



Comfort and Health

Lakeshore Schools renovate to pass the IAQ test.

By Rachel Ruhl

EVERY STUDENT NEEDS A measure of comfort to achieve scholastic success. Studies prove that when classroom temperatures are too hot, too cold or too humid, students struggle to overcome it. The distractions can lead to failure.

When uncomfortable, a person's brain is constantly reminding the body to do something about the condition, making it hard for a student to stay focused.

With comfort, students work better and get smarter. That's a fact.

Nick White, director of operations for Lakeshore public schools in Stevensville, Mich., has orchestrated many changes recently. His attention and prudent management of school improvements at three elementary schools, middle school and high school — to include broad HVAC upgrades — have improved both student and teacher comfort, and energy efficien-

cy at each facility.

In 2013, White and the Lakeshore school board looked at options, hoping to enhance student achievement. It's been about twenty years since any of the schools had new heating equipment installed, and none of them had any form of air conditioning.

"It was time to do something," said White. "We would get daily complaints from teachers about the inconsistency of



White noise, too

“Another issue that we would get regular complaints about was the noise of the units,” continued White. “Teachers constantly had to yell to be heard over the incessant drone of the HVAC equipment.”

“Remember Charlie Brown’s teacher [with a voice like a muffled lullaby]? That’s how our teachers sounded to students before we got a new heating and cooling system; they couldn’t stay awake,” he said with a chuckle. “Our HVAC woes became a huge distraction.”

White contacted Scott Morgenstern, senior mechanical engineer for Kingscott Associates — an architectural and engineering firm, based in Kalamazoo.

“Nick informed me that the school district was looking to do a significant amount of renovating and remodeling in all of the schools,” explained Morgenstern. “The bulk of work to be funded was slated to improve classroom HVAC systems — replacing old unit ventilators with new, quiet, energy efficient ones.

“The old systems were not only noisy, but they weren’t providing sufficient air distribution,” he added. “They were basically oversized fan coil units that sat under classroom windows with the sole purpose of making life miserable for students and teachers alike.”

Overheating and under-heating was sure to affect classroom conditions daily. The discomfort was palpable. Outdoor conditions played an enormous role; another key variable was the location of a student’s chair. Teachers could move their desk, or walk about, but students were mostly unable to make improvements.

“Clearly, we needed a way to provide comfort within the schools,” said White.

Morgenstern sought out Scott Bolhouse, at Bolhouse LLC, a manufacturer’s rep based in Jenison, Mich.

“Scott contacted me with a need for a high volume of unit ventilators,” said Bolhouse. “He explained the troubles Lake-shore schools were experiencing. The school district needed equipment that would offer consistent temperatures year-round, quietly and efficiently.”

Bolhouse took White and Morgenstern on a tour of nearby locations with unit ventilators already installed and running.

room heating. Students seated by old, under-the-window unit ventilators were either sweating or shivering.

“In the mornings,” he added, “the ventilators would be blasting heat and later, as the thermostat was satisfied, outside air was brought in to improve indoor air quality and student health.”

But the fresh air entering the rooms became a textbook lesson in thermal shock. Cold air immediately conditioned students and teachers: the discomfort was so routine that they knew to have their winter jackets nearby.





Cool and Quiet. In a school setting, a good HVAC system is a quiet one. Students and staff at Roosevelt Elementary School in Stevensville, Mich., are breathing more healthful air and perform better in class because the new HVAC systems are quieter, making it easier to hear the instructors.

“We’ve found that it always helps to demonstrate equipment operation; there’s nothing quite like a working demo in a setting not unlike the classrooms they needed to improve,” said Bolhouse. White and Morgenstern saw a variety of HVAC equipment that day.

After further research into equipment capable of solving problems at the school district, they chose Modine’s Airedale Classmate,” continued Bolhouse.

“One of the first things that stuck out to me at the demo was the noise — or better — the lack of it,” said White. “We learned about the equipment’s impressive sound lab performance, but it was most impressive to see and hear the equipment during our tour. We were certain that we’d found the right technology for our schools.”

Replacements for all classrooms

For the five schools, 132 units were specified, and two Modine Varsity under-the-window units were chosen for the high school football locker room.

The classroom units have super-efficient

electronically commutated motors (ECM) and micro channel coils. Advanced blower and compressor technologies contribute to the decreased sound and power output.

They also have a proprietary CF coil, offering substantial improvements over existing parallel flow (PF) coil technology so prevalent in the HVAC market today.

The all-aluminum counter flow (CF) coils provide superb condensing and evaporation. Inside the CF coil, refrigerant makes two-passes — once up and then back down — to create a uniformly conditioned air stream.

The vertical systems allow for ductwork and diffusers to be connected easily so that sound from the fan and the moving air are distributed throughout the room, which more or less eliminates the sound altogether.

“Kingscott has been designing with vertical style ventilators for years,” said Morgenstern. “These types of units have been our preferred solution since they came on the market. Being able to provide ducted supply systems to the classrooms allows

for better temperature control throughout an entire room — which was a huge win for the Lakeshore Schools.” The two-stage cooling keeps the units operating in the most efficient range possible at all times.

Custom controls


With jobs like this, the question of controls always comes up. “Do we use our local contractor’s controls or do we use the manufacturer’s controls?” asked White. Scott Morgenstern prefers to use a manufacturer’s control package for single-source reliability. “We know they’ve tested the controls, and the better firms test them exhaustively,” he said.

Timing is everything

“Lakeshore district’s first question to us before we won the bid was whether or not we could deliver the equipment on time,” explained Gillis. “There’s a very small window of opportunity to get these types of school jobs done since the work — demolition, installation and start-up of all units — must be completed during the summer months so that they’re ready to go for the following school year.”

“The unit we chose does a great job at delivering units on time, and each day that was slated for unit deliveries, the promise to have them there was kept,” said Bolhouse.

This is the first school year since all the new unit ventilators have been installed. White says the teachers have nothing but praise at the lack of noise, and the delivery of consistent temperatures — and conditioned fresh air — in the classrooms.

“The renovations have had a dramatic ‘ladder’ effect. The students are happy, not distracted, and learning . . . which in turn makes the teachers happy, making it easier for them to inspire the student body, which in turn makes the school board happy,” said White. 

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