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(973) 884-5000

NEWSLETTER - JUNE 2019

SERVICE CALLS

Hospital Ventilation Problem Solved with Fan Array



Recently while MSC was testing VAV and airflow at a client's facility, an emergency arose with low-to-no reheat hot water. After confirming that steam was present at the reheat skid, our technician traced the issue to a flooded condensate lift station. A malfunctioning 1" check valve was allowing pumped condensate to return to the tank, so it was unable to empty. The issue was quickly rectified with installation of a new check valve.



A new manufacturing customer came to MSC complaining of persistent temperature and humidity excursions. Several combo temp/humidity sensors and static pressure sensors were found to be far out of calibration, and as it turned out, no annual calibrations had ever been performed in the 6-year-old building. MSC calibrated all sensors and recommended a quarterly PM schedule and air balancing to avoid future problems.

Late last year, a northern New Jersey hospital was experiencing issues with an old centrifugal fan with an external 30-hp motor inside a 30,000 CFM air handler that

served patient floors. Among the fan's problems were noise, vibration, inrush current at startup, and it was a huge energy hog. Replacement was being seriously considered.

A few months after tentatively reaching out to MSC about replacing the fan, there was a



catastrophic bearing failure. A temporary repair was quickly rendered, and with the fan now limping along, replacement rapidly became a priority. Working with a local custom fan and coil contractor, MSC proposed replacement of the old constant-speed centrifugal blower wheel with a new fan array system, and we were promptly awarded the project.

Retrofitting the hospital's system with a fan array offered many benefits. As opposed to the original fan's constant speed, a fan array is comprised of multiple variable-speed, electronically-commutated motors, or ECMs. CFM and static pressure are more easily controlled, and redundancy improves system reliability; if one fan fails, the other fans automatically pick up the slack to allow the system to



run at 100%. A failed fan could be easily replaced by one or two technicians, much unlike the old centrifugal fan. Fan arrays are more energy efficient, quieter, and run with less vibration than the single centrifugal blower. With no drive belts to tighten or replace, less maintenance would be required.

In order to pull off the trick of getting the large centrifugal fan out of the air handler and the new fan array in, MSC had to perform our own brand of surgery by cutting a passageway in the air handler's exterior. This opening was later sealed and made tight at the end of the project. MSC next disconnected, removed and scrapped the original fan, motor and hot water

coils. The new fan array was installed quickly and easily, with boxed fans stacked in parallel, along with new hot water heating coils. The system was commissioned and tested, fan-by-fan and as a whole, including failure scenarios. In the end, the hospital was very pleased with the job MSC did as well as their new, reliable variable-speed fan array system and is now exploring where they can incorporate fan arrays elsewhere in their facility.

TECH TALK

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Chiller Failure: What's Your Back-Up Plan?

By Pete McGrath

The time to plan for an emergency is not during the emergency

Many facilities – hospitals, universities, manufacturers, office buildings, etc. – depend on chilled water, but what happens when the chiller fails? What would such an emergency cost your business?

If you've planned ahead for chiller failure, congratulations. Your pain will be brief. If you haven't planned ahead, get ready for trouble with a capital T. Production lines will halt, buildings (and tempers) will overheat, and costs will multiply quickly. Crisis mode kicks in, fingers point, and there is a mad scramble to figure out what to do until the failed chiller can be repaired or replaced.

This is why you need a contingency plan in place.

In planning ahead for chiller failure, the first step should be installation of tees and valves in the chilled water piping, and insulated emergency connection piping should be run to the outside of the building



and pressure tested. This way, an emergency rental chiller can be quickly connected and normal operations can resume within a brief period of time. Otherwise, the system will have to be drained and lines run to the emergency chiller while operations remain at a halt and/or spaces are getting warmer.

Emergency chillers can be very large, so it's important to predesignate an area where a flatbed trailer can be located for an extended period of time. Also, make sure you have the proper electrical in place to power your emergency chiller at a moment's notice. A good guideline would be to match your electrical feed to your existing chiller.

As for obtaining the emergency chiller, it's advisable to partner with a rental company to ensure that the necessary equipment will be on hand when you need it. It can be extremely difficult to locate an emergency chiller, especially at the height of the summer season.

