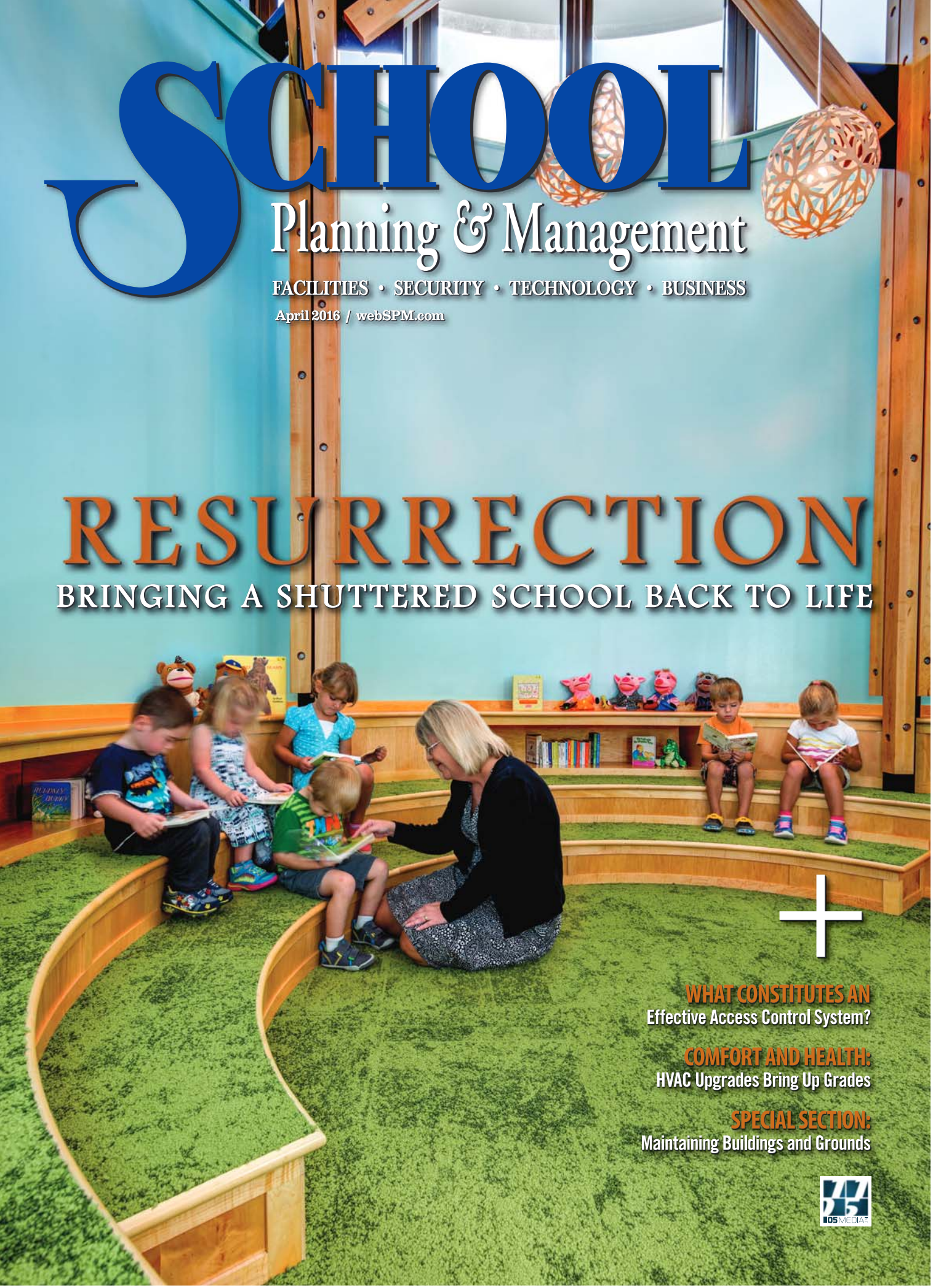

SCHOOL Planning & Management

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RESURRECTION

BRINGING A SHUTTERED SCHOOL BACK TO LIFE

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WHAT CONSTITUTES AN
Effective Access Control System?

