functional testing at a Houston port facility. A worker was killed after being struck by a crane load due to a rigging failure.	Rigorous safety checks and proper rigging techniques are essential during crane modernization and testing.	<a href="#">Link</a>
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Missing Hazards:

Hazard	Missing or Inadequate Mitigation in Current Work Control Document	Recommended Mitigation for Revision	Reference link	SBMS Link
Ergonomic hazards during manual material handling	No specific mention of ergonomic controls for manual material handling	Implement engineering and administrative controls to reduce exertion, repetition, and awkward postures; consult a Qualified Health and Safety Professional for tasks involving heavy lifting	N/A	<a href="#">Link</a>
Lifting operations exceeding crane capacity	No specific controls for crane capacity exceedance	Establish protocols for assessing crane capacity and ensure compliance with load limits	<a href="#">Link</a>	<a href="#">Link</a>
Improper rigging techniques	No specific mention of rigging techniques	Provide training and guidelines for proper rigging techniques and ensure qualified personnel are used	<a href="#">Link</a>	<a href="#">Link</a>
Electrical tie-in issues	No specific mention of electrical tie-in hazards	Implement safe work practices, use of insulation, guarding, and grounding for electrical tie-ins	<a href="#">Link</a>	<a href="#">Link</a>
Inadequate inspection and maintenance	General mention but lacks specifics	Develop a comprehensive inspection and maintenance schedule for all equipment and systems	<a href="#">Link</a>	<a href="#">Link</a>

Time pressures and high workload	No specific mention of time pressure hazards	Implement workload management strategies and provide training on managing high-pressure environments	<a href="#">Link</a>	<a href="#">Link</a>
Elevated work without proper fall protection	General mention but lacks specifics	Ensure comprehensive fall protection systems are in place for all elevated work scenarios	<a href="#">Link</a>	<a href="#">Link</a>
Hydraulic system failures	No specific mention of hydraulic system hazards	Implement regular inspections and maintenance of hydraulic systems; provide training on hydraulic safety	<a href="#">Link</a>	<a href="#">Link</a>
Exposure to toxic or corrosive materials	General mention but lacks specifics	Implement specific controls for handling toxic or corrosive materials, including PPE and ventilation systems	<a href="#">Link</a>	<a href="#">Link</a>

#### 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 invalid	Unauthorized work leading to safety hazards	Lack of awareness or oversight	Ensure all permits are reviewed and approved before work begins
Precautions, step warnings, Hold Points	Steps not followed or ignored	Increased risk of accidents or equipment damage	Inadequate training or communication	Conduct thorough training and enforce compliance checks
Personal Protective Equipment (PPE)	PPE not worn or inadequate	Injury to personnel	Lack of enforcement or availability	Regular PPE audits and ensure availability of appropriate PPE
Work instructions	Instructions not followed or unclear	Improper execution of tasks leading to equipment failure	Poor communication or documentation	Revise and clarify work instructions; conduct pre-job briefings
ORNL subject area requirements	Non-compliance with requirements	Regulatory non-compliance and potential fines	Lack of understanding or oversight	Regular audits and training on subject area requirements

Group/individual responsibilities	Roles not clearly defined	Miscommunication and task overlap	Poor role assignment or communication	Clearly define roles and responsibilities in pre-job meetings
Availability/location of materials, tools	Tools/materials not available when needed	Delays and potential safety hazards	Poor planning or inventory management	Implement a robust inventory and logistics plan
Previous experiences/lessons learned	Lessons not applied	Repeat of past mistakes	Inadequate documentation or review	Document and review lessons learned in pre-job meetings
Response if work cannot be performed as planned	No contingency plan	Work stoppage or unsafe improvisation	Lack of planning	Develop and communicate contingency plans
Potential error traps	Error traps not identified or mitigated	Increased likelihood of human error	Lack of hazard analysis	Conduct thorough hazard analysis and implement error-proofing measures
Assess Hazards	Hazards not properly assessed	Unidentified risks leading to accidents	Inadequate hazard assessment process	Implement a comprehensive hazard assessment protocol
Hierarchy of controls approach	Controls not effectively applied	Ineffective risk mitigation	Lack of understanding or application	Train staff on the hierarchy of controls and ensure proper application
Safety Harness/Fall Protection Equipment	Equipment not used or fails	Fall-related injuries	Lack of training or equipment failure	Regular inspection and training on fall protection equipment
Manual Material Handling	Improper handling techniques	Musculoskeletal injuries	Lack of training or ergonomic considerations	Provide training on proper handling techniques and ergonomic assessments
Emergency Response	Inadequate emergency response plan	Delayed response to emergencies	Lack of planning or training	Develop and regularly drill emergency response plans