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Strategies to improve education facilities and create better learning environments.

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VOLUME 81 • JULY 2009 • NUMBER 12

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DEPARTMENTS

STRATEGIES FOR SUCCESS:

On the Cover: A renovation at Washington Technology Magnet Middle School, Saint Paul, Minn., bridged the gap between a 1924 masonry building cluttered by numerous additions and a technology-focused curriculum.
Architect: Cuningham Group Architecture, PA
Photographer: Dana Wheelock

Did you miss the Green Expo?
Don't worry! You and your staff can access the GREEN School & University Expo sessions on demand free at www.asumag.com/green_virtual_conference.
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Knowledge Building

Hopefully, you were one of the more than 1,500 fellow professionals registered for last month's unprecedented GREEN School & University Virtual Conference & Expo. Attendees from 47 states and 13 countries participated in the free, day-long event dedicated to how to incorporate green/sustainable practices in our nation's education institutions.

The groundbreaking event garnered the support and participation of the leading organizations in the education, architectural and green communities, including the United States Green Building Council (USGBC), Collaborative for High Performance Schools (CHPS), National Clearinghouse for Educational Facilities (NCEF), Healthy Schools Campaign (HSC), Association of School Business Officials International (ASBO), National School Plant Management Association (NSPMA), Society for College and University Planning (SCUP) and Association for the Advancement of Sustainability in Higher Education (AASHE).

Like an on-site conference, the GREEN School & University event enabled registrants to attend industry-leading education sessions with live Q&A; visit an exhibit hall to interact with vendors; access a resource center to download white papers, presentations, videos, podcasts and more; and enter a communications center to network with peers, presenters and exhibitors.

In this challenging economy, a virtual event such as GREEN School & University is an attractive vehicle for both attendees and sponsors, as it eliminates travel expenses normally associated with an industry conference and trade show; allows entire staffs to attend a series of educational sessions they wouldn't normally be able to attend because of cost, time constraints and/or scheduling conflicts; and brings together thought leaders on a topic of increasing importance and interest—ensuring superior educational benefits and networking opportunities.

If you missed out, don't fret: The event is available On Demand at www.ASUmag.com (see Web 101 at right for more information). Make sure you and your staff benefit from this unique opportunity by attending the session or sessions of your choice today. ■

Joe Agron

jagron@asumag.com

WEB 101

Building knowledge

Did you miss the GREEN School & University Virtual Conference & Expo last month? If so, you still can get the insight and information provided by the industry's most prominent thought leaders in a series of one-hour sessions, including:

- **Maximizing Learning and Savings by Going Green**: Ken Sidebottom, Johnson Controls.
- **Greening Your School District—Capitalizing on Options and Opportunities**: Rachel Gutter and Emily Knupp, USGBC; and Alfred R. Sena and Martin Montano, Rio Rancho Public Schools, N.M.
- **How to Make the Stimulus Work for You**: Judy Marks, NCEF; and Jon Kuzmich, CHPS.
- **Green Cleaning: How to Turn Your Facilities Into Healthier, More Productive Environments**: Stephen Ashkin, The Green Cleaning Network; and Mark Bishop, Healthy Schools Campaign.
- **Defining the Green Campus—Buildings and Beyond**: Rachel Gutter, USGBC; and Carol Walker, University of Florida.

All of the sessions are available free at ASUmag.com/green_virtual_conference. For information on the 2010 expo, contact Joe Agron at jagron@asumag.com.

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CONSTRUCTION ZONE

UPGRADE/RETROFIT

Significant expansion

In April 2009, the University of Southern Indiana, Evansville, broke ground on its $18.4 million University Center expansion. The project will convert the university's 60,000-square-foot library building into dining, lounge, meeting and student organization spaces, and replace the existing conference center bridge linking the old library and existing University Center.

Featuring a 103-foot-tall conical stone tower placed at the center of campus, the project emphasizes the facility's significance to the campus and surrounding community, and its central position at the heart of student life.

Scheduled for completion in Summer 2010, the expansion adds 20,815 square feet, while celebrating Evansville and southwestern Indiana roots.

The project also incorporates innovative applications of local and reclaimed materials, including the stone-clad tower featuring quarry-faced roughback limestone.

Architect for the project is Holzman Moss Architecture (New York City).

University of Southern Indiana, University Center expansion. Rendering courtesy of Holzman Moss Architecture

The Benning School, Washington, D.C. Photo courtesy of Maxwell MacKenzie

A quick transformation

The Benning School, a former Washington D.C. Public School "School without walls" recently was transformed into a bright and colorful space for two fledgling charter schools.

In just 40 days, the design team worked with client Building Hope to gut and renovate the 50,500-square-foot space to provide facilities that can be leased to start-up charter schools on a revolving basis. The incubator program provides new charter schools with a home during their first five years of operation, when the small number of students they serve makes it difficult to afford commercial space. The two charter schools share common spaces in the new building, but each school has its own facilities on separate floors.

Designers used inexpensive materials, paint and vinyl tile in colorful floor patterns that complement the wall colors. They created individual classrooms, a library, a reception area, and administrative space for each school, and the second-floor school now has its own entrance. Standard gypsum-board wall construction is used in a sculptural fashion to create unique and playful spaces for children. All the corridor walls are angled to create interesting sightlines.

The $2.9 million project cost included a complete roof renovation. Architect for the project was Cooper Carry (Alexandria, Va.). MCN Build (Washington, D.C.) was the contractor.

Location: Washington, D.C.
Project timeline: 40 days
Area: 50,500 sq. ft.
Cost: $2.9 million

A premier venue

Brookdale Community College, Lincroft, N.J., is underway on a 94,000-square-foot renovation and addition of the Collins Arena and Recreation Education Center. This project will create one of the region's premier sports and entertainment venues.

The project will bring the existing arena up to code and event standards. The main entry lobby will receive a new vestibule and entry area that will create a new entry facade to the arena, updating its exterior character to a more inviting and exciting entry sequence. Once inside the lobby, patrons will notice the existing offices and multi-use rooms have been replaced with new and expanded restrooms and concessions spaces.

The wood bleacher seating will be replaced with 1,410 retractable molded plastic bleachers with integrated circulation aisles, 430 premium fixed seats, 36 ADA seats and room for 140 folding padded seats surrounding the concourse for a total seating capacity of 2,015.

The plan is organized to provide access, restroom and concession services, and lobby and gathering spaces that enable the arena and event center to operate together or independently without negatively impacting the function of either.

Also included will be a new 7,600-square-foot fitness center. The projects will be completed in 2010 and will be LEED-certified. Clarke Caton Hintz (Trenton, N.J.) is architect for the project.

Brookdale Community College, Lincroft, N.J., Collins Arena and Recreation Education Center rendering

Athletic expansion

The University of Arizona Intercollegiate Athletic Facilities Expansion project, which completed construction last September, consisted of three components: a new 43,150-square-foot indoor practice gym, expansion of the existing gymnastics facility and a new 6,150-square-foot diving pool. The practice gym features two competition-sized basketball courts, five mini basketball courts and seven volleyball courts.

The new diving pool has diving platforms and springboards ranging from 1 to 10 meters.

Architect for the project was TMP/Breckenridge Group (Tucson, Ariz.), and contractor was Lloyd Construction Company, Inc. (Tucson).

University of Arizona, Tucson

Minnesota State University–Mankato, Trafton Science Center, Leonard A. Ford Hall. Photo courtesy of Paul Crosby

Setting standards

Leonard A. Ford Hall, the new 67,000-square-foot addition to Minnesota State University—Mankato's Trafton Science Center, has fulfilled Minnesota's B3 program (Buildings, Benchmarks and Beyond), which is equivalent to LEED silver.

Daylight floods the corridors and reaches into classrooms. South-facing windows look out onto a parterre garden of Native American plantings grown from the school's seed collection. The north side of Ford Hall overlooks a rock garden that exhibits the geology of the state.

The building was designed by HGA Architects and Engineers (HGA) (Minneapolis). ■

The new Forest Elementary School, Crystal, Minn., was built over the existing school's footprint.
Photo courtesy of Ralph Berlowitz

The Long Haul

The decision to repair or replace a facility doesn't happen overnight; it requires long-range planning.

By Paul W. Erickson

Are you facing the decision to add on and modernize, or build new? You are not alone; most education institutions have faced this decision, as well as whether to demolish, abandon or sell a facility.

As education programs change, older structures become less adaptable to support the curriculum. Older buildings typically are void of large- and small-group learning spaces, flexible teaming areas, planning areas for staff, adequately sized classrooms and proper spaces for administration. Major physical hindrances can impede student

learning and staff development.

But don't base the decision on this criterion alone. Some older facilities are characterized by higher test scores, more parental involvement and greater community pride. But when parents, staff, students and community members express frustrations about a facility, and students leave for newer schools in neighboring districts, it may be time to consider new construction. Excessive repair needs, high energy consumption and operating costs, thermal discomfort and the inability to physically support the education program are evidence that a building no longer provides a good environment for learning.

