

# Equipment Maintenance in Cold Temperatures



Cold temperatures place unique stress on equipment, materials, and mechanical systems. As winter conditions intensify across North America, equipment failures become more frequent, maintenance intervals tighten, and the safety consequences of breakdowns increase. For OHS managers, cold-weather equipment maintenance is not just an operational concern, it is a core safety issue.

When equipment behaves unpredictably, workers are exposed to higher risk during operation, troubleshooting, and repair. Slips, strains, crush injuries, and unexpected start-ups are far more likely when cold temperatures compromise performance. Understanding how cold affects equipment and maintenance practices is essential to preventing incidents during the winter months.

## How Cold Temperatures Affect Equipment

Low temperatures alter the physical properties of materials and fluids. These changes can significantly affect equipment function and reliability.

Common cold-related impacts include:

- Thickening of lubricants and hydraulic fluids, reducing flow and increasing wear.
- Reduced battery capacity, leading to starting failures

and erratic electronics.

- Metal contraction, affecting tolerance and increasing brittleness.
- Hardened seals and hoses, increasing the likelihood of leaks or rupture.
- Condensation and ice formation, causing corrosion and electrical faults.

These effects often appear gradually, making early signs easy to miss until a failure occurs.

## Why Cold-Weather Failures Increase Safety Risk

Equipment failures in cold conditions rarely happen in isolation. They often occur under time pressure, poor visibility, and challenging environmental conditions.

Safety risks associated with cold-weather maintenance include:

- Unexpected equipment movement during start-up.
- Manual handling injuries during frozen or seized component removal.
- Increased exposure to cold stress during extended repairs.
- Slip hazards from ice, snow, or fluid leaks.
- Improvised repairs due to limited tools or access.

OHS managers should anticipate that winter maintenance tasks carry **higher inherent risk** than the same tasks performed in warmer conditions.

## Equipment Types Most Affected by Cold

While all equipment is impacted to some degree, certain categories are especially vulnerable.

### Mobile Equipment and Vehicles

Construction equipment, forklifts, and fleet vehicles experience starting issues, reduced braking performance, and hydraulic delays. Cold tires also reduce traction, increasing collision risk.

### **Industrial Machinery**

Conveyors, presses, and automated systems may experience sensor failures, misalignment, or sluggish movement due to cold-induced material changes.

### **Power Tools and Hand Tools**

Cold affects battery life, grip surfaces, and vibration exposure. Workers may overexert themselves when tools underperform.

### **HVAC and Building Systems**

Heating systems, boilers, and ventilation equipment are under peak demand in winter. Failure can create both equipment hazards and cold stress for workers.

## **Best Practices for Cold-Weather Equipment Maintenance**

Effective winter maintenance requires both **technical adjustments and safety-focused planning**.

### **Use Cold-Appropriate Fluids and Lubricants**

Select lubricants and hydraulic fluids rated for expected temperature ranges. Using standard fluids in sub-zero conditions accelerates wear and increases failure risk.

### **Increase Inspection Frequency**

Cold weather shortens maintenance windows. More frequent inspections help identify leaks, cracks, or abnormal operation before failures escalate.

### **Warm-Up Procedures**

Allow equipment adequate warm-up time before full operation. Rushing start-ups increases mechanical stress and failure

risk.

### **Protect Equipment When Not in Use**

Where possible, store equipment indoors or use thermal covers and block heaters. Simple protection measures significantly reduce cold-related failures.

### **Maintain Batteries and Electrical Systems**

Test batteries regularly, keep terminals clean, and ensure charging systems function properly. Electrical failures are common in winter.

## **Safe Maintenance Practices in Cold Conditions**

Maintenance work itself introduces additional safety considerations during winter.

OHS managers should ensure:

- Clear lockout and energy isolation procedures, especially when cold affects responsiveness.
- Adequate lighting for early mornings and reduced daylight.
- Slip-resistant surfaces around maintenance areas.
- Proper PPE for cold exposure without restricting movement.
- Realistic time allowances for cold-weather repairs.

Maintenance staff should never feel pressured to bypass safety steps to restore operations quickly.

## **Sector-Specific Considerations**

Cold-weather maintenance risks vary by sector.

### **Construction and Heavy Equipment**

Outdoor exposure, uneven ground, and weather variability increase both equipment and worker risk. Pre-shift inspections

are critical.

### **Manufacturing and Processing**

Temperature fluctuations between indoor and outdoor zones stress components and increase condensation risk.

### **Transportation and Logistics**

Fleet reliability directly affects safety. Preventive maintenance reduces roadside repairs in hazardous conditions.

### **Utilities and Infrastructure**

Power, water, and gas systems operate under extreme winter demand. Failures can create public safety risks as well as worker hazards.

## **Training and Communication**

Maintenance personnel need winter-specific training. This includes recognizing cold-related failure signs, understanding revised procedures, and knowing when to stop work due to unsafe conditions.

Clear communication between operations, maintenance, and OHS teams reduces rushed repairs and improves coordination.

## **Documentation and Due Diligence**

From a regulatory standpoint, equipment maintenance is a core element of due diligence. In cold conditions, documentation becomes even more important.

Records should reflect:

- Adjusted maintenance schedules.
- Cold weather inspections and findings.
- Equipment failures and corrective actions.
- Training related to winter maintenance.

These records demonstrate that risks were anticipated and managed appropriately.

# **The Cost of Ignoring Cold-Weather Maintenance**

The consequences of inadequate winter maintenance extend beyond downtime. Injuries, environmental releases, and regulatory action are all more likely when equipment fails unexpectedly. Preventive maintenance costs are far less than emergency repairs performed in dangerous conditions.

For OHS managers, winter maintenance planning is a powerful risk control. By adapting maintenance practices to cold conditions, organizations protect both their assets and their people. Reliable equipment supports safe work. In winter, reliability must be earned through preparation, patience, and disciplined maintenance practices.