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Mitigating Equipment Breakdown Hazards Associated with Idle Facilities



The rapidly evolving COVID-19 pandemic has prompted governments and businesses to take extraordinary steps to help slow the spread of the virus and keep people safe. As a result, many organizations are being forced to close their facilities temporarily.

These measures reduce operating costs, but do not eliminate breakdown exposures that could result in property damage. Below are some recommended steps, considerations, and tips to help keep critical equipment online and operational during the shutdown. Note that this is an inclusive, but not exhaustive, list of recommendations.

Electrical Distributions Systems in Idle Facilities



The following actions should be taken to help reduce the risk of electrical equipment breakdown in idle buildings.

- **Shut Off Unnecessary Circuits:** Shut off unnecessary electrical circuits at the feeder switch on the main electrical panel. Note that in-depth knowledge of the facility's electrical distribution system is required to avoid shutting off critical circuits, such as heating or building monitoring systems, which need to be online to help prevent losses during the idle period. Keep a record of which circuits are shut off to ensure all circuits are properly turned on when the building reopens.
- **Preventative Maintenance of Active Circuits:** Continue routine preventative maintenance on active equipment when the building is idle. Annual infrared scanning, exercising of breakers, and cleaning/tightening of electrical connections should be completed as long as the systems are turned on. The periodic calibration of protective relays and service of circuit breakers, which occurs every three to five years on medium voltage equipment, should continue as well. This applies to liquid-filled transformers as well.
- **Preventative Maintenance of Batteries and Uninterruptible Power Source (UPS) Systems:** Battery banks and UPS systems are critical for building control, security, and monitoring systems. They are also critical for protective relays on medium voltage switchgear, and for starting diesel fire pumps and emergency generators. Periodic preventative maintenance and testing should continue during the idle period as follows:
 - Monthly inspection with float voltage and electrolyte checks.
 - Quarterly cell voltage and specific gravity checks.
 - Annual full rack inspection, cell-to-cell, and terminal resistances measured.
 - Discharge testing every two to five years, depending on battery type.
- **Preventative Maintenance of Emergency Generators:** Generators can be important in keeping critical building systems, such as heating and monitoring systems, online during an outage. Regardless of whether the building is idle, standard practices regarding load testing and maintenance of generators and automatic transfer switches should continue as if the building were fully operational.

Heating Systems in Idle Facilities



Heat levels should be maintained in idle buildings to prevent freeze. The two most common types of heating systems are hot water/steam heating and forced hot air systems. Take the following steps to prevent the breakdown of these systems in an idle building.

Preventative Maintenance of Hot Water/Steam Heating Systems

- Continue the chemical treatment of boiler water systems to prevent corrosion and mechanical/pressure failure of boilers and piping systems.
- Test critical boiler protections regularly. For example, safety valves on low water cutout controls should be tested and logged per manufacturer's recommendations.
- Service and test burner and combustion controls seasonally, before and after the heating season.
- Periodic jurisdictional inspections of the boilers and pressure vessels will continue during idle periods. Make sure to coordinate with your authorized inspection agency or the authority with jurisdiction during idle time. Note that it is the responsibility of the boiler owner to ensure all certificates of operation are up-to-date for boilers and pressure vessels. The jurisdiction, the authorized inspection agency, and Marsh

Risk Consulting can all help clients with questions regarding jurisdictional requirements.

- Most importantly, facilities personnel should perform regular inspection rounds of boilers and heating systems to detect developing issues that could lead to a breakdown. This may be a requirement of the jurisdiction depending upon the size of the boiler.

Preventative Maintenance of Forced Hot Air Heating Systems

- Service and test burner and combustion controls seasonally, before and after the heating season.
- Change and perform regular maintenance on air filters per manufacture guidelines.
- Most importantly, facilities personnel should perform regular inspection rounds of boilers and heating systems to detect developing issues that could lead to a breakdown.

