



## Integrating Technology and Controls

- By Andrew LaRowe
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In the past, educational facilities organizations have been slow to embrace automated alarm technology other than life safety systems required by building code and, to some degree, security systems. Even though using technology for controlling HVAC systems is now standard practice, automated alarm and notification capabilities included in the software is often not fully utilized and sometimes turned off all together. With recent advances in web-based facilities solutions involving critical and non-critical alarm applications, facilities administrators are showing a renewed interest, and the interest extends well beyond life safety, security and HVAC systems.

If there is a single reason for the reluctance of some school facilities personnel to use automated systems, it is likely to be a result of alarm flood. When building automation systems (BAS) first started showing up to control HVAC equipment, most of them included capabilities to send messages directly to maintenance technicians whenever an alarm condition with the equipment was triggered. Unfortunately, in the early days,

these systems were prone to generating numerous messages that were very often unnecessary and required no immediate response. A failed pump could initiate an alarm with multiple low-pressure alarms following, each sending an alert message. It did not take too many pagers going off, or phones ringing in the middle of the night, for maintenance workers to start ignoring the messages. Alarm settings were adjusted to be less sensitive or simply disabled.

## Alarm filtering

Facilities management software providers are helping school districts reconsider the alarm notification component in their BAS systems. SchoolDude, based in Cary, N.C., developed a system that collects alarms stemming from multiple BAS systems. They filter out “nuisance” information by integrating the information with their work management system. Rather than alarms going directly to a maintenance technician, they are routed through SchoolDude. A work order is automatically generated when alarms are received including information such as building, craft, trade and the specific equipment issue. If not reviewed within specific timeframes set by the facilities staff, the system escalates critical alarms to the next person in line.

The key advantage to a third-party provider like SchoolDude’s “Critical Alarms” solution is that it promotes interoperability. New products capable of communicating through the local area network are being installed in school buildings every day. There are air quality sensors, light meters, moisture indicators, and motion detectors. Multiple data points for classroom sound, food service equipment, and irrigation systems can easily be programmed to issue critical alarms. In response to heightened concerns related to campus security, there are now hundreds of cameras mounted throughout the school, all of which are capable of communicating directly to the Internet. With so many different suppliers, types of equipment, and functions, it is extremely difficult to have them all work together efficiently. Routing automatic alarms and notifications through a common interface such as the SchoolDude solution creates efficiency in school operations.

## Kent Intermediate School District

One district that stands out in their innovative approach to automated alarm technology is the Kent Intermediate School District in Grand Rapids, Mich. Kent’s Maintenance Director, Fred Hayward, currently has responsibility for almost a million square feet of facilities space, including a 600,000-square-foot main campus and additional satellite facilities. He has instituted a comprehensive communications network that utilizes critical and non-critical alarms from all of his school buildings. He states, “We will consider almost any building system that has the capability to send an e-mail. In a world where everything can talk to everything, there is no reason you can’t have it all communicating directly to the work management system.” Hayward adds, “Many school districts operate their equipment in run-to-fail mode, and as a result continually waste money on infrastructure that may be desperately needed in the instructional program. It is often difficult for school boards to see the bottom line when their support is needed for technology upgrades in facilities.”

# Georgetown County School District

The Georgetown County School District in Georgetown, S.C., fully integrated web-based control at each of their 18 schools as part of their energy program. Energy Manager Tony Holcomb has racked up many success stories since beginning the automated alarm program in 2007. For example, one of their schools was recently scheduled to hold a Saturday morning memorial service for a student who was tragically killed in a fire. Over 600 members of the close-knit community were expected to attend the service. The weather forecast called for excessive high temperatures and high humidity. The day before, maintenance crews inspected the air conditioning equipment and returned to the shop confident all systems were running correctly. Just before crews left for the weekend, the automated system generated a work order indicating the air conditioning system had completely shut down. Several hours were required to get the equipment operating properly. The next morning, the service proceeded without incident. Mr. Holcomb credits the district's investment in the automated alarm system for saving the day.

Tony Holcomb advises any school district planning to install or expand their automated alarm capabilities to work closely with the Technology department from the very beginning of any project. Acknowledging that technology has enormous responsibility for the security of student records stored on the network, he states, "You can't get there without them, nor would you want to. In order to be successful, it must be a joint effort."