Revitalizing the neighborhood

After analyzing districtwide needs, Robbinsdale (Minn.) Public Schools decided to demolish Forest Elementary School in Crystal, Minn., and build a new facility over the existing building footprint. No land was available for a new site; the existing site was in an established neighborhood, adjacent to a community park.

Because of the presence of asbestos and mold, and the need for major repairs, the district concluded it would be more cost-effective to demolish the school and build a new facility. That decision prompted the city to provide funds for a larger gym and invest in upgrading the adjacent park.

With the new building, instructional space now supported the educational program, energy-efficiency and sustainable-design strategies were used, and community pride increased. Students were relocated to an nearby school for one year until construction was complete.

The decision to build a new school was made after considering all the long-range planning factors. Success builds on success; the district is seeking more new school "replacements" with the help of federal stimulus low-interest bond funding opportunities.

Start with a long-range plan

How does an institution begin deciding whether to renovate or build new? Look at the "big picture" and develop a campus- or districtwide master plan. Begin in-house discussions with administrators, staff, school board, parents and community groups. A facilities-planning specialist can evaluate building conditions and educational adequacy, and conduct dialogue with stakeholders. Form a facilities task force of parents, administrators, teachers, students, agencies, community members and business leaders to craft a facilities master plan.

A long-range master plan includes assessments of deferred maintenance, educational adequacy, life-cycle comparisons, construction costs (short- and long-term), parity and equity, mandates and code compliance. The assessments take into account the institution's teaching mission and educational philosophy.

The Forest Elementary School project represented a neighborhood revitalization. Photo courtesy of Ralph Berlowitz

Master planning helps to measure a building's useful life, identify needed improvements and map out its future as it relates to enrollment demographics and educational adequacy. The process for decision-

making is more all-encompassing than setting a "percentage threshold" comparison to replacement cost.

A master plan becomes an effective tool in determining whether to add on and modernize, or to build new. Look at the following areas to help arrive at a decision:

•**Goals and objectives**. Confirm vision/goals/philosophy outcomes, technology needs, flexibility/expansion expectations, district identity and the community interaction process.

•**Facilities assessment**. Evaluate building deterioration, deferred maintenance, capital-renewal issues, mandated health and safety upgrades, facility obsolescence, physical-plant condition, site, structure, envelope, mechanical, electrical, codes and accessibility.

•**Educational-adequacy assessment**. Determine quality of space, function, expansion needs, aesthetics, safety and security, site size and circulation, square footage, grade-level configuration, instructional aids, program support, flexibility, capacity, space utilization, core facilities, seating efficiency, state education mandates and re-purposing opportunities.

•**Operational assessment**. Develop and assess project costs, life-cycle costs, replacement analysis, energy efficiency, administrative and transportation efficiencies, demographics and maintenance measures.

•**Community assessment**. Investigate historical significance, political aspects, new and existing site analyses, board preference, effect on property values and community opinion.

•**Environmental assessment**. Compare the sustainability impact of maintaining an existing facility with new construction.

•**Implementation assessment**. Determine the effect of maintaining school operations during construction, phasing and sequencing considerations, time, and the effect that different building solutions will have on learning.

Factors to consider

Addressing all planning components provides a thorough process for making decisions. When evaluating whether to modernize or build new, education institutions should rank their priorities and consider how each option will:

•Enhance student learning.

•Realize short- and long-term cost savings.

•Save construction time.

•Avoid disruption of curriculum and learning.

•Affect the process of purchasing a new site.

•Extend the building's useful life.

•Best manage project scope and budget through phasing opportunities.

•Minimize any breach of safety and security if construction takes place while school is in session.

•Enhance the area's historical character.

•Provide higher-quality finishes for long-term value.

•Address neighborhood values.

•Achieve sustainability credits with products, systems and less construction waste.

•Maximize operational costs based on student capacity.

•Enhance program function with fewer building constraints.

•Define cost certainty with fewer unforeseen conditions.

•Manage design and construction fees because of risk and other issues.

•Provide positive design solutions

NOTABLE

29 Percentage of school districts completing some form of construction project in 2008.

57 Percentage of colleges and universities completing some form of construction project in 2008.

Source: AS&U's 35th Annual Official Education Construction Report, May 2009

The Neshaminy High School project, Langhorne, Pa., involved a combination of demolition, renovations and new construction. The 371,000-square-foot, one-story high school was built in 1953, and had five additions and numerous renovations. The final project was a renovation of 200,000 square feet of older portions of the building; demolition of 165,000 square feet of the additions; and construction of 264,000 square feet of one- and two-story additions. The additions tie together the non-contiguous, renovated portions into a transformed high school.
Photo courtesy of Reynolds Construction Management Co.

The new four-section Riverside Central Elementary School, Rochester, Minn., replaced two, two-section turn-of-the-century elementary schools. The existing schools were repurposed with other programs that serve the community. Photo courtesy of Ralph Berlowitz

with fewer building constraints.

•Maximize energy-efficient construction.

•Address educational state guidelines standards.

•Address safety and security more effectively in design.

•Maximize funds for instructional technology and infrastructure routing.

Whether building new or adding on and modernizing, it is essential to properly maintain school facilities. Education institutions must keep facilities in excellent operating condition. A school that is well-maintained extends its useful life, reflects the institution's leadership, enhances student achievement, instills community pride and protects long-term viability. ■

Look at the "big picture" and develop a campus- or districtwide long-range master plan.

Erickson, AIA/NCARB/REFP, is president of ATS&R Architects/Engineers/Planners, Minneapolis, a firm specializing in school facilities planning, design and construction. He can be reached at perickson@atsr.com.

WEB 101

Also read "Ensuring Quality," from the March 2009 issue, at ASUmag.com/construction/planning.

Window Systems

For schools and universities that have not upgraded their windows in many years, a variety of options are available that can make facilities more comfortable, energy-efficient and more conducive to learning.

The Efficient Windows Collaborative, a coalition of manufacturers; federal, state and local government agencies; and research institutions, has put together a "Tools for Schools" guide that provides administrators with information about the types of windows available and the benefits they offer.

"Different glazing and frame materials and special assemblies can provide insulation value, sun control, and daylight redirection as appropriate for a given room or building," the guide says.

Glazing options:

•**Tinted glass:** It reduces glare from the outdoors and reduces the amount of solar heat transmitted through the glass.

•**Highly insulating glazing:** Gas fills and additional glazing layers can further improve a window's insulating value. The additional layers reduce heat loss, as well as visible light transmission and solar heat gain.

•**Laminated glazing:** This type of glazing consists of a tough plastic interlayer that is bonded between two panes of glass under heat and pressure. It offers increased protection from the effects of hurricanes or earthquakes. Another benefit is that laminated glass reduces noise transmission, the guide says.

•**"Smart" glazing:** This glazing reacts to solar heat gain and glare, and can change from clear to tinted. "Smart glazing could reduce peak electric loads by 20 to 30 percent in many buildings, increase daylighting benefits, and improve comfort and learning environments in schools," the guide says.

•**Low-e coatings:** These improve the insulating properties of window glazing by reducing the amount of heat that is transferred through the glazing. "Of particular value for school buildings are coatings that reflect heat from solar infrared while allowing the visible light spectrum to enter," the guide says. "These coatings are called spectrally selective."

•**Reflective coatings:** These can be used for greater reductions of glare and solar heat gain. "These coatings can reduce solar heat gain substantially, but visible transmittance usually declines even more, which is problematic if daylighting is desired," the guide says.

Window-frame options:

•**Aluminum:** This material can provide great structural strength, but it has high thermal conductance, which increases the potential for heat loss and condensation. To combat this, aluminum frames often have thermal breaks, which split the frame into interior and exterior parts, joined by a less conductive material.

•**Wood:** It has good thermal performance, but is susceptible to rot and can require a lot of maintenance. The guide notes that cladding the exterior face of a wood frame with either vinyl or aluminum creates a weather-resistant surface and can reduce maintenance requirements.

•**Wood/polymer composites:** Composites meet or exceed the structural and thermal properties of conventional wood, and are more resistant to moisture and decay.

•**Vinyl:** These window frames require little maintenance, do not require painting, and have good moisture resistance. The guide notes that for structural integrity, larger vinyl units often will incorporate metal or wood stiffeners. In changing temperatures, vinyl expands or contracts more than wood, aluminum or fiberglass.

•**Fiberglass:** These frames get good thermal performance by incorporating air cavities, which can be filled with insulation. It has a low coefficient of thermal expansion, which means warping and leaking are minimized in cases of high inside/outside temperature differentials.

The entire guide is at http://www.efficientwindows.org/ToolsForSchools.pdf. ■—*by Mike Kennedy*

Our assignment for the school project: the [air]

This illustration highlights the various Greenheck products available for school buildings; it does not represent an actual ventilation application.

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11. *Utility Distribution System*
12. *Kitchen Hood Variable Volume*
13. *Sunscreens*
14. *Indoor Air Handling Unit*
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Budget Relief

Facility rental helps schools recover costs for community use of their facilities.

