
Mobile Crane Daily Wire Rope and Sheave Inspection

1.0 Maintenance Objective & Frequency

The objective of this daily inspection is to identify wire rope degradation, broken wires, kinking, corrosion, or sheave damage before they compromise lifting capacity or cause a dropped load. This PM ensures compliance with ASME B30.5 Section 5-2 and CSA Z150 standards for mobile crane wire rope retirement criteria.

Frequency: Daily, prior to first lift of the shift, or after any event that may have caused rope damage (e.g., shock loading, snagging, or contact with electrical lines).

2.0 Lockout/Tagout (LOTO) & Safety

- **Engine Shutdown:** Turn off crane engine and remove ignition key. Place key in your pocket or lockbox.
- **Hydraulic System Isolation:** Lower all loads to ground. Release hydraulic pressure by cycling all functions to neutral with engine off. Wait 60 seconds for accumulator bleed-down.
- **Swing Brake:** Engage swing brake and chock wheels if on grade.
- **Personal Protective Equipment (PPE):** Hard hat, safety glasses, high-visibility vest, steel-toed boots, and cut-resistant gloves (ANSI A4 or higher) for handling wire rope.
- **Fall Protection:** If inspection requires accessing elevated sheaves (e.g., boom tip), use a full-body harness with lanyard attached to a certified anchor point.

3.0 Required Tools, Parts & Lubricants

- Wire rope gauge (go/no-go type) or digital caliper (0-50 mm range, 0.01 mm resolution)
- Wire rope inspection magnifying glass (10x minimum) or borescope for tight spaces
- Wire rope lubricant (OEM-approved, e.g., Mobilgrease XHP 462 or equivalent NLGI Grade 2 with moly)
- Clean lint-free rags
- Flashlight or headlamp
- Sheave groove gauge (radius gauge set matching rope diameter)
- Torque wrench (0-150 Nm range) for sheave retaining bolt checks
- Inspection checklist and pen (or ServiceGrid mobile device)

4.0 Step-by-Step Maintenance Procedure

1. Perform LOTO as per Section 2.0. Confirm engine off, key removed, and all hydraulic pressure bled down.
2. Visually inspect the entire length of the wire rope from dead end to hook. Look for kinks, birdcaging, crushing, corrosion, or heat damage. Mark any suspect areas with tape for detailed measurement.
3. Using the magnifying glass, count broken wires in each rope lay length (typically 6-10 rope diameters). Per ASME B30.5, remove from service if 6 or more broken wires are found in one lay length, or 3 or more broken wires in one strand in one lay length.

4. Measure rope diameter at three locations along the rope (near dead end, mid-span, and near hook) using the wire rope gauge or caliper. Record the smallest measurement. Remove from service if diameter reduction exceeds 5% of nominal diameter.
5. Inspect the rope end connections: swaged sockets, wedge sockets, and clips. Check for cracks, deformation, or slippage. Torque wedge socket retaining bolts to OEM specification (typically 45-60 Nm for 5/8" rope).
6. Rotate the sheaves by hand (if accessible) or slowly jog the boom hoist with engine running (after LOTO removal) to inspect all sheave grooves. Listen for grinding or clicking sounds indicating bearing failure.
7. Using the sheave groove gauge, check groove radius at four points around each sheave (0°, 90°, 180°, 270°). Groove radius must not exceed nominal rope radius by more than 15%. Replace sheave if groove is worn, flared, or has sharp edges.
8. Inspect sheave flanges for cracks, chips, or deformation. Measure flange thickness with calipers; reject if worn more than 20% of original thickness per OEM spec.
9. Check sheave bearing play by attempting to rock the sheave axially and radially. Maximum allowable play is 0.5 mm for boom tip sheaves, 1.0 mm for lower block sheaves. Replace bearing if excessive.
10. Clean the wire rope with a rag to remove grit and old lubricant. Apply fresh wire rope lubricant evenly along the entire length, working it into the core between strands. Do not overlubricate to avoid drip hazards.
11. Inspect the hook and load block: check for hook twist (no more than 10° from plane), throat opening (no more than 15% increase), and any cracks. Replace hook if any deformation is found.
12. Document all measurements and observations on the inspection checklist or in ServiceGrid. Flag any findings that require immediate removal from service or scheduled replacement.

5.0 Verification & Return to Service

1. Remove all LOTO devices. Reinstall ignition key. Start engine and allow hydraulic oil to warm to operating temperature (40°C minimum).
2. Perform a no-load function test: raise boom 10°, lower boom 10°, extend and retract telescope (if equipped), and rotate swing 90° each direction. Listen for abnormal noise from sheaves or rope.
3. Perform a load test at 100% of rated capacity (or as per site policy) using a certified test weight. Lift load 6 inches off ground, hold for 30 seconds, and lower. Check for rope slippage, sheave binding, or abnormal deflection.
4. Re-inspect the rope and sheaves after the load test for any new deformation or broken wires. If none found, the crane is cleared for service.
5. Complete the PM work order in ServiceGrid: attach inspection photos, note any replacement parts used, and set next inspection due date (next day for daily PM).

Regulatory Disclaimer: This document is a generic maintenance template provided for educational and informational purposes only. It does not constitute professional engineering or reliability advice. The end-user assumes all liability for validating all step sequences, torque specs, and LOTO protocols against specific machinery OEM manuals before deployment to a live production floor.