

Office Building Air Handling Units

Overview

The impact of an air handling unit (AHU) fan failure depends on many factors including the time of year, size of the building, and the type of industry. Data centers, financial services, and telecom companies are among the industries that would be most affected if a facility had to shut down because a fan failed. Costs associated with loss of business can run into the millions.

Located in a Western U.S. city, a company that could have been significantly affected by an AHU fan failure is relieved today. A seven-story, 230,000-square-foot building houses the regional headquarters, corporate business offices, and customer support call center of this large financial company. When the fans serving the building's AHU began showing signs of serious trouble, the facility's chief engineer called in Cherrington's Inc., a mechanical contractor based in Salt Lake City, UT. Cherrington's reached out to Twin City Fan & Blower representative Jeremy Steed at Midgley Huber, Salt Lake City, UT, for a solution.

Challenge

The supply fans for the building's AHU had begun to vibrate—severely. “The fans were sending vibrations through the whole facility,” said the company's chief engineer. “We could see the lights moving; we could see water in glasses moving. We noticed cracks in some of the fan blades and tried to patch them the best we could, but we knew it was a stop-gap solution. We placed vibration sensors on the fans. We didn't want them to come apart.”

Slow response from the fans presented another challenge. Because of inertia, the 250HP fans could not react to the control system quickly enough to control the static pressure, resulting in pressure buildup. In this case, the high static pressure actually damaged some of the ducts within the building.

As the summer heat increased, so did the vibration and control problems. The company needed a quick solution to its fan issues. If the fans failed, the facility could have faced a shutdown.

In addition to smooth, reliable fans with low vibration, other AHU fan requirements included: Guaranteed quick delivery, Modularity, Small footprint, High reliability, At least 315,000 CFM (total) at 4 inches of static pressure and Ease of maintenance

Another critical requirement was quick installation over the Labor Day weekend (2012).

Solution

Midgley Huber supplied 18 MPQN Modular Plenum Fans with 25HP motors, and six isolation bases, all from Twin City Fan. The 18 fans are arranged in two arrays, with nine fans in each array. Each fan array provides



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Quick Facts

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Application

Office Building Air Handling Units

Twin City Representative

Midgley Huber - Salt Lake City, UT

Contractor

Cherrington's Inc. - Salt Lake City, UT

Challenge

Lower vibration, more responsiveness to controls, small footprint, quick delivery, high reliability, ease of maintenance, narrow changeover timeframe

Solution

Twin City Fan & Blower's MPQN modular plenum fans & six isolation bases

Result

Negligible vibration measurements and improved efficiency of modular, reliable, high-performance fans that were delivered on time, installed ahead of schedule, and that exceed the end user's requirements.

CASE STUDY



Model MPQN Modular Plenum Fans



Wheel Sizes
12.4" to 49.0"

Performance
Airflow to 76,000 CFM
Static pressure to 12 inches w.g.



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157,500 CFM at 4 inches of static pressure, which satisfies the 315,000 CFM requirement. The 24.5-inch, modular plenum fans run at 2,570 rpm and are designed to operate inside of AHUs. And because MPQN fans are stackable, multiple fans can be used in parallel, which reduces sound levels.

“Instead of using two huge fans like before, we proposed using 18 modular MPQN fans in two stacked arrays—nine fans on each of two wings of the building,” said Steed. “And the company wanted them installed over Labor Day weekend.”

Steed received the order on Aug. 1, and had to ensure the customer that these 18 fans and six isolation bases would be delivered no later than Aug. 27 to meet the schedule. “Standard lead time for an order like this would have been close to six weeks,” Steed said. “All of the fans were delivered the Thursday before Labor Day.”

“The old fans had to be ripped out,” said Steed. “Then the new fans and isolation bases had to be taken up. Because they’re modular, the fans could be taken to the AHU penthouse easily.”

Even though new electrical wiring was also required, the new fans were running smoothly by Monday morning—Labor Day. The installation was successful.

Results

The financial company can continue to operate without fear of having to shut down because of an AHU fan failure. The employees that occupy the building can work without the annoyance of fan vibration and noise.

The new fans resolved the vibration issue. “We reattached the vibration sensors to the new fans, and compared to the old system,” said the chief engineer. “The vibration measurements are negligible. You can stand next to them and feel the floor, and there is no vibration.”

The chief engineer estimates that the new fans are 5% to 10% more efficient than the old fans. “This has been a hot summer, so this is not a typical average. But we can develop the static pressure we need with less energy,” he said.

The installation was done ahead of schedule. “They actually had the project done in two days instead of three—and that included removing huge inertia slabs and the old fans,” said the chief engineer. “Coordination was very tight.”

The installation went well partly because Twin City Fan delivered the new fans on time. “No other manufacturer would have been willing to guarantee to have fans built and delivered in four weeks,” said Steed. “This is a testament to Twin City Fan’s engineering capabilities and flexibility. In our opinion, Twin City Fan is the best solution for everyone. When I sell a Twin City fan, I’m confident that it will work and it will meet the customers’ needs.”

“We’re thrilled,” said the chief engineer. “This couldn’t have gone better. If you had told me the new fans were going to be this much better, I would have laughed at you.”