With budgets and funding still major concerns in school districts nationwide, business officials and facility administrators are continuously challenged to identify alternate sources of income and more effective ways to cut costs.

One trend that is further increasing the financial burden on operating staffs and budgets is the growing use of school facilities by the community.

This upward trend creates high demand for a district's support services teams (custodial, maintenance, IT, athletics), as well as generates additional costs in utilities, custodial overtime and wear and tear on equipment and facilities.

While educational professionals recognize that the use of facilities by the community must be supported, they also should acknowledge that some of these related costs must be recovered.

How well school systems recover the costs associated with the influx of community use within their districts can help determine the overall success of the facility use program, as well as the impact it has on the district and budget.

Setting Up for Success

Some districts are faring quite well when it comes to cost recovery for facility use. Douglas County School District Re1 in Colorado is one of them.

The 52,900-student district implemented SchoolDude's FSDirect facility usage scheduling system in 2005 and has been successfully invoicing to recoup costs incurred by the nearly 50,000 events that take place each year.

Denine Kysar, facility use coordinator for Douglas County Schools, explained that the district formed a team to discuss the benefits of such a program and present a recommendation to the superintendent's policy council. The desire to open facilities to the community, and recover related costs, was evident at all levels.

"It was a priority for our school district from the top down," Kysar said.

This priority to allow outside groups to easily utilize facilities while also regaining the costs associated with this usage led to a cost recovery of more than $970,000 in 2008, which is more than $23 per student.

Small Schools, Big Recovery

But, this type of success isn't limited to just top 100 schools. Districts of all sizes can be good stewards of facilities while enabling a strong community use cost recovery program.

Tamalpais Union High School District, also invoicing using SchoolDude, proves that size doesn't matter. The 3,944-student district in California has been steadily increasing its events for the past five years. In 2008, the district recovered more than $291,000 in community use costs—more than $73 per student.

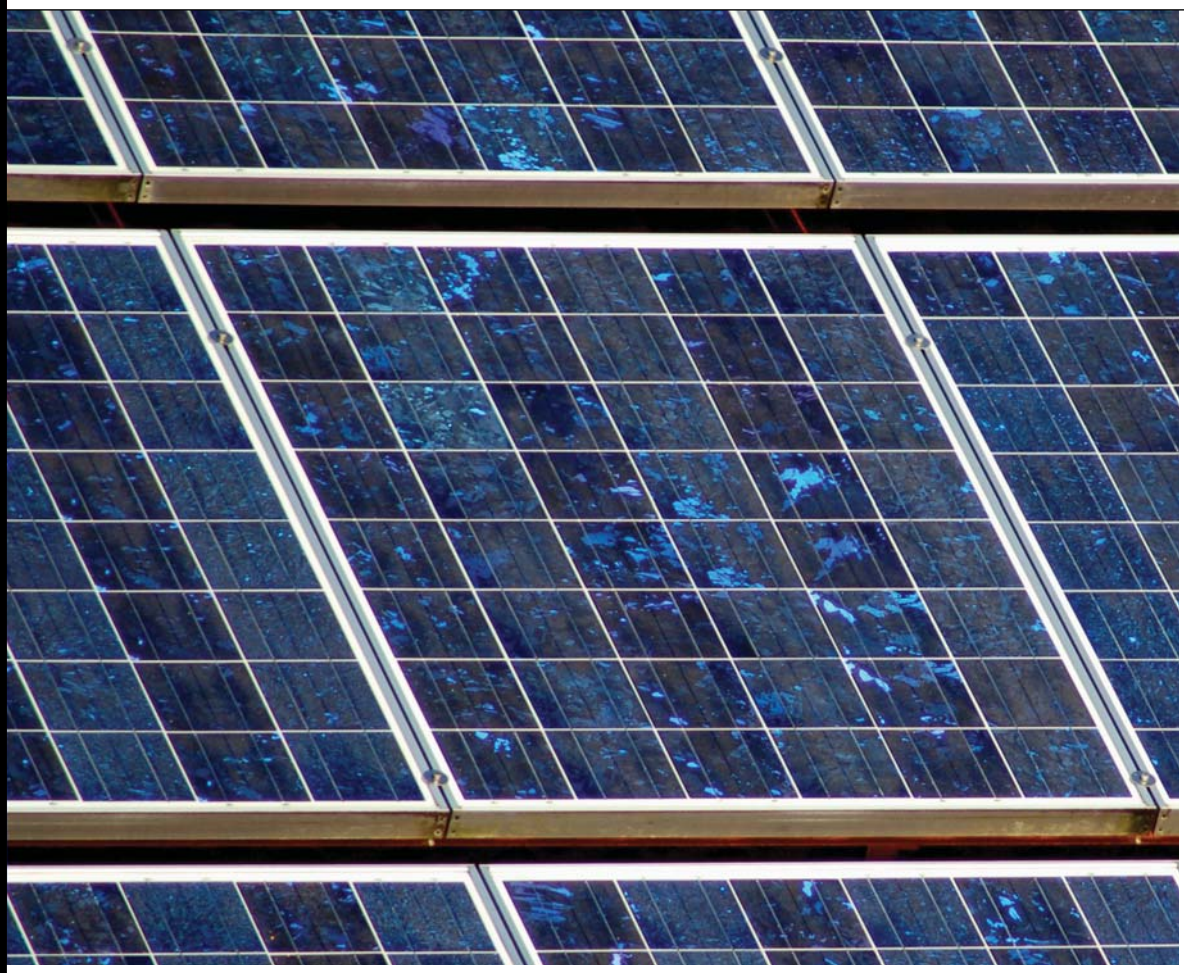
Desone Parker, facility coordinator for Tamalpais UHSD, said, "We understand the public thinking that because they're taxpayers they should be able to use facilities, but we have expenses to pay. The pricing is fair. We haven't had challenges with getting support from principals or the public. They're all for it."

Once naysayers learn of the strain that free facility use puts on schools, the idea of recovering costs becomes more reasonable. It's not about making money; it's about making sure district-allocated funds are used properly.

Siphoning money away from the classroom to fund community facility usage is a detriment to the core mission of schools: educating students.

That's a price no one wants to pay.

facilities upgrade & retrofit



Solar panels on schools make a strong statement about commitment to the environment.

Paying for Itself

Fitting LEED certification into a capital plan.

By Ron Wilkinson

Many schools and universities want the U.S. Green Building Council's LEED certification for their facilities, but they are concerned about cost. This certification is tangible evidence that a facility is designed to conserve resources and use energy more efficiently. "Low-cost/no-cost" upgrades can be worked into a capital plan that provides a 3- to 5-year energy savings payback and achieves LEED certification.

Continued...

The LEED for Existing Buildings program is in its third version. The first program was simply LEED-EB, a resource- and pollution-conscious operating plan. The second was called LEED-EB: O&M (LEED-EBOM) and stressed the operations and maintenance components of LEED-EB. The third program, which was rolled out April 27, 2009, is LEED-EB: O&M 2009. It is one of a suite of LEED programs that recently have been unified in point counts and regional bonus options.

LEED-EBOM projects now must be registered under LEED-EBOM 2009. If a project already has been registered under the old program, it can transition to the new program free of charge until Dec. 31. This is desirable in many cases as the point counts in the 2009 version are better for many of the energy-conservation methods.

A regional LEED bonus

A new aspect of LEED 2009 for all programs is the addition of regional "bonus" points. One bonus credit point is given for the attainment of each one of six existing credit points that are deemed especially important for a region. For example, extra points are given for saving water in California and for monitoring occupant comfort in New York.

The regional bonus points emphasize water and energy conservation. Reusing rainwater; lowering water use for landscaping; lowering heating, cooling and lighting energy; installing photocells; and buying off-site renewable energy credits (RECs) are the big winners across the 48 states when it comes to bonus points.

The best way to save energy dollars and get LEED points in the ventilation arena is through proper maintenance of ventilation air systems.

Good point

Earn LEED credits in every part of a school:

•**Lighting**. Lights that are turned off save energy and maintenance (by reducing lamp replacement) and gain points under LEED-EBOM 2009 EA Credit 1. Motion sensors turn lights off in unoccupied areas, and timers turn lights off during unoccupied hours. Master switches enable the last person out to turn off all lights in an area. Automatic lighting controls can cut energy bills when sunlight is providing adequate illumination.

Common areas along building perimeters usually have plenty of daylight; photosensor-based light controls dim the electric lights when the sun is shining. The same system can provide a selection of predefined light levels that suit needs from film screenings to silk screenings. This contributes to energy savings and points under EA Credit 1, and it may earn a point for controllability under IEQ Credit 2.2.

•**Filter maintenance**. The best way to save energy dollars and get LEED points for ventilation is through proper maintenance of ventilation air systems. Develop a plan that calls for inspecting and cleaning air intakes, fans and filters. Clogged filters and air intakes cause fans to work harder, and grit deposits on fan blades cause them to be less efficient. Clean equipment is quiet as well as economical. Even better, this IAQ management program earns a LEED-EBOM point under IEQ Credit 1.1.