## PERSPECTIVE FROM A DIRECTOR OF TECHNOLOGY

Ken Woody is the director of Technology Services for Guilford County Schools in Greensboro, N.C. He states, "Automated alarm and notification technology involves multiple systems with multiple data streams which can be very difficult for the IT Department to support." Boiler rooms typically do not have a network drop; therefore additional planning is required. Although wireless connections may be considered, the density of metal equipment and construction materials in mechanical areas will present potential problems with reliability. Consideration should be given to the overall impact of the site's bandwidth capacity. Woody states, "When it comes to new technology, the least understood message out there is sustainability. Technology is dynamic. Hardware can be out of date within three years of installation and in critical failure within seven years". He recommends determining the estimated useful life from the manufacturer and including a plan to replace or upgrade the equipment at the end of the predicted lifecycle.

# Chesterfield County Public Schools

Many school districts are recognizing unique advantages of sharing web-based facilities information directly with building occupants. Chesterfield County Public Schools, in Virginia, track real-time energy use in each of their middle schools to support a student-centered energy conservation program they call Whack-a-Watt. The school system's Energy Management Coordinator, Seth Austin, implemented a web-based system called Building OS developed by Lucid, an energy software company based in Oakland, Calif. Each school is equipped with pulse meters, which tie into the existing BAS. Energy data is continuously uploaded to Lucid's software, which is accessible on a customized "Building Dashboard" website. The Lucid system is equipped to issue automated alarms and notifications. Austin says, "The system we have in place is helping the district reduce energy use and energy costs long term while providing data for future energy conservation efforts."

## Comprehensive plan

If a district is going to use automated alarms as an effective strategy for operating facilities, it is essential to have a comprehensive plan that all stakeholders understand and agree to. With state of the art technology installed in new construction and renovations, districts should plan for how they will upgrade existing facilities in order to deliver equitable service for all schools. Consider the following basic steps when developing a district plan for integrating technology and controls:

### Alarm Philosophy

Most facilities initiatives require resources, and resources require justification. Make the case early on for the organization's automated alarm technology program. The goal should be for everyone involved to understand in simple terms, what they are

doing and why they are doing it. When support is needed for additional resources, chances are greatly improved when everyone is reading from the same page.

### **Written Standards**

For an automated alarm program to be successful, there must be a structure in place to assure consistency. The plan must have a detailed list of the building systems, functions, and conditions to be monitored and under what circumstances an alarm will be activated. Written standards should be prepared for each building or system. For example, all refrigerated food storage equipment in cafeterias throughout the district will be electronically monitored. An alarm will be triggered when temperatures exceed specified levels or when the equipment is in failure mode. Written standards should include how notifications occur and who should receive them.

### **Assessment**

Once there is consensus and understanding within the organization of the automated alarm program, including standards for each application, a report should be developed outlining the degree to which each standard has been implemented at every facility. One of the easiest ways to organize this type of information is with a heat map, (a graphical representation of data using colors to indicate compliance with each standard).

### **Prioritized Action Plan**

Analyze the relative strengths and weaknesses of any particular standard and develop improvement strategies. Use the assessment data to develop a prioritized action plan to fully implement automated alarm and notification technology throughout the district. If the Technology Department is not already involved, it is certainly appropriate to bring them into the discussion at this stage of planning.

### **Communication and Training**

Once automated alarm capabilities are added or expanded, it is essential to communicate with all stakeholders concerning the changes made and provide training to anyone who will be involved in the process. An automated alarm program can create significant savings for the district, however it must receive regular attention. Alarm settings are notoriously easy to change and can become ineffective as a result of unapproved or “temporary” adjustments that are forgotten about. Sensors, connectors, data loggers, and other related equipment items require periodic inspections and routine maintenance. Upgrades to hardware and software associated with automated alarms should be included in the planning process.

Implementation or expansion of existing automated alarm systems can provide significant benefits for facility maintenance organizations. Staff and maintenance resources can be used with greater efficiency as the rate of emergency responses is reduced. Capital budgets are preserved with a reduction in catastrophic equipment failures, and customer service improves by enabling staff to respond to critical problems in a timely manner.

### **About the Author**

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