



CASE STUDY

Project Snapshot

Industry
Water & Wastewater

Application
Wastewater treatment odor control

Customer
Lakehaven Utility District
Des Moines, WA

Aerovent Representative
Ron Beyersdorf
David P. Wilson Company
Bellevue, WA

Challenge
Move air through packed-bed chemical scrubbing towers, corrosion resistant, low noise, fit into existing space, efficient, high reliability.

Solution
Aerovent's BCF belt driven, corrosion resistant fiberglass centrifugal fans with carbon fiber wheels

Result
Odor is controlled by pulling air through scrubbing towers with reliable, high-performance fans that exceed requirements of the application.

Wastewater Treatment Odor Control



Overview

Wastewater treatment plants must be good urban neighbors by ensuring that odors from their processes are minimized. Hydrogen sulfide, or H₂S, forms in the early processing stages, and is typically the primary cause of odor emissions. Large urban wastewater plants have a growing number of odor treatment options from which to choose – many of which require the use of robust and reliable air moving equipment.

The wastewater treatment facility operated by Lakehaven Utility District, Des Moines, WA, controls odor by pulling the air from the plant's headworks, primary clarifiers, and sludge processing areas; filtering it through packed-bed chemical scrubbing towers; and exhausting it to atmosphere. Make no mistake: applications like this require the use of high quality industrial grade fans.

The fans on the odor control system at the Lakehaven plant had been in place for nearly 30 years. Over the course of time, they had corroded severely because of the H₂S as well as the chemicals used to eliminate it. The treatment facility was in need of new fans – corrosion resistant fans. Lakehaven turned to Aerovent representative, Ron Beyersdorf, David P. Wilson Company, Bellevue, WA, to specify the proper fans for the system.

Challenge

The facility's primary concern was controlling odor. "We are required by ordinance to not emit any odors," said John Barton, wastewater operations supervisor at the Lakehaven treatment plant. "The plant is one block off the beach in an extremely affluent area."



CASE STUDY



Because the 30-year-old fans were so corroded, it was imperative for their replacements to be highly corrosion resistant. “The existing fans were stainless steel,” said Beyersdorf. “The process was corroding them. They were being eaten away.”

Replacement fans would have to fit into the existing space. “We were replacing another manufacturer’s fans,” Beyersdorf said. “Because of that, we had space and ductwork configuration constraints to work around.”

The older fans had 100 HP motors. Replacement fans could not exceed this rating because doing so would require Lakehaven to change most of the electrical components and the wiring that supplies power to the fans.

Noise was also an issue. “They wanted the fans to be as quiet as possible while allowing adequate access for maintenance,” Beyersdorf said. “One of the fans is installed in a relatively small concrete-walled room. Previously, they had blankets hanging from the walls to attenuate the sound.”

In addition to increased corrosion resistance, form factor, horsepower rating, and low noise, other fan requirements included:

- Volume of at least 23,000 CFM
- Static pressure of at least 18 inches
- Quiet, smooth operation
- Efficiency
- Ease of installation
- Ease of maintenance
- High reliability

Solution

David P. Wilson Company supplied two BCF 330 fiberglass fans from Aerovent. The 33-inch, centrifugal, backward curved, high pressure fans are designed for handling corrosive or caustic air in high pressure applications where conventional steel and stainless steel fans are not suitable. The BCF’s carbon-fiber-reinforced wheel is designed for maximum efficiency, quiet operation, minimal weight, and optimum strength. It features a wide wheel and housing, which produce high volume, low velocity air movement.

Competitors’ fans would have to use a fiberglass and stainless steel combination to obtain the required speed and performance. “But Aerovent fans were able to exceed the performance requirements with fiberglass and carbon fiber wheels,” said Beyersdorf.

Noise was also an issue at the Lakehaven treatment plant. “They wanted the fans to be as quiet as possible while allowing access for maintenance,” Beyersdorf said. “The backward curved wheels are quieter than other blade designs. They don’t impact the air the way straight radial blades would.”



Carbon Fiber Wheel



CASE STUDY

According to Beyersdorf, these backward curved fans met the pressure and flow requirements and they're more efficient than other blade designs. He also said that the two BCF fans are identical, except for rotation. "One fan has a clockwise rotation and the other has a counter-clockwise rotation," he said. "Because of the space and ductwork configuration constraints, one of the fans had to have an opposing rotation to fit the existing duct layout."

The 100% wheel width of the BCF fans easily produces the required 23,520 CFM at 18 inches of static pressure. The speed of each belt-driven fan is around 2,200 rpm. "A speed of 2,200 rpm is not a good fit for direct drive," said Beyersdorf. "You either have to over-speed an 1,800 rpm motor, or you have to run a 3,600 rpm motor slower, which would require a larger motor because it would have to be derated."

Results & Benefits

The Lakehaven wastewater treatment facility can continue being good urban neighbors by controlling odor emissions. Because the plant's odor control system uses Aerovent's corrosion-resistant fiberglass/carbon fiber fans, clean air is exhausted to the atmosphere.

In addition to exceeding all performance requirements, the new fans are more efficient. "We were at the point where we had to run the old fans at 100% all the time," said Barton. "Now, we're able to turn them down to about 50%. We would have odors if we ran the older fans at less than 100% because we weren't moving enough air. These two fans are evacuating air from two 30-foot-tall bio-towers. They have to move a certain amount of air across those towers. It takes less energy to move more air with the new fans."

According to Barton, the BCF fans from Aerovent are cleaner electrically and have much less vibration. "The new fans are definitely superior to the ones we had," he said. "They are much smoother, much cleaner electrically – less harmonics – they're really good fans."

Barton is also pleased with the support that the David P. Wilson Company provided. "Ron was extremely helpful with the technical aspects of the fans themselves, and also the installation," he said. "He was here for the startup, but he was also here to answer questions about the actual installation."

"For this application and performance requirements, the BCF is the best fit," Beyersdorf said. "Aerovent is the only fan company that could meet all the requirements the customer needed."



Model BCF

Backward Curved, High Pressure Composite Fan

Sizes (wheel diameters)

16.5 to 60 inches

Performance

Airflow to 151,000 CFM
Static pressure to 34 inches

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