HVAC/R • PROCESS COOLING • BUILDING AUTOMATION

TECHTALK

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Penny Wise, Pound Foolish: The True Cost of Deferred Maintenance

There's no dispute that preventive maintenance (PM) is essential to energy-efficient HVAC operation and long-term equipment performance. The challenge is making that case to the people holding the purse strings.

When budgets tighten, PM programs are often among the first things to be scaled back or postponed, and necessary non-critical repairs increasingly find themselves pushed off the table as well.

These are costly mistakes. Cutting service frequency, reducing scope, and deferring repairs can look responsible on paper, but in practice, carry real operational risk. A neglected HVAC system consistently ends up costing far more than one that receives regular attention. Deferred maintenance prevents systems from running at peak efficiency, driving up energy consumption. Smaller problems can cascade into expensive repairs, equipment failure, and down time.

Numbers Make the Case

Most facility managers understand what's at stake with PM and timely repairs. Oftentimes, the harder conversation is with owners, CFOs, and controllers who are tasked with fiscal responsibilities. They tend to see maintenance as a cost to be reduced rather than an investment to be protected. The data, however, is hard to ignore.

According to the U.S. Department of Energy, HVAC systems on preventive maintenance programs use **10 to 20 percent less energy** than systems that are allowed to deteriorate. Downtime and operational interruptions are significantly reduced with regular PM. Factoring in equipment longevity, the savings can run into the tens of thousands of dollars per unit over time.

A properly maintained water-cooled chiller, for example, can be expected to last 20 to 30 years, and sometimes longer. A neglected chiller, however, will struggle to hit the low end of that range or fall short of it entirely, meaning a costly and avoidable replacement cycle that arrives years ahead of schedule.

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Beyond equipment life, regular PM is consistently associated with better indoor air quality, occupant productivity, and tenant retention. These are outcomes that show up directly in occupancy rates and long-term asset value.

Protecting the Budget Conversation

Industry benchmarks typically recommend budgeting 2 to 4 percent of a building's total replacement value annually for facility maintenance. When that figure is challenged, the facility manager's best defense is in the fine details: document your equipment inventory, track maintenance history, and calculate what deferred costs have actually run in prior years. Decision-makers respond to concrete numbers, and the data consistently supports a proactive approach.

According to the International Facility Management Association (IFMA), every $1 spent on preventive maintenance averts approximately $5 in future repair costs. Emergency service calls, expedited parts, and after-hours labor add up quickly. The key point for decision-makers is that deferring maintenance and repairs does not eliminate cost. It just makes it unpredictable.

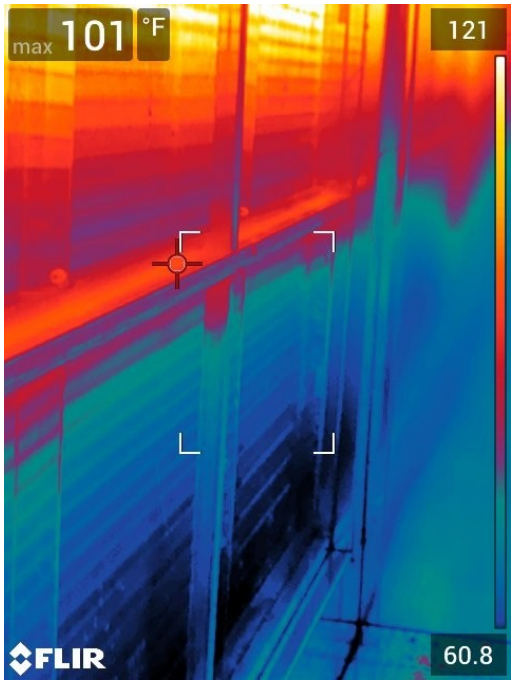
For facility managers navigating that conversation, having a service partner that brings deep technical expertise to every visit, maintains thorough records of system conditions over time, and helps translate that record into financial terms can make all the difference. MSC has been providing exactly that kind of partnership to commercial, industrial, and institutional facilities across the New Jersey tri-state region for 50 years.

Time to Prep HVAC Systems For Cooling Season

Spring arrives with a predictable but critical set of priorities, and the goal behind every task is the same: maximize system efficiency, protect your equipment, and prevent a breakdown on the first hot day of the season. That means filters, evaporator and condensing coils, and drain pans need attention before cooling loads pick up. Cooling towers and water filtration systems should be cleaned and tested, chilled water and reheat hot water systems flushed and strained, and all DX systems checked for refrigerant leaks.

Don't forget economizer cycles. Warm days and cool nights mean free energy if the controls are programmed to use them. A little time spent now confirming everything is running to design intent goes a long way toward lower utility bills and longer equipment life.

Solving Freeze Stat Trips: Advanced Diagnostics at NJ R&D Facility



As any facility manager can attest, failure of freeze protection systems can have serious and costly consequences. Designed to protect hydronic systems from freezing and subsequent pipe or coil ruptures, these systems serve as critical safeguards against damage during frigid weather. Over the past five decades, MSC has encountered numerous freeze-related issues, including HVAC coil breaks, frozen sprinkler lines, plumbing failures, steam condensate problems, and condenser water issues.

Case Study: Freeze Crisis at R&D Facility

A large research and development facility with multiple 100% outside air (OA) HVAC systems was experiencing repeated freeze stat trips during a prolonged cold spell, causing costly business interruptions. As is typical with 100% OA systems, the exhaust is interlocked with the supply, meaning all air circulation stops during a trip. This shutdown can affect critical pressurization requirements in airlocks and compromise lab hood functionality. Upper management needed the problem resolved immediately, especially since other contractors had already made several unsuccessful attempts to fix the issue.

MSC's Diagnostic Approach

After meeting with facility personnel directly involved with the systems to establish background on the freeze stat trips, MSC verified proper installation of freeze stats and related instruments, and confirmed all equipment was functioning correctly. Using NIST-calibrated instruments, our team verified that the systems met design specifications for preheat water temperatures and flow rates, AHU CFM airflow measurements, and pressure drops across equipment. We also performed temperature and velocity profiles throughout the air handling units and carefully trend-logged critical parameters, including outside air temperature and humidity, discharge air temperature, preheat water temperature, and preheat two-way control valve position.

Identifying the Root Cause

Analysis of the collected data revealed an issue with temperature profiles in some of the AHUs, particularly when the heating control valve positioning dropped to approximately 25% or less. To investigate further, we incorporated a FLIR thermal imaging camera, which clearly revealed temperature variations across the coils, indicating significant temperature concerns at low control valve positions. Due to the low flow rate through the heating coil and non-uniform airflow across the coil, localized regions of air temperatures at 35°F were observed, resulting in the freeze stat tripping and taking the unit off line.

The Solution

After reviewing all collected information and evaluating various options, MSC recommended the installation of freeze protection pumps at each air handler's heating coils. These pumps would activate automatically when outside air temperature reached 40°F and below, maintaining proper coil circulation, fluid velocity, and temperatures to prevent freezing of the coil. While awaiting the arrival of the new pumps, we implemented a temporary measure: preventing preheat control valves from closing below 35% and providing offset cooling to maintain proper discharge air temperature.

Results

Once the freeze protection pumps were successfully installed, controlled, and inspected using the thermal imaging camera, MSC was able to verify that temperatures were uniform leaving the coils and that the freeze stat problem was completely corrected, allowing the systems to operate properly without interruption.