East Maine School District

Chicago Northwest Suburbs, Illinois

Mechanical Plant Renovation Project Brings New Respect

"We came from the point where people criticized our facilities to now, when they are saying good things."

This is Mike Nowlan's assessment of the results of a major district-wide school building renovation project. Nowlan is the Director of Buildings and Grounds for the East Maine School District No. 63 in northeastern Illinois, about 10 miles northeast of Chicago's O'Hare International Airport. He explains that the school district has recently completed a major upgrade of the windows, lighting, and mechanical systems at its seven schools, and the results have pleased parents, teachers, and students.

The K-8 public school district serves parts of the communities of Morton Grove, Niles, Glenview, and Des Plaines. This part of north central Cook County has been largely developed residentially, and school-age populations are stable. The district has an enrollment of

"The teachers and administrators have really noticed the difference and are pleased with the new level of comfort control.

approximately 3,800, and operates six elementary schools (grades K-6) and one junior high school (grades 7-8). According to Nowlan, most of the school buildings date to the period 1950-1980, with none being of recent construction. A new superintendent, Dr. Kathleen Williams, came to the district in early 2000 and worked with the school board and district administrators to set priorities for the district, one of which was to bring the school buildings to contemporary standards of comfort and efficiency.

Dr. Williams restructured the top administration of the school district and brought in Nowlan to serve as Director of Buildings and Grounds. He was given the specific agenda of activating a building improvement plan. Nowlan says, "Dr. Williams and I joined hands to bring this district's buildings up to date. Many of the schools had antiquated heating systems, and five of the schools had no air conditioning at all, or only had systems serving the administrative areas. We also noted that a large number of the building windows had deteriorated or had never been satisfactory for room comfort. This also became a priority."

Identifying Comfort and Efficiency Needs

Nowlan initiated a detailed needs assessment of the schools. At about the same time, the district began a relationship with Exelon Solutions, a division of Exelon Corporation (NYSE: EXC). Exelon Solutions was contracted to assist the district in detailing what would be necessary to bring facilities to optimum efficiency and reliability. As a result of that assessment, major improvements were recommended in several areas. Exelon recommended improvements to classroom lighting by replacing incandescent and fluorescent fixtures with high-efficiency T-8 fluorescent systems. Window replacements were suggested to tighten up the building thermal envelope and improve comfort. Finally, Exelon recommended replacing most of the existing boilers and installing modern cooling systems for all school buildings. Exelon contracted with McCauley Mechanical of Bridgeview, Illinois, to install the mechanical equipment and to provide additional engineering assistance.

Separate from, but related to, this facility improvement plan was a $9 million addition to Gemini Junior High School. Construction on this addition was coordinated with the upgrade of the existing facility. Superintendent Williams and Director Nowlan looked for assistance

Air-cooled chillers were chosen because of their expected low maintenance and because there was no available indoor space.

"We can check on the status of any room in any school and check comfort conditions.

programs for financing the improvements, which would have a total cost of $24 million over a two-year period. With help from a state grant and district bonding, the improvement programs were initiated.

Classroom Cooling a Priority

The classroom cooling installation was a priority. According to Nowlan, "We knew that in the interest of fair treatment, we needed to do all the schools." He points out that the district school year runs from late August until late May, plus the district has an active six-week summer school. "A comfortable classroom environment year-round requires the use of cooling. That has increasingly become the expectation of teachers, students and parents." He notes that if the classroom is hot and stuffy, learning suffers, and absenteeism increases."

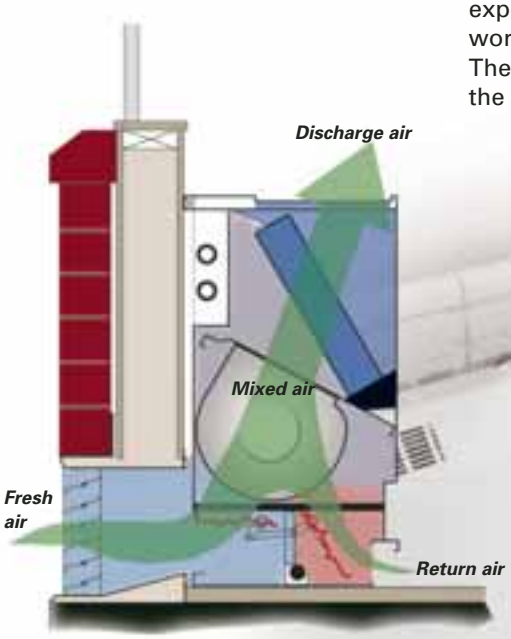
Nowlan explains that it was decided to install air-cooled chillers to supply chilled water for the schools not having air conditioning. The units selected were Trane Series R™ air-cooled helical-rotary chillers. Three of the K-6 schools received chillers (80, 100, and 110 ton sizes). Nowlan believes air-cooled chillers were the best solution for this application because of their expected low maintenance requirement, and because most of the existing buildings did not have space for an indoor chiller plant. The new units needed to be outside the buildings.

