HVAC/R • PROCESS COOLING • BUILDING AUTOMATION

TECHTALK

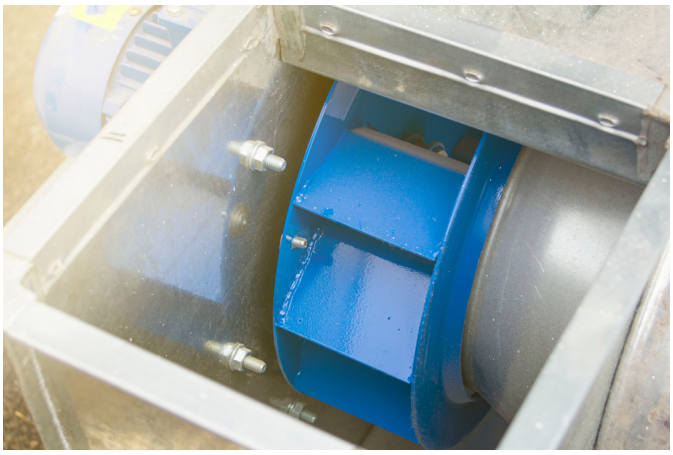
QUARTERLYNEWSLETTER
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Understanding and Addressing Fan Stall: Causes, Symptoms, and Solutions

When a fan is selected for an HVAC application, the expectation is for the fan to deliver steady airflow and pressure with little fluctuation. Certain conditions, however, can produce extreme variations in airflow, leading to a variety of issues including reductions in efficiency and performance, excessive noise, structural metal fatigue, and equipment failure. One such condition is known as fan stall.



What Causes Fan Stall?



An angled fan blade passing through an airstream deflects air. As the blade's attack angle increases, the amount of air deflection is likewise increased, thus generating higher air pressure. However, if the attack angle is too severe in relation to the CFM entering into the fan blades, the air will separate from the blades' surface, resulting in a drop-off in pressure known as stall.

In other words, fan stall is caused by CFM that is too low, typically because the selected fan is too large for the system it's serving. This oftentimes occurs when a designer or contractor specifies a larger-than-necessary fan to compensate for possible errors in calculation.

Fan Stall Symptoms

Turbulence from the separated air buffets the fan blades, causing a severe increase in noise that can sometimes sound like loud hammering. Other symptoms include excessive vibration, unsteady flow, system inefficiency, and mechanical damage to the fan, ductwork, and/or other system components. Fan stall is common in axial fans, forward-curved centrifugal fans, and backward-inclined centrifugal fans, but axial fans are most likely to sustain damage and perform poorly when fan stall occurs.

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What Can Be Done to Remedy Fan Stall?

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There are fixes that can be applied to alleviate or eliminate fan stall such as increasing airflow through the fan by creating a leak downstream or running a duct from the fan outlet back into the inlet. However, these approaches reduce system efficiency and may not suffice as a permanent fix. If fan stall proves to be a persistent issue, it is likely advisable to replace the fan with a unit that's appropriately sized for the HVAC system.

Diagnosis Doubts? The Importance of Vetting Your HVAC Service Contractor



We've all experienced it – that nagging uncertainty when something breaks and the service professional you hired diagnoses a major failure that will cost a bundle to fix. What if they're wrong? What if the problem only requires a minor adjustment or low-cost part replacement? Are they taking advantage of you, or are they simply lacking in expertise? Time is of the essence, so what do you do?

Qualifying Your HVAC Contractor

It is important to note that misdiagnosis does not necessarily indicate questionable motives on the part of the contractor. It is not uncommon for inadequately trained or inexperienced HVAC service technicians to misdiagnose a problem and erroneously condemn an expensive component or piece of equipment. Fortunately, there are some things owners and facility managers can do to avoid these types of pitfalls.

First and most importantly, exercise due diligence by fully vetting your HVAC contractor of choice. What are their qualifications? Do their service technicians receive regular in-house and vendor-sponsored training to ensure they are fluent in new and evolving technology? Does the contractor own or have access to the tools and equipment necessary to diagnose the cause of your specific issue? If you still have doubts, seek a second opinion from a reputable and capable service contractor that can perform an independent analysis and arrive at their own conclusions. Obtaining an evaluation uninfluenced by the original diagnosis helps to ensure that the root issue is properly qualified, allowing you to move forward with the appropriate repair.

A Recent Real-Life Example

MSC was called in to provide a competitive quote to replace a failed blower motor based on another contractor's diagnosis. Since it is our practice to perform our own diagnostics before submitting a bid, the client allowed one of our service technicians to come in and examine the motor. Our tech quickly traced the source of the problem to a pitted contactor that was preventing the necessary transfer of electrical energy to the motor. The part was replaced the same day at a small fraction of the original quote, saving the client nearly $10,000.

October is Here – Time to Get Ready for the Heating Season



As summer wanes and we begin the transition into autumn, now is the time to prepare your HVAC systems for the heating season. Start by making sure economizer cycles are working properly to take advantage of the free, cool nighttime air. Fall preventive maintenance, which should go well beyond simply changing belts and filters, is now due. We recommend having heat exchangers inspected, heat pump systems checked, hydronic systems balanced, and heating controls tested to make sure they're functioning properly as part of your scheduled fall PM routine. If you are considering retro-commissioning to reduce energy costs, reduce downtime and repairs, and extend the lifespan of your equipment life, autumn is the ideal time to do it.

A/C in 1925: NYC'S Rivoli Theater a Pioneer of Willis Carrier's New Technology





Willis Carrier is credited with inventing modern air conditioning in 1902 and was instrumental in the development and implementation of the technology. He also played a pivotal role in introducing AC to the general public when in 1925 he persuaded Paramount Pictures to install his system in the Rivoli Theater, their flagship movie house under construction in New York City's Times Square. The experiment was an instant success, with amazed audiences flocking to the Rivoli to enjoy the cool environment while taking in Hollywood's latest movies. Over the next five years, Carrier would go on to install more than 300 air conditioning systems in movie theaters, revolutionizing the technology's impact across the nation.