If the aim is to control janitorial costs, install more efficient filters and reduce the dust brought into a space by the ventilation system. In a facility equipped with low-efficiency filters, the janitorial staff will have to dust too frequently. MERV 13 filters fit into the same space as old filters and earn a point under IEQ Credit 1.4.

•**CO^2 monitoring**. Have your cake and eat it, too, by reducing outside air with carbon dioxide (CO^2) monitoring. CO^2 is a product of human expiration that is measurable in occupied spaces. CO^2 sensors measure the gas and move the dampers in the air-handling unit to bring in more or less outside air. Most systems take in too much air when the spaces they serve, especially auditoriums and cafeterias, are unoccupied. CO^2 control saves money by reducing the amount of outside air heated or cooled. It earns an EBOM point under IEQ Credit 1.2 at the same time.

•**Efficient systems**. More efficient boilers, chillers and cooling towers, and the replacement of buried steam piping can earn up to 18 points under EA Credit 1 while fitting into a facility's long-term capital plan. A central building-management system allows not only scheduling but also remote off-site access by a member of the maintenance staff. Remote monitor-

NOTABLE

18 Number of LEED points that can be earned by installing more efficient boilers, chillers and cooling towers, and the replacement of buried steam piping.

ing enables staff to make sure lights, heating and cooling are off at night and on weekends.

•**Water**. Reducing water consumption saves money on sewer and water bills. Simply monitoring a building's water use earns one LEED-EBOM 2009 point under WE Credit 1, and providing sub-metering for cooling towers, irrigation or other specific areas earns another point. This is an easy way to pick up two points while laying the foundation for water savings.

The WE Credit 2 point comes automatically as new water-conserving fixtures replace old ones as part of a capital plan. WE Credit 3 can be worth five points when thirsty landscaping is replaced with natural plants that require little or no water beyond normal rainfall. WE Credit 4 is obtained when rainwater is captured from the roof and stored for cooling tower makeup. This might be easy or it might be something to do as part of the capital-plan roof replacement. Water offers the three-way benefit of energy savings, maintenance savings and LEED certification.

•**Roofing**. Some schools and universities are using tax credits and incentives from utilities and state energy offices to add photovoltaic or solar-thermal collectors to roofs. Paybacks as short as five to seven years can be obtained when using matching funds, and the low-maintenance panels are a hedge against rising power prices. Solar panels make a strong statement about commitment to the environment, and they yield up to six LEED points under EA Credit 4 (plus bonus points, see sidebar on p. 20).

•**Commissioning**. Commissioning (Cx) facilities reduces energy consumption while tuning up the healthfulness and safety of a building. EA Credits 2.1, 2.2 and 2.3 offer up to six points for Cx (plus a bonus point in most regions). Use Credit 2.1 for an energy audit or Cx plan to help guide energy options for a long-term capital plan. Credit 2.2 is earned automatically as the "low-cost/no-cost" energy savings ideas are put into place. Credit 2.3 requires only creating a long term re-commissioning plan and the completion of half of this scope of work. Make this continuous re-commissioning part of a capital plan by updating cost estimates and energy savings. Make sure energy savings are staying in a school's bank account where they can do the most good. ■

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Washrooms/Locker Rooms

As schools and universities are opening more to the community, they need to provide family-friendly restroom facilities.

The trend in the United States is for school campuses to extend their operating hours and use their facilities to serve neighborhoods as community centers. As a result, families often "come to school" with small children. They come for weekend recreation and sports activities, and after-hours programs.

Unfortunately, the restrooms in many of these schools aren't prepared for small children. Diaper-changing often has to take place on tailgates and back seats. Also, the children often are unsupervised when their parents are using the restroom.

To address the situation, schools are equipping some of their restrooms with family-friendly accessories to serve the needs of small children. Baby changing stations are available in a variety of sizes, shapes and finishes, and can be installed on a wall or on a countertop adjacent to sinks. Sometimes they are situated inside toilet compartments.

Selections include horizontal and vertical wall-mounted and recessed models crafted of polyethylene, with stainless-steel cabinetry available.

Changing stations should:

•Be equipped with full-length steel-on-steel hinges with 11-gauge mounting support.

•Comply with consumer safety performance specifications in ASTM F 2285-04, with third-party confirmation of testing.

•Provide a smooth, concave changing surface that has no pinch points, crevices, and other dust and dirt collection areas.

•Be constructed of high-density polyethylene with stable, embedded anti-microbial technology.

•Include replaceable nylon safety straps, hooks for bags and purses, instructional graphics and Braille.

•Have built-in sanitary bed-liner dispensers.

An additional family-friendly accommodation is the installation of child-protection seats so children have a safe place to sit while a parent is using the restroom.

Separate from restroom facilities, family rooms provide a rest area for parents and guardians and their young children. These rooms often are equipped with baby-changing stations and child-protection seats. ■

—By David Leigh, director of marketing for Koala Kare Products, Centennial, Colo.

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WEB EXCLUSIVE

•Restroom maintenance tips from the Collaborative for High Performance Schools

ASUMAG.COM/EXCLUSIVE

facilities upgrade & retrofit

All outside penetrations on school facilities should be caulked and sealed properly.

A Pest-Free Process

Incorporating integrated pest management into the construction process can help ensure an energy-efficient and virtually pest-free school for years.

By Rosemary Hallberg and Janet Hurley

Now that green building has become more popular, school facility directors and architects are beginning to make different choices during construction. These choices may involve energy-efficient lighting, window size, building materials and design elements. Often, though, what happens during construction has unexpected consequences—unwanted visitors.

For instance, overhangs over windows may provide relief from the afternoon sun, but they also make great roosts for pigeons. Doors that let light in from underneath may be easy to open and close, but they also

let heat and air conditioning out, and rodents and snakes in. When decisions about construction—whether or not it is green—are paired with integrated pest management (IPM), the result is an energy-efficient, healthful building that is virtually pest-free.

Why IPM?

"If you're trying to create a healthy building that ultimately affects worker productivity, IPM is a natural next step," says Thomas Green, director of the IPM Institute of North America in Madison, Wis. "The work environment is less distracting when you're not dealing with issues like cockroaches and flies."

IPM involves creating an environment where pests do not want to live. IPM should begin right after the concrete is laid when the building is being constructed.

Al Greene, IPM coordinator for the U.S. General Services Administration, says one of the easiest ways to control pests both before and after building construction is the most often overlooked: replacing garbage dumpsters with more efficient, self-contained compactors.

Other experts warn that pest problems can be contained within the walls for years before they cause a sudden infestation. Some have witnessed construction workers wall up their fast-food bags and soda cans as they put up drywall, leaving school maintenance workers later to wonder where the ant problem originated.

IPM in schools has not caught up to "green" in popularity, but 15 states have laws requiring public schools to have an IPM program or to provide notification before a scheduled pesticide application, and another nine have a voluntary mandate.

Making greener choices

Several choices before and after building construction can help with energy efficiency, indoor air quality, and pest management:

•Minimizing the number of slab plumbing penetrations and expan-

sion joints helps keep termites away. Termite barriers should be placed around potential entry points such as plumbing and expansion joints to essentially create a permanent barrier to termites.

•Nylon brush weatherstripping on the bottoms and sides of outside doors shuts out pests and keeps in heating and air conditioning.

•Inspect new walls before they are sided with sheetrock. Keep insulation and sheetrock protected from rain and moisture during construction. Mold and various mold-feeding insects, such as Psocids and fungus beetles, will quickly colonize structures built with wet, cellulosic building materials.

•Minimizing the number of outside wall penetrations helps control pests and conserves energy. Maintenance teams should caulk and seal all holes in outside walls.

•Discourage birds from landing on a building. Exterior perches and nesting nooks can harbor a family of pigeons. Properly installed bird nets and wire grids can deter roosting.

•Be sure floor drains in the kitchen are easy to access. To maintain a pest-free environment once a school is inhabited, use one tablespoon of mineral oil in the drains to keep water from evaporating and allowing cockroaches to move into the building.

•Consider groutless flooring over tile. Grout often collects moisture, providing water that can attract small insects and eventually lead to mold problems.

•Plant native plants surrounded by a barrier of crushed stone or concrete around the building perimeter. Plants should complement the building scale and be planted several feet away from the structure. Seek help from a county extension agent to see which plants work best in your area.

•Purchase self-contained compactors for trash. New compactors, which are essentially pest-proof and water-tight, can be a wise expenditure.

•Move outdoor lights away from doors but to a location where they still illuminate doorways. Experts recommend placing the lights 30 feet from the entryway, using sodium vapor lights instead of mercury vapor lights. Another way to keep flying insects away from a front door is to turn on lights one hour after sunset and turn them off one hour before sunrise. Changing the timing can reduce both the insect population and the electric bill by 50 percent. ■

Hallberg works for the Southern Region IPM Center, North Carolina State University, Raleigh. Hurley is Extension Program Specialist – School IPM, Texas AgriLife Extension Service, Dallas.