There is some cost involved when it comes to preparing for chiller failure, but it comes at a small price when you consider your potential losses. For assistance in setting up your back-up plan so you're ready when the time comes, call MSC at (973) 884-5000.

Canadian Ice Core Samples Lost in Catastrophic Meltdown



Speaking of chiller failure...

Precious Arctic ice core samples were lost when chillers and alarms at a University of Alberta cold storage facility simultaneously malfunctioned in 2017. Nearly 13% of the Canadian Ice Core Archive melted inside the brand-new \$4 million facility over an April weekend, unbeknownst to facility personnel. Each of the 180 meter-long cores would cost between \$500,000 and \$1 million to replace.

An investigation found that high head pressure conditions caused the chillers to circulate hot water, and temperatures inside one the facility's two freezers rapidly rose to 104°F. Compounding the problem, the freezer's monitoring system sent out high temperature alarms, but they were never received by the control center due to database corruption. The situation was finally discovered when the fire department responded to a tripped heat detector.

Following the incident, the university made a number of improvements and modifications to the refrigeration system and installed a second independent alarm to help ensure that such a catastrophic failure can never occur again.



TECH TALK

OPINION vs. FACT: The Difference Between Guesswork and a Solid Diagnosis



Opinion: a view or judgment formed about something, not necessarily based on fact or knowledge.

When something goes wrong with an HVAC system, there can be value in seeking the opinion of an HVAC professional - if, that is, the opinion turns out to be correct.

But how do we know when we can have confidence in an opinion, even an informed opinion? The fact is, you can't. An opinion is just a starting point that can either be supported or disproved by establishing facts.

"When you hear hoofbeats, think horses, not zebras". This phrase reminds doctors to consider the most probable diagnosis first before moving on to more unlikely explanations. But in HVAC – and medicine – **this doesn't mean it's always a horse, because zebras DO exist.** You wouldn't allow a doctor to perform surgery based on an opinion without going over your medical history, determining all of your symptoms, and performing tests, and the same standards should apply to your HVAC system.

Accurate HVAC diagnostics requires a combination of knowledge, experience, the right tools and instruments, and some good old-fashioned detective work. A good HVAC service contractor invests the necessary time, money and brainpower required to collect the pertinent information necessary to accurately

diagnose and solve problems in an HVAC or process system. Far too many contractors, however, don't bother, because opinions are easy and cheap. They perform repairs or replacements based only on a handful of symptoms and a gut feeling. It's no surprise these diagnoses are often wrong, and it's always the customer that bears the cost.

As the only true HVAC service subspecialist in the tristate area, MSC in the business of fixing and optimizing what you have, not performing unnecessary repairs and selling new equipment. We don't substitute opinions for solid diagnostic work. We discuss the issue with the client, observe, perform all necessary testing, analyze the collection of testing data and other information to come up with an accurate diagnosis. Customers receive a detailed diagnostic report, including information on how the data was collected, a conclusion, and recommended repairs or other options.



Three Ways to Avoid Major End-of-Project Air and Water Balancing Problems

Air and water balancing, also known as TAB (testing, adjusting and balancing), usually signifies that a project is near completion. All too often, though, it's where issues that were entirely preventable are unearthed and must be corrected. Here are three simple things that can be done to avoid these painful and costly project problems and delays:

1. Follow the manufacturer's upstream and downstream diameter requirements when installing air and fluid flow measuring stations. Otherwise, they simply will not work properly, and project progress will halt. Possible corrections are relocating the flow stations, purchasing and installing flow straighteners, or replacing them with usually more expensive flow stations that can operate within tighter parameters (which may or may not be possible).

2. On pressure-critical projects, a true zero reference point must be established.

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point in place from the beginning, it will need to be installed later on, causing schedule delays and great expense to the project. **3.** Use quality VAV/CV boxes, dampers, and instruments. These items are often downgraded early on during the value

Building pressures must operate against a known quantity in order to ensure accuracy across the board. If there is no zero reference

engineering process or eliminated completely to save money, only to cost about four times that amount to put them back in when air and water balancing reveals various shortcomings. There is nothing wrong with wanting to save money, but make sure doing so doesn't come at a much higher cost.