These chillers supply chilled water to unit ventilators in each classroom. The district replaced all the older classroom unit ventilators with 115 new Trane units, designed to meet current ASHRAE 62-2001 ventilation standards, certified to today's economizing efficiency standard, ARI 840, and equipped for both heating and cooling. Trane unit ventilators were also installed in the addition to the junior high school. Nowlan specifically requested Trane unit ventilators because of his successful experience with this product when he worked with other school districts. The office areas and gymnasiums in the schools were equipped with six Trane Precedent rooftop gas-electric units. Six of the schools were also equipped with Trane makeup air handlers for additional ventilation, principally in gymnasium areas.

New Classroom Comfort Units

The Trane unit ventilator installed in the East Maine schools is a floor-mounted vertical unit containing a two-pipe hot water/cold water changeover system. Typically installed on an outside classroom wall, the unit ventilators are situated beneath existing windows, allowing fresh-air ventilation to be drawn directly into the classroom, allowing little or no cross-contamination of air between classrooms. The units have chilled-water coils supplied by the air-cooled chiller, and heating coils receiving hot water from the new gas package boilers. The selected unit ventilators contain a face-and-bypass damper to allow a variable portion of the mixed return and ventilation air flow to pass over the heating coil.

This face-and-bypass damper approach is a common and acceptable method of capacity control that allows for both ventilation and effective



Schematic showing the ventilation and air-mixing functions of Trane unit ventilators.

The new unit ventilators are installed on outside classroom walls, allowing ventilation directly into the classroom.

The bold solution taken—adding cooling and new terminal units—has brought the schools to a new standard of comfort and efficiency.

dehumidification, even at times when the outdoor air is relatively cool and full-stream cooling is not necessary. The unit ventilators are equipped with Trane ZN520 controllers that help ensure the most efficient functioning of the unit by supporting integrated economizing. This allows the unit ventilator to mix outside air with return air to delivery an energy-efficient, cost-saving solution. The digital controls also communicate with other equipment, such as the air cooled chiller and/or boiler, indicating when to supply warm or cool water to support heating or cooling demand.

The entire conversion project took place over a two-year period, with most of the work being done during the summer months to reduce the impact on school programs. The project was completed in August 2003, in time for the 2003-2004 school year. According to Nowlan, the system upgrade has resulted in a noticeable improvement of the classroom environment, especially during late spring, summer and early fall times. "The teachers and administrators have really noticed the difference and are pleased with the new level of comfort control."

Benefits of Standardization

According to Mike Nowlan, the most noticeable change to him is the reduction in the number of classroom comfort complaints. Because the new units were sized appropriately for the classrooms, there doesn't appear to be any problem with acoustics. "This is a system we understand," says Nowlan, "and I'm very pleased that we have a standardized system. It makes inspection and maintenance easier."

The Trane chilled-water system and the unit ventilators were specified to communicate with the district's central building-control system, and according to Nowlan, the interconnection of systems has been no problem. "We can check on the status of any room in any school and check comfort conditions. That, along with equipment standardization, means we can assign personnel more efficiently, and can send out trained personnel to any building whenever needed."

The situation at the East Maine School District in Illinois is one common to many districts. The bold solution taken—adding cooling and new terminal units—has brought the schools to a new standard of comfort and efficiency. The new system operates with little fanfare, but with a high level of comfort for everyone.

TRANE

Trane
A business of American Standard Companies
www.trane.com

For more information, contact your local Trane office or e-mail us at comfort@trane.com

Literature Order Number	CASE-SLX098-EN
Date	February 2004
Supersedes	New
Stocking Location	Inland