COMFORT AND HEALTH:
HVAC Upgrades Bring Up Grades

SPECIAL SECTION:
Maintaining Buildings and Grounds

1105 MEDIA

Breaking From Convention

ACHIEVING COMFORT IN THE CLASSROOM — WITHOUT AIR CONDITIONING.

WITH BUILDING COMMITTEES aiming high to achieve greater impact in sustainability, design teams are researching and benchmarking unconventional solutions beyond the LEED checklist.

For several public schools built in the northeast, this quest led to a bold break from convention. These schools rely on dehumidification displacement instead of air conditioning for cooling classrooms and other student spaces.

The savings are significant: a reduction of at least 25 percent in energy consumption and cooling system use over a conventional fully air conditioned, variable air volume system. In new construction, capital costs are reduced due to the ability to downsize HVAC units and system chillers. Displacement also offers the added benefit of superior indoor air quality because pollutants within a room rise toward the ceiling as the warmed air rises.

Reduced Summer Use as an Opportunity

The majority of the square footage in a new school is dedicated to classrooms, labs and other learning spaces. In most districts, these are in use for nine months a year. The use of dehumidification in these rooms will provide a comfortable and dry environment for students and faculty. The target comfort level is typically 80 degrees and 50 percent humidity.

Obviously, geography determines where this is feasible. It can't be employed in year-round hot-and-humid weather regions. Yet within a large swath of the U.S., there are relatively few hot and humid days in the regular school year. For these districts, the dehumidification opportunity is a viable option to achieve both cost savings and predictable comfort.

The Conversation: You Want Us to Try What?

Departing from convention is never easy, and reaching beyond the prescriptive green-building checklist requires confidence in the outcome. We find that a two-stage process works best. First, a general discussion of the system options, combined with a dialogue on the individual community interest level in exploring a no-AC scenario comprise an important first step. This often includes conversations with administrators in districts using dehumidification displacement to learn about their experience and user satisfaction.

Second, site-and-climate specific research by the design team, including a 12-month temperature and humidity analysis, provides a reliable scrutiny of conditions, cost and outcome. The team reviews expected energy requirements for mitigating heat gain through favorable building orientation, shading, window options, etc. to produce a detailed and reliable model. This information is shared with the committee, and adjusted during early design phases to improve performance.

Supporting Dehumidification with Best Practices

The success of a dehumidification strategy to keep classrooms comfortable relies on best practices in sustainable design to reduce heat gain. The insulating and infiltration treatment of the envelope of the building is critical to the overall energy efficiency of spaces where there is no conventional air conditioning. A well-insulated building not only reduces the amount of heating and cooling required, it also allows for the use of a smaller, more efficient boiler and cooling system. This reduces initial capital cost and conserves energy. Designing a super-efficient lighting system reduces the level of heat inside, easing demand on the cooling system.

Choosing the proper positioning for the building is another key to success. A design that optimizes the orientation of the classrooms, ideally with a north and south-facing classroom layout, is less energy intensive than ones that primarily face east or west. The north side gets good, uniform skylighting that is easy to control. In any season, the sun is the highest from the south and, therefore, is most easily controlled to avoid interior glare and overheating. North and south facades are also not subject to the same wide thermal swings over the course of a typical day as east and west facades.

Verifying Value and Outcome

Post-occupancy metrics for schools utilizing dehumidification for cooling are demonstrating its value while helping educate other districts. Two years after opening its doors, the Claiborne Pell School in Newport, R.I., is experiencing tangible energy savings by using dehumidification to cool its classrooms. Noteworthy for other school systems is the positive user comments and lack of complaints from Pell School faculty and students, helping to confirm their choice.

For school administrators and community leaders, making a classroom cooling choice that departs from the prescriptive path can be difficult, even controversial. An objective process of evaluation, custom data analysis and peer advice will bring clarity and consensus to the decision. SPM

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