

Work scope details:

Title: BL11B Goniometer Preventive Maintenance (PM)

Work Scope Summary: The work involves performing semi-annual lubrication of the kinematic mounts and lift rails of the BL11B goniometer. This maintenance is critical to ensure optimal operation and prevent equipment failure during subsequent use.

Key Work Scope Components:

- Disconnecting electrical, cryogenic, and pneumatic lines
- Lubricating kinematic mounts and lift rails
- Lifting and placing the goniometer on a stand
- Reinstalling connections and testing the goniometer post-maintenance

Relevant previous events and lessons learned:

Event Title	Event Summary	Lessons Learned	Reference Link
Goniometer Equipment Failure	A goniometer failed during operation due to inadequate lubrication, leading to a halt in experiments and costly downtime.	Regular maintenance and lubrication schedules must be strictly adhered to in order to prevent equipment failure.	N/A
Electrical Shock Incident	A technician received an electrical shock while reconnecting power to equipment without proper lockout/tagout (LOTO) procedures.	Always implement LOTO procedures before performing maintenance on electrical equipment to prevent electrical hazards.	OSHA LOTO Standard
Pneumatic Line Contamination	Contaminants entered a pneumatic line during maintenance, causing equipment malfunction.	Ensure all lines are properly capped or sealed during maintenance to prevent contamination.	N/A
Falls from Height	A worker fell while removing a railing without proper fall protection measures in place.	Implement fall protection measures when working at heights or near open edges.	OSHA Fall Protection
Improper Manual Handling	A technician injured their back while lifting a heavy goniometer without assistance.	Always use team lifting or mechanical aids for heavy lifting tasks to prevent musculoskeletal injuries.	N/A

Missing Hazards:

Hazard	Missing or Inadequate Mitigation in Current Work Control Document	Recommended Mitigation for Revision	Reference Link	SBMS Link
Electrical Hazards	Not addressed	Implement lockout/tagout procedures before maintenance.	OSHA LOTO Standard	N/A

Hazard	Missing or Inadequate Mitigation in Current Work Control Document	Recommended Mitigation for Revision	Reference Link	SBMS Link
Falls from Height	Not addressed	Use fall protection harnesses and ensure guardrails are in place when removing railings.	OSHA Fall Protection	N/A
Manual Handling	Not addressed	Enforce team lifting protocols and provide lifting aids for heavy components.	N/A	N/A
Contamination Risks	Not addressed	Ensure all lines are capped and clean before and after maintenance.	N/A	N/A
Noise Exposure	Not addressed	Conduct noise assessments and provide hearing protection if noise levels exceed 85 dBA.	OSHA Noise Standard	N/A
Ergonomic Risks	Inadequate mitigation	Evaluate work posture and provide ergonomic tools to minimize strain.	N/A	N/A
COVID-19 Risks	Inadequate mitigation	Ensure masks are worn and social distancing is maintained throughout the work area.	N/A	N/A
Time Pressure	Not addressed	Schedule maintenance during low-activity periods to reduce time pressure on workers.	N/A	N/A
Communication Failures	Not addressed	Conduct pre-job safety briefings to clarify tasks and responsibilities.	N/A	N/A
Tool Availability	Not addressed	Ensure all necessary tools are available and in good condition before starting work.	N/A	N/A

Failure mode analysis:

Current Control	Failure Mode of the Control	Effect of Failure	Cause of Failure	Recommended Action
Lockout/Tagout Procedures	Permit not obtained or expired	Risk of electrical shock or equipment start-up	Lack of adherence to safety protocols	Ensure all personnel are trained and understand LOTO requirements.
PPE Requirements	PPE not used or inadequate	Increased risk of injury	Overconfidence or lack of enforcement	Conduct regular audits to ensure compliance with PPE usage.
Work Instructions	Instructions not followed	Increased risk of accidents	Vague guidance or miscommunication	Provide clear, detailed work instructions and conduct pre-job briefings.
Communication Processes	Poor communication	Increased risk of errors	Lack of coordination among team members	Implement a communication plan that includes regular check-ins and updates.
Emergency Response Procedures	Emergency procedures not followed	Delayed response to incidents	Lack of training or awareness	Conduct regular emergency drills and training sessions.
Tool Availability	Tools not available or malfunctioning	Delays in work and increased risk of injury	Poor inventory management	Maintain an inventory checklist and perform regular tool inspections.
Training and Competency	Inadequate training	Increased risk of accidents	Lack of proper training programs	Implement a comprehensive training program for all personnel involved in maintenance.

Current Control	Failure Mode of the Control	Effect of Failure	Cause of Failure	Recommended Action
Team Lifting Protocols	Team lifting not practiced	Risk of musculoskeletal injuries	Lack of awareness or enforcement	Reinforce team lifting protocols through training and supervision.
Fall Protection Measures	Fall protection not utilized	Risk of falls and serious injury	Complacency or lack of awareness	Regularly review and enforce fall protection policies.
Noise Control Measures	Noise levels exceed safe limits	Hearing damage	Lack of monitoring	Conduct regular noise assessments and provide hearing protection as needed.

This risk assessment report provides a comprehensive overview of the potential hazards associated with the BL11B Goniometer PM work plan, relevant historical events, missing hazard mitigations, and failure modes of existing controls. Implementing the recommended actions will enhance safety and reduce the risk of incidents during maintenance activities.