NOTABLE

15 Number of states that require public schools to have an IPM program or to provide notification before a scheduled pesticide application.

Roofing

We know we should change the oil regularly in our cars, but too often it doesn't get done until engine trouble develops. We know we should floss our teeth every day, but for many, it takes a dentist's scolding about gum disease to take action. In the world of school facilities, that kind of procrastination and inattention comes under the heading of deferred maintenance. Facility managers know that carrying out simple steps can prevent major problems, but their failure to take those steps has left many a building ailing and operating poorly.

It's easier to ignore a potential problem if we aren't confronted with it every day. So when time is short and maintenance staffs are short-handed, one of the easiest spots to forgo maintenance checks is on the roof of a school. Patrons and board members will let you know when a window is cracked or a faucet is dripping, but they aren't likely to haul themselves onto a roof to see if the surface is holding up to wear and tear.

But that doesn't change this fact: Regular inspections of roofs can help schools and universities identify troublesome conditions early and prevent minor flaws and damage from becoming expensive and destructive headaches. Maintenance staffs should have a goal of checking the roofs on their campuses at least twice a year—in the spring and in the fall.

Inspectors should looks for signs of deterioration on the roofing surface—cracks, blisters, gaps, loose flashings, cracked caulking and "alligatoring"—when a surface dried out from sun and heat begins to resemble an alligator's skin. The inspectors should look especially closely at the places where different surfaces meet—the roof and a wall or parapet, or where mechanical equipment or a skylight may be situated.

Schools and universities that opt for more extensive inspections may seek out an infrared inspection, which can detect moisture inside a roofing system and enable workers to identify leaks that might not be found in a visual inspection.

Maintenance departments should keep thorough records of their inspections and the conditions of each roof, so that inspectors can pay close attention to areas where problems may be developing.

In addition to checking the roofing surface itself, inspectors should look for other situations that can lead to problems on the roof.

Blocked downspouts and clogged gutters can stop rainwater from draining properly and leave a roof with standing water. If left unattended, moisture can seep into the building below and create mold that can threaten the health of building occupants. In addition, standing water from rain or melting snow can weaken a roof that was not designed for the excess weight.

It's usually easy to remove leaves, trash and other debris, and prevent water from ponding on a roof surface, but unless maintenance staff is checking roofs regularly, they won't discover the problem.

An inspection in the autumn after leaves have fallen from trees enables maintenance workers to clear roofs of twigs and leaves and other items. On a spring inspection, workers can look for problems that may have developed during harsh winter conditions. ■

—by Mike Kennedy

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WEB EXCLUSIVE

•Roof inspection tips from the Ohio Department of Health's School Environmental Health and Safety Inspection Manual

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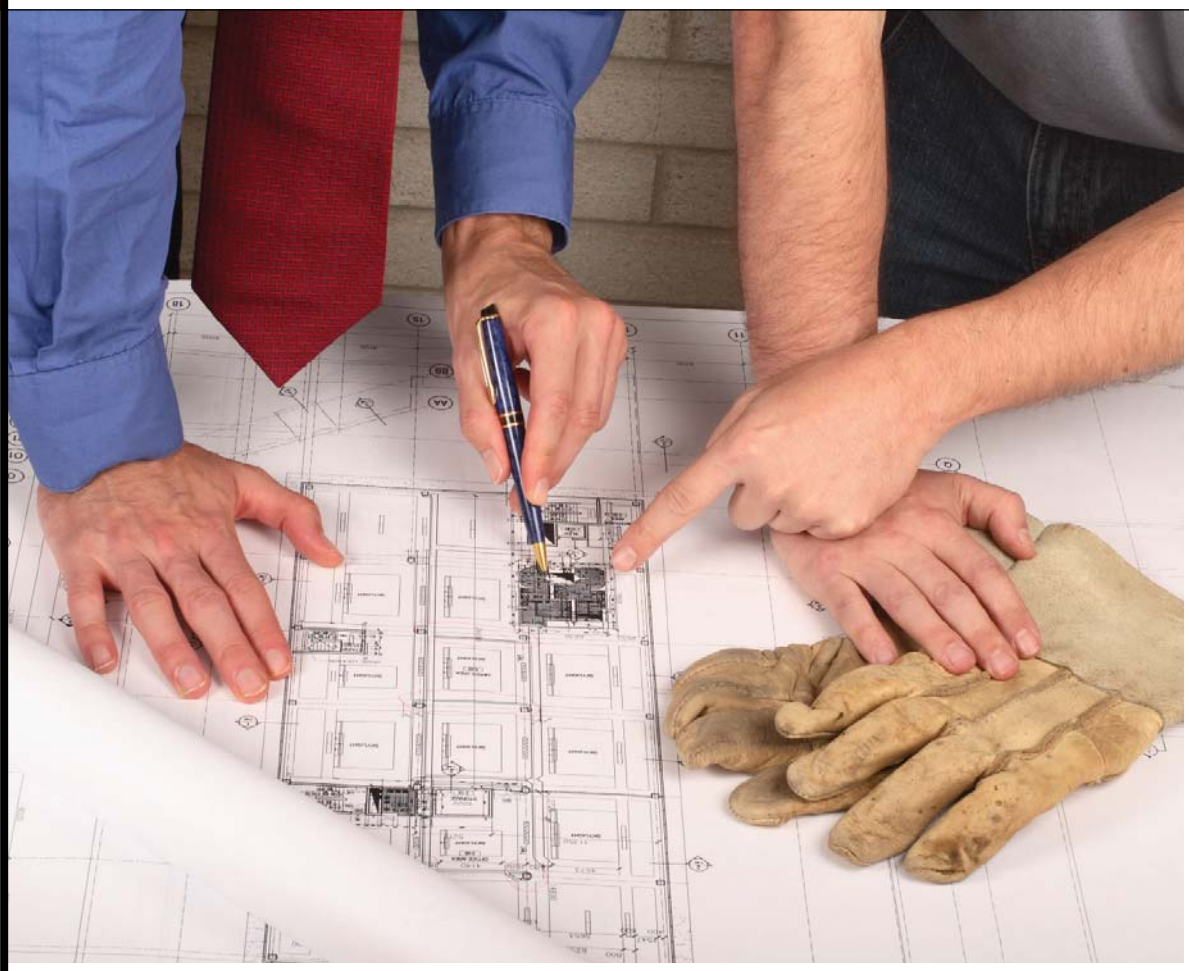

Third-party construction document review has emerged as a best practice for avoiding unanticipated building costs.

Cost Control

Preventing change orders is key for reducing school construction costs during tough economic times.

By Phillip Foreman

Education administrators involved in construction initiatives unanimously agree that when it comes to change orders, less is more. Change orders have a negative rippling effect of driving up building costs and producing expensive project delays that often interfere with school operations and schedules.

Some change orders are initiated by schools or universities, but the vast majority result from construction document errors and inconsistencies that go undetected until construction already is underway. Any blueprint or specification error resulting in a change order during construction is a loss for the school budget and a win for those who charge a premium for corrections.

As countless administrators have witnessed, the harsh reality about error-driven change orders is that

they occur too often. Contractors and building professionals who stand to gain financially from change orders also may not reveal that they have noticed errors or missing details prior to issuing their lowest bids.

One question often asked: "If design and engineering professionals are doing their jobs right, why should construction document errors exist at all?" There is a long-held understanding in the construction industry that an A/E professional can look at the same document 10 times and miss a detail that will be discovered in one pass by another set of eyes. When a project involves hundreds of specifications and blueprints across multiple disciplines, human error rates tend to increase. This is a primary reason why the third-party construction document review process has emerged as a best practice for avoiding unanticipated building costs.

When a review is performed well, it has multiple, far-reaching benefits, including:

•Significant reductions in requests for information and change orders.

•Reduction in the likelihood of claims.

•Improved construction documents that are more likely to produce high-quality construction outcomes.

•A streamlined bidding process that helps to generate lower, more competitive contractor bids.

•Improved adherence to construc-

What's the difference?

An independent, third-party review of construction documents often is confused with a "constructability review," yet they are two different processes with unique goals.

Constructability reviews occur early on during the "schematic through design development" phase for the purposes of:

•Establishing the best possible construction phasing.

•Determining site logistics.

•Evaluating design progress with respect to milestone scheduling.

•Identifying buildability issues such as long lead times for specific building materials.

•Conducting a basic cost analysis, which often is dovetailed into value-engineering estimating.

tion schedules resulting from a lower number of change orders.

What to expect

An independent, third-party review of construction documents occurs at the end of the construction document phase when all bidding documents are 100 percent complete.

When a review is completed, administrators responsible for the project receive a detailed report with line items and recommendations to be addressed before construction documents are released for bid. Often, the final report will be categorized into sections by design and engineering discipline.

