SIEMENS

Wayne State University

After an independent evaluation of lab control technologies, the Siemens single-blade damper is the new standard on campus.

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In more than 140 years since its founding, Wayne State University in midtown Detroit has grown to become a nationally recognized metropolitan research institution. Today, the university offers more than 400 academic programs through 13 schools and colleges.

Nearly 32,000 students attend classes on the university's 200-acre campus, which comprises 100 buildings. Approximately 12 of those campus facilities have labs that require 100-percent outside air. Many of these buildings are older facilities in need of renovation or system upgrades.

Client background

The Chemistry building, built in the late 1960s, underwent a Phase I renovation five years ago. By 2009, the remaining half of the building was in need of attention. The Phase I project used single-blade damper technology to control laboratory ventilation and exhaust systems. However, a later project at the Engineering Development Center used the Venturi air valve lab control solution. Moving into Phase II at the Chemistry building renovation, the university was at a crossroads: use the Venturi air valve or the single-blade damper?

"When we started the renovation of the second half of the Chemistry building, we started looking at the cost differences. The Chemistry Phase I project and the Engineering Development Center scope-wise were very similar but there was a pronounced cost difference," explains Larry Fodor, WSU's director of utilities and energy management. Exploring the price disparity was the auspice for what became a full-blown independent review of the two technologies.

The facilities team looked at the Siemens blade damper and Venturi offering, as well as the competitive Venturi solution, to draw comparisons between the two technologies.

Client objectives

Wayne State University's facilities team had many objectives when evaluating the control of laboratory ventilation and exhaust systems. Chief among those was the need to install lab controls that were high quality and energy efficient (since labs require 100-percent outside air). Another necessity was seamless integration with the existing (Siemens) building automation system.

"The other driving force behind our deep dive was that we didn't want to go through this whole process again," says Fodor. "We basically wanted to put a stake in the ground, saying after we did our evaluation, whatever the outcome was, from this point forward all our labs would be like this." By performing a thorough evaluation of the available technologies once, the university hoped to standardize and save both time and money on future lab renovations.

Siemens solutions

After evaluating the single-blade damper and Venturi air valve solutions and their functionality and capabilities, the single-blade damper was selected. The Siemens single-blade dampers were installed on more than 120 fume hoods in the Chemistry building during Phase II of the facility's renovation. The project costs were between $750,000 and $800,000. The year and a half construction cycle concluded in September 2011.

While both the blade damper and Venturi air valve could meet the university's performance requirements, the university's independent evaluation uncovered many advantages to using the blade damper technology. Chief among those benefits was cost. "The blade damper is a lot less expensive than the Venturi," notes Fodor.

Not only did the blade-damper system cost less, but less labor and fewer materials would be required, further lowering the price of the installation. "In certain situations, the Venturi valve, based on air flows, will require two of these air valves, sometimes three. With the blade damper, no matter what the air flow requirement is, we'll only need one," explains Chuck Glowicki, Account Executive, Siemens Industry, Inc., Building Technologies division. "Right off the bat, you're reducing materials required for the job and you're reducing labor required to install these materials."

The efficiency of the single-blade damper was another budget-friendly benefit. "The Venturi product requires more air to operate, thereby taxing the fan systems more, having to use more energy in the fan system to deliver air to the Venturi valve. The blade damper is totally opposite: it uses less energy, less materials and less labor to install," adds Glowicki.

Findings from the university's evaluation addressed all hesitations and concerns. "Some of the other manufacturers said blade [technology] is no good because speed of response is too slow," says Fodor. They also warned that turndown ratio, how much you can throttle it down, might be inadequate. "We took that into consideration."

After looking at the operation of blade dampers in the Phase I renovated space of the Chemistry building, the facilities team could not detect any appreciable difference in speed of response. "There might be other applications where the speed of response is measured in milliseconds, which is more critical, but for our application, it is not," notes Fodor.

Likewise, the turndown ratio was determined to be more than appropriate for this application. "The Venturi can be throttled back a lot more than the blade," explains Fodor. "But for our application, we don't need a 10-to-1 turndown ratio, usually something like a 4- or 5-to-1 turndown ratio is sufficient, because we still have to maintain some ventilation through the lab and through the fume hood."

While both the single-blade damper and Venturi air valve provide superior performance, the requirements for this application made the blade damper solution ideal. "Given our criteria and the way we're using the technology, the blade made more sense," explains Fodor.

Results

Wayne State University's entire Chemistry building is now outfitted with laboratory controls that will keep the occupants safe at all times, providing the necessary ventilation where and when it is needed.

Not only did the project have a lower initial cost because the single-blade damper was selected, but also it (as opposed to the Venturi air valve) will use less energy and save the university money over time. Siemens blade dampers offer the opportunity to save typically 10 percent of fan power at design flow and higher percentages at lower flows.

The Siemens lab control technology will operate smoothly with the Siemens building management system in place. "Integration of those lab controls with the regular building automation technology is seamless," says Fodor. "There's no BACnet/LonWorks black box integrator or anything like that that gets in the way to complicate communications or complicate future compatibility down the road."

The university's efforts to standardize on Siemens control systems has enabled the facilities team to establish templates that will cut down on consultant fees on future projects. "Part of the initiative was to establish templates for the way we operate our equipment. We have schematic drawings in control sequences that have already been established, so that when we get a designer on board for a new project, we can hand them a package with Siemens by our side and say, 'Here is how we do things at Wayne State for this equipment we want you to install,'" explains Fodor. "Doing it the consultant's way costs us more money; by doing it our way, we're saving money. And we can roll the project out a lot quicker."

WSU's entire Chemistry building is now outfitted with laboratory controls that will keep the occupants safe at all times, providing the necessary ventilation where and when it is needed. Perhaps the biggest success, though, is that efficiency wasn't sacrificed at the expense of occupant safety.

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