mechanicalservicecorporation

TECH TALK

MSC - THE ONLY TRUE HVAC SERVICE COMPANY - WE FIX IT

NEWSLETTER - JANUARY 2017

973-884-5000

SERVICE CALLS

Faulty Damper- A client was experiencing problems with a parallel set of 20hp supply fans. One of the fans had tripped a breaker, leading to decreased air flow and failure to meet the required CFM. MSC technicians found a gravity damper stuck in the open position, causing the fan to back-wheel upon startup. The techs repaired the broken damper linkage, programmed the drive for dynamic braking, and changed the program sequence to a slower 90-second ramp time.

Soft Start- MSC was called in to repair a fitting on a large condenser water pump that had ruptured and was spraying out water under pressure. Techs found that, despite vibration isolation on the pump, piping moved and shook substantially whenever it turned on, eventually cracking the fitting at its weakest point. After repairing the fitting, a soft start was installed to slowly ramp the pump to prevent damage from sudden shocks.

Bridging The Gap Between System Controls & Mechanics

Tackling a stubborn HVAC issue almost always begins with a simple question: “Why are we losing compressors?” “Why is it always cold in the morning in the cafeteria?” Answers to these questions, however, are seldom clear-cut due to the increasing complexity of today’s HVAC/process cooling systems. An in-depth understanding of the link between a system’s mechanical functionality and how it is controlled is often the key to uncovering the root of a problem, and not all HVAC technicians are equipped with this level of knowledge.

Understanding Cause-and-Effect

When it comes to system design, HVAC/DDC controls programmers – those responsible for telling a system what to do and when to do it – are computer people by trade, not HVAC technicians. So while a talented programmer may have the necessary step-by-step sequence of operation down pat in theory, their knowledge of a system’s physical mechanics is generally somewhat limited. Likewise, the reverse can often be said of the average HVAC technician’s understanding of DDC controls. This is why, when a malfunctioning HVAC system appears to meet sufficient standards from a mechanical standpoint, the culprit can often be found hiding in the interface between DDC controls and the mechanical system itself. The trick is in knowing how find and bridge these gaps, which is where MSC comes in.

The Value of Advanced Training

With HVAC and control systems more technically advanced than ever before, MSC’s service technicians are thoroughly trained in both system mechanics and controls. By effectively straddling the point of interface between these two dynamics, our techs are better able to diagnose, and fix problems that can leave others perplexed. Case in point: MSC was called in to diagnose numerous problems and repeated equipment failures with three 100% outside air DX systems at a brand new medical facility. The project’s mechanical work and controls programming had been done by separate entities, and attempts to get to the bottom of the problems had devolved into a finger-pointing blame-game between the two contractors, and repair costs had climbed to more than six figures.

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INSIDE...

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SPACE STATION THERMAL CONTROL

Thermal control on the International Space Station is essential for keeping the station running and sustaining human life, but the physics of outer space mean there are distinct differences from the thermal control systems we use here on Earth. With temperatures on the sun-facing side of station reaching 250°F and dark side temperatures hovering at -250°F, the ISS's thermal control system must balance the two extremes while controlling excess heat produced by electronic instruments and equipment.

There are two main thermal control systems on the ISS: the Passive Thermal Control System (PTCS) and the Active Thermal Control System (ATCS). Thermal control starts with the PTCS, which consists of insulation and thermal surface coatings to block solar radiation and the extreme cold of outer space, as well as heaters and heat pipes. The ATCS takes over to provide heat rejection where the heat loads exceed the capabilities of the PCTS.

The crew module of the space station is chock full of electronic instruments that produce waste heat, which the ATCS must remove and transfer to space. This is achieved with cold plates and heat exchangers cooled by a circulating water loop. The collected heat is then transferred to ammonia contained in two loops located on the exterior of the space station's main truss. The heated ammonia is then circulated through huge radiators that release the heat into space as infrared radiation. Ammonia was selected by NASA because it best meets thermal performance and safety requirements for toxicity, flammability, freeze temperature, stability, and cost.