The primary goal of a third-party review of construction documents is to identify inconsistencies in the specifications and drawings developed by the various disciplines responsible for project design. Although each project is unique, examples of commonly identified inconsistencies include issues related to HVAC systems, building system incompatibilities, and plumbing, electrical and safety issues, among others.

Maximizing effectiveness

Not all independent, third-party construction document review processes are alike. To protect a school's investment and enhance review effectiveness, education administrators should:

•Ensure that the review occurs when bidding documents are finalized, just prior to advertising them for bids.

•Choose "actively practicing" architects, engineers and specification writers to review construction documents.

•Select professionals who are skilled and experienced in education facility design because they can apply specialized school construction expertise to the document review process.

•Track progress to verify that all review recommendations and identified construction document errors, inconsistencies and ambiguities are addressed prior to bidding.

•Gain the support of architects and engineers (who initially may be reluctant to participate) by educating them that a third-party review of construction documents is an industry-recommended best practice that leads to a win-win for all concerned. ■

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Flooring/Carpeting

Backpack vacuum cleaners play an important role in the commercial cleaning industry. As with any type of power equipment, the design of the unit can affect an operator's performance significantly. Because the operator wears the vacuum on his or her back, the total weight, weight distribution, sound level, harness comfort and air-discharge direction can affect operator fatigue, cleaning effectiveness, productivity and the potential for repetitive stress injuries.

Standard-setting organizations have not set specific ergonomic standards for backpack vacuums, but they do recognize the importance of proper design. The green-cleaning guidelines published in the LEED-EB rating system recommend that "power equipment be ergonomically designed to minimize vibration, noise and user fatigue." However, except for noise level, LEED leaves it to equipment manufacturers to interpret the design specifics and encourages manufacturers to design ergonomic equipment.

Most backpack vacuums meet the noise standard, but differences among various designs can affect comfort, fatigue and productivity.

Backpack vacuums are similar in basic design. They generally consist of a motor housing and tank, a support harness that rests on the shoulders and hip girdle, and a hose, cleaning wand and various accessory heads. Although the designs are similar, research has shown that minor differences in weight, weight distribution, harness comfort, sound level and air-discharge direction can affect perceived effort, cleaning productivity and potential for repetitive stress injuries:

•**Weight**. Studies from the outdoor recreation industry indicate that carrying camping-style backpacks that exceed 13.2 pounds (6.0 kilograms) for extended periods may impair lung function, cause extensive skin irritation and risk thoracic nerve injury. This relates directly to carrying a backpack vacuum because the weight, harness design and typical duration of use are similar. Most backpack vacuums weigh less than this suggested upper limit, and a general design trend is the development of smaller and lighter units consistent with durability and good vacuuming performance.

•**Perceived weight/weight distribution**. Perceived weight is a subjective measure of weight that is influenced by total weight, harness design and weight distribution. Various studies have indicated that if a given weight is carried close to the body and higher on the back, there is less perceived weight. Conversely, when the weight is distributed low on the back or tends to lean away from the body, the perceived weight is significantly higher. In addition to restricting mobility, weight distributed low on the body tends to pull the shoulders back and put continuous strain on abdominal muscles.

•**Harness**. The design of a support harness is critical for distributing the weight of the backpack vacuum in a way that reduces perceived weight, while allowing sufficient mobility for effective cleaning. Harness comfort is a function of total surface-bearing area, padding thickness and density, and the flexibility, texture and resiliency of the harness materials. Backpack vacuums are worn by male and female operators, and harnesses must be adjustable to fit many body sizes. Harnesses with large bearing surfaces, good padding and a wide range of adjustability offer the best comfort.

•**Sound level**. LEED has established an upper limit of 70 dB(A) for all vacuums, including backpacks. Sound levels across brands vary from 59 dB(A) to 75 dB(A) for units with comparable vacuuming performance. High sound levels are known to increase stress and induce fatigue in workers.

•**Air discharge**. Because the operator of a backpack vacuum is wearing the device, proximity to the hot discharge air can create discomfort and fatigue. Backpack vacuums discharge their exhaust air in different ways: straight down; down at an angle away from the operator; straight back; or back and upward away from the operator. ■ *—By Bob Abrams, product manager for Advance, Plymouth, Minn.*

Experience has shown that major fires or other acts of vandalism have been preceded by less-noteworthy building intrusions or evidence of loitering.

Major Losses

A well-developed plan can help prevent arson and vandalism on school and university property.

By Miles Kravis

From 2003 to 2005, fires on school properties cost about $85 million a year. An estimated 14,700 fires required a fire department response: 36 percent were trash fires, 19 percent were fires in open fields, and 43 percent were structural fires.

Sometimes, the needs of school security seem to conflict with the requirements of fire safety. For example, exits may be restricted for security reasons. A risk-control consultant familiar with school design can assist education institutions in reviewing security procedures. This is especially important because injuries in school fires occur at slightly

higher rates than in home fires.

By the numbers

The most common causes of fires in elementary schools are cooking (27 percent), incendiary or suspicious activity (25 percent), and heating (12 percent). The primary causes of fires in middle, junior or high schools are incendiary or suspicious activity (47 percent), cooking (15 percent) and heating (7 percent). The highest percentage of fires occurs in middle and high schools.

Juvenile fire-setters generally fall into three categories:

•Experimentation.
•Reactionary.
•Delinquent.

The first group involves elementary children who experiment out of curiosity and lack of supervision. They are five times more likely to do it again unless professional intervention takes place. Youth that do not have adequate problem-solving skills or cannot express their feelings may use fire to convey these feelings. This group also lacks supervision and has easy access to sources of ignition. Delinquents, the third group, typically are older. They set fires that usually are peer-driven and do not understand the legal repercussions associated with setting fires.

A partnership among teachers, administrators, fire service and the judicial system can help identify fire-setters at an early stage.

> Arson and vandalism, like theft, are crimes of opportunity.

Opportunity knocks

Arson and vandalism, like theft, are crimes of opportunity. In most cases, the person committing the crime does not usually leave his or her home and head for school with the specific intent of destroying a large part of the building by fire. However, given the right set of circumstances, serious fire or other damage can oc-

cur. What are the circumstances?

•**Easy access.** The first and probably most important condition is easy access to the interior of the building when it normally is closed to students. This can happen on weekends or holidays when the building is unoccupied, or it can happen during vacation periods when the normal staffing is reduced or concentrated in small areas, leaving the rest of the building unsupervised.

•**Availability of potentially damaging materials left around a school.** These might include combustibles such as leaves or trash that have accumulated, and can be used to easily start a fire against a portion of the building that can burn, such as a wooden door, or be collected and dumped into an open window and then ignited.

In one case, an elementary-age child went to his school on a Saturday afternoon to play baseball. Finding no one to play with, he picked up golf ball-size rocks and hit them toward the school with his baseball bat. He managed to shatter 87 panes of glass with such force that in some rooms, the battered rocks damaged the chalkboards on the opposite wall.

Large trash receptacles left open and full over holidays and weekends also present opportunities for arson, as well as provide a means to climb to low roofs or open windows when they are placed against the building. Bicycle racks that can be upended also make good ladders, as do shed-like storage structures placed against a building.

Once in a building and undetected, an intruder often can enter and explore many rooms. Again, if opportunity presents itself in the form of access to flammables such as paper goods, combustible art supplies or even chemicals, a serious fire can ensue. An intruder also may be caught by his or her own ignorance, and be seriously injured or killed in the fire or in the rush to escape. Additionally, unlocked food-storage areas or refrigerators and freezers provide an opportunity for significant loss in terms of spoilage or contamination.

Many cases of serious vandalism, such as the destruction of expensive equipment or furnishings, also result in arson as an intruder attempts to cover his or her involvement by setting a fire as a diversion.

Another unintended, but equally serious, loss associated with vandalism occurs when windows near water lines are broken or left open in freezing weather. The cold air freezes the water, and pipes subsequently burst and flood the area.

Not all school losses associated with vandalism and arson are the result of curiosity and "accidental." Certain school fires are set deliberately by arsonists whose purpose is revenge or postponing a school experience anticipated to be unpleasant. These youngsters, usually boys between the ages of 8 and 14, set aggressive

Program tips

As a first step in setting up an arson and vandalism program, the governing body should approve a policy taking a stand against vandalism. The policy statement should recognize that acts of vandalism are crimes against the community, and declare that all acts of vandalism against property will be prosecuted. Also:

•Identify the staff members that will be responsible for administering the program.

•Provide a basis for full cooperation among all responsible administrators and those agencies responsible for detection, apprehension and prosecution of vandals.

•Urge the governing body to take action to reduce the incidence of vandalism and protect property.

•Limit building access to those pupils, public and staff that have a legitimate purpose in being there.

•Exercise control and supervision over those who are allowed in the buildings.

•Make sure that everyone is out of a building when it is closed for the day. Coaches and others who supervise pupil activities late in the day or in the evening should not leave until all the students have left.

•Assign specific responsibility to the custodial staff, preferably one person in each building, to be sure that all windows, doors and other access ways are closed and locked.