In the case of oil-fired heating systems, check oil storage levels regularly and fill as needed. Although this is not a maintenance activity, it is a commonly overlooked activity in idle buildings. An empty oil tank will lead to heating system failure and potential freeze risks.

If fire detection and suppression systems are present, perform regular inspections, testing, and maintenance. These activities should include:

- Weekly testing of the fire pump.
- Monthly inspections of sprinkler control valves.
- Quarterly testing of sprinkler water flow alarms.
- Annual testing of the fire pump and physical operation of control valves.
- Annual inspections and testing of fire detection systems.

Restarting of Idle Equipment at the Conclusion of an Idle Period



During this idle period, equipment in a production facility may be shut down for a long time. The following actions should be taken at the beginning of an idle period to help protect equipment and to ensure a smooth eventual restart.

- **Shut Off/Secure Energy Sources:** Shut off electrical power supplies to equipment and its controls, and secure fuel and other potential energy sources to help prevent damage to equipment from an accidental startup during an idle period.
- **Follow OEM Recommended Shutdown Guidelines:** Follow manufacturer's guidelines for long-term shutdowns of equipment. This could include special lubricating and greasing instructions, special alignments, positioning, equipment settings, and depressurization.
- **Protect from Weather or Other Corrosive Elements:** Ensure equipment is properly protected from corrosion during the idle period. This could include covering idle equipment, energizing pipe heat tracing, applying special coatings, packing with moisture absorbent material, or providing a low humidity environment.
- **Proper Layup of Boilers:** In the case of process boilers and other pressure equipment,

follow proper layup procedures for long-term or short-term storage to help prevent corrosion.

- **Protection of Motor Windings:** Consider installing heat lamps on electric motors to drive moisture off windings, prolonging winding insulation life, and reducing the risk of motor winding failure when re-starting.

The following actions should be taken during the idle period to help protect and preserve equipment:

- **Periodic Rotation of Rotating Equipment:** This can help to prevent damage to bearings during extended idle periods.
- **Testing of Boiler Water Chemistry:** If a boiler has been placed in wet layup during an idle period, regular testing of water chemistry will help to determine if the proper level of oxygen scavenger is being maintained in the boiler.
- **Periodic Inspection of Idle Equipment:** Regular idle equipment checks should be performed to prevent damage. For example, is there evidence of rodents nesting in equipment controls that could lead to electrical failure when the equipment is re-started?

Before starting idle equipment back up at the end of an idle period, the following actions should be taken to help reduce the risk of equipment breakdown:

- **Following OEM Recommended Start-up Guidelines:** Follow manufacturer's guidelines before restarting equipment after a long shutdown period. This may include inspections and testing, diagnostics, slow speed test runs, and warming up.
- **Testing of Protective Devices:** Most types of equipment have installed protective devices. Review and verify these devices when recovering from an idle period.
- **Insulation Resistance Testing of Motor Windings:** Idle motors can contain moisture, which could lead to grounds and shorts when reenergizing. Insulation testing results can indicate whether additional steps should be taken to dry out the motor before starting.
- **Electrical Switchgear Cleaning and Tightening:** Cleaning dust out of switchgear cabinets and tightening electrical connections after a long idle period can help to reduce the risk of electrical failure when the equipment is re-energized.

- **Internal Inspections of Boilers and Pressure Vessels:** Even if a boiler has been properly laid up for a long-term outage, an internal inspection to check for cracking or other discrepancies is always recommended before putting the equipment back online.
- **Pay Close Attention When Restarting Idle Equipment:** The equipment operator should use their senses (hearing, sight, smell, touch) when re-starting equipment. If something does not seem right, shut the equipment down and troubleshoot.

Proper equipment maintenance during a shutdown can help to prevent breakdowns, property damage, and business interruption.

If you have any questions or need additional guidance, please reach out to your Marsh Risk Consulting property risk consultant or visit <http://marsh.co.in/service/riskconsulting/> or contact riskconsulting.india@marsh.com



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