In addition to heat removal, the ATCS works in tandem with the station's environmental control system to manage air quality and flow. Hot and cold air don't rise and fall in zero gravity, so air must be properly circulated to provide a well-mixed, breathable atmosphere while preventing condensation, electrical shocks, corrosion, and microbial growth.

Bridging the Gap between System Controls & Mechanics

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Drawing on combined expertise in mechanical, electrical, and controls systems, MSC techs stepped in and traced the problems to cause-and-effect lapses between sequencing and mechanical function, and the appropriate fixes were applied.

So what went wrong on this project? While it wouldn't be fair to assign all of the blame to either the designers, DDC programmers, or the installing contractor, the problems most certainly could have been avoided with better collaboration. Also, the issues that occurred should have been uncovered during performance testing, but in this case a perfunctory "checklist" commissioning process was performed, rather than the customized testing the facility's complex systems required, and problems were overlooked.

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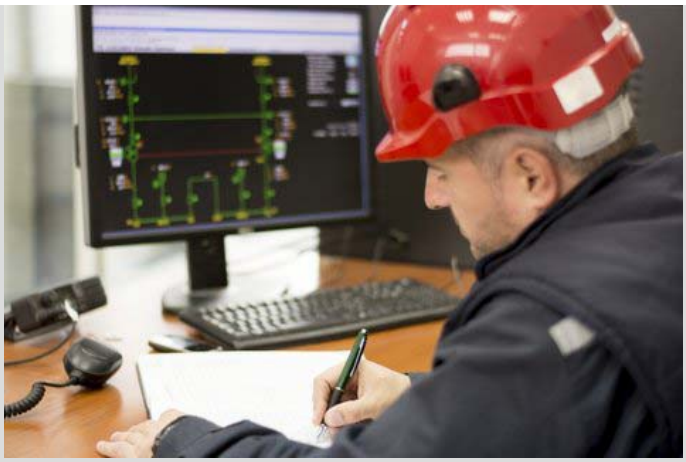
IT'S NEVER JUST ONE THING by Pete McGrath

If I had a dime for every time Harry Hartigan has uttered the words, "It's never just one thing", I could buy Google. Newer MSC service technicians hear this phrase spoken by Harry on a near-daily basis until they find out the truth of it for themselves. There is never, ever "just one thing" wrong with an HVAC system.

Take the loss of a compressor. The HVAC industry is chock full of contractors who will simply replace the failed compressor without ever asking the key question: Why? Was it due to flooded starts? Then what caused the flooding? Applying simple fixes like replacing a leaky solenoid valve or bad crankcase heater can prevent a repeat failure and potentially save tens or even hundreds of thousands of dollars in replacement equipment and lost production.

The same goes for problems with fans, motors, contactors, pumps, or any other system glitch, malfunction, or general underperformance. Technicians should always ask themselves three important questions:
1) Does the problem begin with this particular component or piece of equipment?
2) Is this a symptom or trickle-down result of another problem?
3) What other problems is this issue causing elsewhere down the line?

HVAC and controls are more complex than ever, but every system has a story to tell if you're willing to listen. It does, however, take expertise in multiple disciplines to view and understand a system holistically. A technician who doesn't have this understanding is a mere parts replacer, throwing fixes against a wall to see if something sticks (at the client's expense) and missing the big picture entirely. Experience can be a tough teacher when you get the test first and learn the lesson afterward, which is why "it's never just one thing" is always one of the first things we learn, and what we live by here at MSC.



DID YOU KNOW...

- As the recognized industry leader in HVAC, process cooling, and building automation diagnostics and service, MSC technicians receive continual technical training, participate monthly in monthly in-house workshops, and regularly attend vendor training seminars. This ensures that every client receives the top-echelon expertise, quality, service and professionalism they deserve.