•Collect and secure all trash and other loose combustible materials so they are placed in outside containers with covers.

•Prevent access to roof areas by prohibiting vehicles or other objects from being left close to a building—they can be used for climbing.

•Maintain interior and exterior lighting in such a way as to discourage loitering and reveal intruders by sight from the outside.

•Verify that police authorities or school personnel are scheduled for drive-around inspections at irregular intervals.

•Provide adequate illumination and ease of visibility to courtyards, cul-de-sacs and other places not readily visible from outside the building.

•Be alert to school and community problems that may heighten the risk of fire—for instance, pupils or parents who may harbor strong negative attitudes toward a school. This is a a frequent motive for arson.

NOTABLE

47 Percentage of fires in middle, junior or high schools that are caused by incendiary or suspicious activity.

fires because of their problems with authority figures. Girl arsonists, on the other hand, may set wastebasket fires during the school day to avoid a test or cover their failure to complete an assignment. They often "discover" the fire and assist in its control. These fires can happen in a toilet, corridor or even in the classroom.

Prevention and control

A well-developed plan for preventing and controlling vandalism and arson takes into account building characteristics and the condition of the surrounding grounds. It uses staff and community resources effectively, and is supplemented with intrusion barriers or alarm systems.

Another important element is gathering data about building intrusions or loitering on school grounds. Experience has demonstrated that major fires or other acts of vandalism have been preceded by less-noteworthy building intrusions or evidence of loitering.

One way to collect this data is to have a custodian in each building inspect the facility and its immediate perimeter every morning to uncover any evidence of unwarranted activity. Several burnt matches on a floor in any area, disturbed supplies or equipment, open desk drawers or lockers, and unusual litter all are signs of possible illegal entry. Empty soda or beer containers, cigarettes or matches and other evidence of exterior loitering should be noted with a call to the police for added surveillance.

When it becomes common knowledge among students that a school is easy to enter or that a location near a school is a good place to "hang out," traffic will increase steadily and the likelihood of a major property loss rises.

Such building condition reports should be in writing and sent to the central office, where an administrator can examine the data for evidence of unwanted trends.

Administrators also should consider whether it's financially feasible to install a security system. More and more education institutions are coming to the conclusion that such a system is essential for protecting property and the investment in the children's future. ■

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WEB 101

Also read "Safe Passage," from the archives at ASUmag.com/security/life_safety.

Green Cleaning

State legislation requiring green cleaning in schools is gaining momentum. Illinois and New York were the first to make green cleaning in schools law (followed by Missouri and Maine), but now the country is witnessing a substantial trend within state governments to ensure the quality of public health and minimize harmful effects on the environment.

Recently, Connecticut passed a green cleaning in schools bill, and Maryland enacted a green cleaning in schools law as well.

Maryland Governor Martin O'Malley signed legislation (HB 1363) that requires the state's K-12 public schools to procure and use green-cleaning products.

The law requires local school boards to buy green-cleaning products for use in K-12 public schools. The boards also must draft "clear and accurate descriptions of the functional characteristics or nature" of green cleaning products that will be bought and used by the schools.

The bill's language defines "green cleaning products and supplies" as those that have "positive environmental attributes," such as biodegradability, low toxicity, low VOC content, minimal packaging and low life-cycle energy use. Another specification is that, at minimum, the products are "recognized" by the EPA's Design for the Environment Formulator program, Environmental Choice or Green Seal. The bill goes into effect on Oct. 9, 2009.

In early May, Hawaii's House and Senate passed HB 1538, requiring all public school buildings to build and maintain a list of approved green-cleaning products, and give first preference to Green Seal products when making purchases.

Also in May, a compromise in the Nevada legislature resulted in only floor surfaces being covered by green-cleaning legislation. It does allow individual districts to make decisions on other products. Although this is not an ideal green cleaning bill, it can be a springboard to a more comprehensive approach.

Illinois used its existing "Illinois Guidelines and Specifications for the Green Cleaning for Schools Act" as a blueprint for all public buildings. With the passage of HB 2437, Illinois now will require all state-owned buildings to create and maintain a green-cleaning policy, including the purchasing of only products that are compliant with the Green Cleaning for Schools Act.

Connecticut also expanded its existing laws that require green cleaning in all state buildings (including universities and vocational schools) to include all school districts and require the use of only certified Green Seal or Eco Logo products for general-purpose cleaning, floor-care products, soaps and hand cleaners. The bill was approved unanimously by the state senate. Supporters of the bill emphasized the economic advantages of switching to green products.

"This is another small step in making sure we can do things in a better way—not just for the environment, but I think also for public health," said Sen. John McKinney (R-Conn.).

Other states, including California, Massachusetts, Minnesota, Oregon, Iowa, Rhode Island and Vermont, have introduced legislation for green cleaning in schools this year.

This is exciting news within the green cleaning industry. Furthering the excitement is the number of school districts across the nation creating their own directives that establish green-cleaning programs within their facilities. From the beaches of Florida to the shores of the Pacific Northwest, green-cleaning programs are multiplying at a rapid pace within individual districts. ■—*by Stephen Ashkin, executive director of the Green Cleaning Network and* AS&U's *"Green Cleaning" columnist.*

NOTABLE

14 In millions, the number of school days missed each year because of asthma exacerbated by poor indoor air quality.

Source: Healthy Schools Campaign

Athletic Fields

Exercise, physical education and recreation are integral elements of student life at schools and universities, and many institutions are devoting additional resources to recreational spaces.

One upgrade that many schools and universities have pursued is the installation of synthetic turf fields. More than 1,000 synthetic-turf fields are installed in the United States each year, according to the Synthetic Turf Council, which supports the industry. The appeal of such fields to cash-strapped education institutions is clear. The synthetic turf can be used more frequently and in more weather conditions than natural turf. The council says the surfaces can be used year round 3,000 hours per year with no damage. In contrast, it says, natural turf fields become unplayable after 680 to 816 hours, and usually are not available for part of the year.

"For schools with sufficient land, it would take three or four natural fields to withstand the usage of one synthetic turf field," the council says.

In addition, the council asserts, natural turf fields require more maintenance—about 70,000 gallons for irrigation water each week, 15 to 20 pounds of fertilizer a year per 1,000 square feet of turf, plus herbicides, pesticides and regular mowing. Some 25 million used auto tires are recycled each year to provide the material used as infill for synthetic turf fields.

Some parents and health advocates have raised concerns about the safety of those tiny bits of ground-up rubber tires, known as crumb rubber, that are used as infill. They worry that children using the fields may be exposed to potentially harmful chemicals.

The Synthetic Turf Council says those fears are unfounded and points to studies that it says "provide compelling evidence of the safety of synthetic turf and crumb rubber."

"In more than 40 years of usage under EPA oversight and OSHA-regulated manufacturing, no one has ever reported ill effects related to any materials used in synthetic turf," the council's president, Rick Doyle, said in a May 2009 statement.

The New Jersey Education Association (NJEA) looked at the pros and cons of natural and synthetic fields in a 2008 report. The NJEA says districts deciding on which type of field should weigh "cradle-to-grave" costs including field preparation, installation, maintenance and repair, and disposal. It notes that natural turf fields require personnel and equipment for mowing, watering, fertilizing and pesticide application; and artificial turf fields need personnel and equipment for dragging the field, adding or redistributing infill, and cleaning or repairing the field. Some maintenance staff may have to be retrained to work on artificial turf.

A regularly maintained synthetic turf field usually lasts up to 10 years, the NJEA says, and a properly installed and maintained natural grass field is viable for about 15 years.

One drawback of synthetic turf is that it absorbs heat and in extreme temperatures can become too hot to play on. Watering the surface can cool the surface, but the relief is only temporary.

"Because of the potential for high temperatures on infilled synthetic turf fields, it is important that people who play or work on the fields be provided with adequate warnings regarding the potential for heat stress," says a fact sheet from the New York State Health Department. "People should also be advised to remain hydrated and to seek relief from the heat in shaded areas." ■—*by Mike Kennedy*

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Water play

Program brings healthy drinking water to neighborhoods

Custom water fountain for the "Schoolyards to Playgrounds" program

Halsey Taylor. The PlaNYC 2030 Initiative, a sustainability plan for the city's future, is a collaboration among the New York City Department of Parks & Recreation, the Department of Education and the non-profit The Trust for Public Land. The PlaNYC "Schoolyards to Playgrounds" program aims to increase the amount of open space in underserved neighborhoods throughout the five boroughs of New York City and ensure that all New Yorkers live within a 10-minute walk of a park or playground.

To achieve this goal, they have identified 266 public schoolyards that ultimately will be transformed into more than 200 acres of new parkland within walking distance of about 400,000 children and their families. Along with the improvements and additions, many will be updated with custom outdoor drinking fountains from **Halsey Taylor**. New Endura Steel Wall-mount Drinking Fountains, customized with a specially designed "nyc water" logo and blue color, were installed in many of the newly created parks throughout the city.

The fountains have heavy-gauge, cold-rolled steel construction and are manufactured using the E-coat Immersion process, which coats the fountain for corrosion protection. Many of the models specified for the project feature an optional freeze-resistant valve system, which ensures that the fountain will function despite weather conditions.

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CONTINUED...

Prefabricated booth

B.I.G Enterprises. The Vista, a new booth design, serves as a welcoming interface for visitors, while providing the design features for high-volume ticket sales. The booth has a stucco facade exterior and a standing-seam roof, and can accommodate several workers. It comes with electrical, including provisions for data, communication and security camera systems, stainless-steel shelves and high-output commercial HVAC.

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Green seating

Biofit Engineered Products. The full line of seating, including chairs and stools designed for educational use, recently earned compliance under the IAQ requirements set forth by Business and Institutional Furniture Manufacturer's Association (BIFMA) Furniture Emissions Standards. Subsequently, specifiers of the seating products for use in schools, universities and other training facilities now are eligible to receive credits under the U.S. Green Building Council's LEED program.

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Recessed down lights

Nora Lighting. An innovative series of energy-efficient LED recessed down lights has been introduced for new construction and renovations. Three 120V models are featured: a 4-inch-diameter aperture fixture (11W), and 5-inch- and 6-inch-diameter aperture fixtures (15W). The fixtures integrate the warm white color of incandescent lamps with long-lasting, high-output LED technology. They are rated for 50,000 hours at 70 percent lumen maintenance.

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Access control

Corbin Russwin Architectural Hardware. The Access 700 lockset with PERSONA Campus software is an intelligent, one-card solution for economical and effective campus access control. The Grade 1 quality lockset—available with keypad and magnetic stripe, or magnetic stripe-only versions—is a battery-operated lockset with on-board memory. The software technology provides seamless database integration and software interfacing with enterprise, transaction and housing systems. Locks can be programmed to define unlimited access, extended-hours access or no access.

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IMPACT
RETHINK + REUSE + RECYCLE = RESPONSIBILITY

Recycling program

Roppe Corporation. The IMPACT rubber products recycling program encourages building professionals to Rethink + Reuse + Recycle = Responsibility. Products are gathered at the jobsite and palletized for return to a recycling partner, and are made into many different products, such as municipal landscaping mulches, playground surfacing, and rubber crumb for athletic fields and other applications.

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Continued...

Roofing accessories

Firestone Building Products Company, LLC. The UltraPly TPO custom accessory program has been added to the company's accessories product line. The program offers UltraPly TPO Pipe Boots and Curb Flashings, which are available in white, tan or gray. Custom Pipe Boots are available in round, square and conical configurations to provide flexibility to meet project flashing needs. Custom Curb Flashings are available in four designs for a variety of curb sizes.

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Data collector

Videx. The iBR9000 is the newest addition to the data-collection family. Small and lightweight, the iBR9000 portable, handheld data collector is a miniature-sized reader of iButtons. This tough data collector measures 2¾ inches in length, weighs less than 2 ounces, and easily fits on a keyring or in a user's pocket. It can store at least 9,000 reads before the next download of data.

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Occupancy sensor

Watt Stopper/ Legrand. The new HB350W high-bay occupancy sensor is engineered specifically for wet locations. The sensor is IP65-rated, as well as UL-rated raintight (UL244A and UL508). The line voltage sensor offers two different and interchangeable lens options and is part of the company's offering of fixture-integrated lighting controls. When the sensor no longer detects occupancy in a controlled space, it automatically turns lighting off. The device features sealed and gasketed lenses, as well as a raintight enclosure to ensure wet or damp conditions do not impair sensor performance.

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Cutting campus crime

Camera systems installed in parking lots protect students and staff

Wireless mesh network camera and radio

ADT Security Services. The University of Texas at San Antonio (UTSA) has enhanced security in three of its largest parking lots with the addition of video-surveillance systems from **ADT Security Services**. The installation includes cameras, transmitted via a wireless mesh system, that monitor a 600-space remote parking lot about a quarter-mile from the university's main campus.

"The wireless system was the most effective way to get data from such a far-away area without the cost and environmental impact of trenching associated with a wired system," says Daniel Pena, UTSA assistant police chief.

The system already has helped solve several break-ins and auto-theft cases, according to campus police. The success of the wireless mesh system, which has been operational since early 2007, led the university to recently install more wired cameras in two other parking lots.

The wireless cameras enable the security team to capture video as cars come and go from the university's largest parking lot. The team looks for suspicious activity, such as cars circling past open spaces and people lingering near parked vehicles. If a suspicious activity is identified, cameras enable officers to zoom in and capture license-plate numbers of cars entering and exiting the lot. The cameras also have helped campus police identify suspects.

"We are generally able to identify offenders as they exit the lot. We capture the license plate and we've got them. The system has been an invaluable tool for identifying suspects and shutting down theft rings," says Pena.

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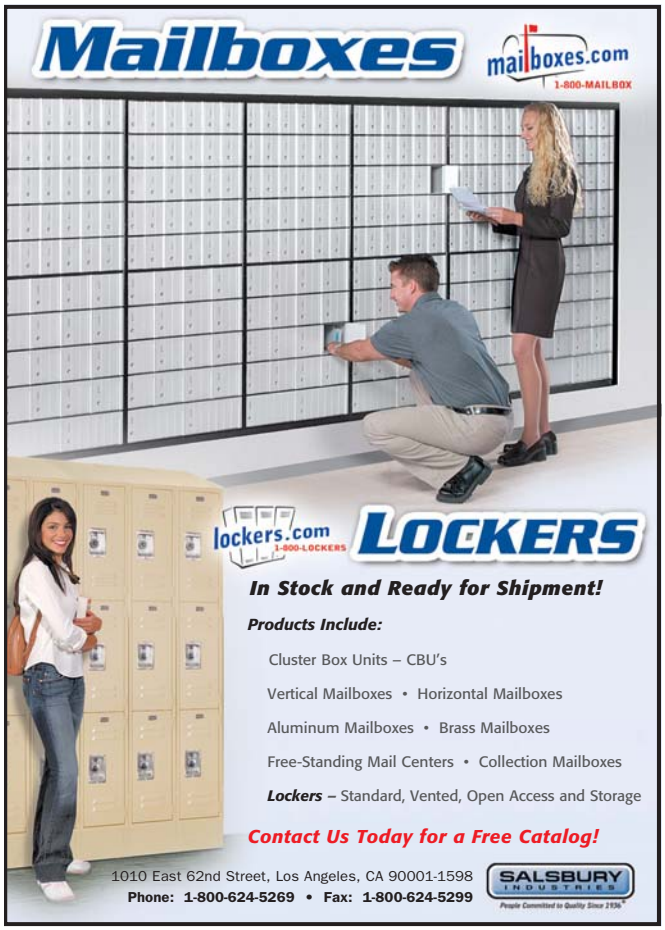

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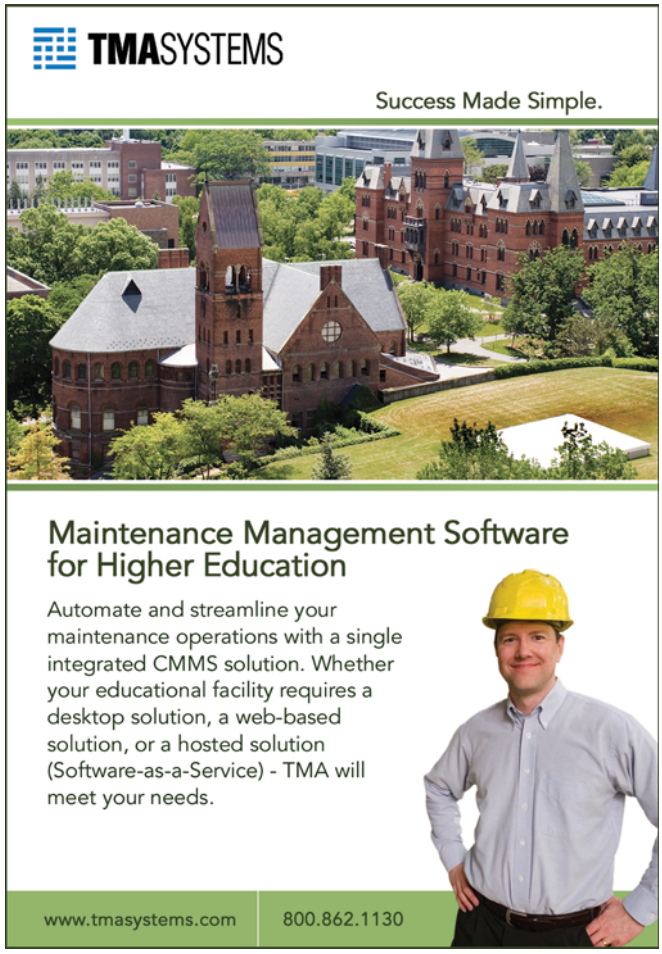

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6 ❑ 6-10
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