

Today's

FACILITY MANAGER

Water: Keep Out!

Roof Maintenance Plans are the latest tool in the battle against water damage.

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trends

This green building design and construction code will have an impact on indoor air quality for those who adopt it.

By Lawrence J. Schoen, P.E., FASHRAE

ANSI/ASHRAE/USGBC/IES Standard 189.1-2009 for the Design of High-Performance Green Buildings, Except Low-Rise Residential Buildings is the compliance path within the IGCC (International Green Construction Code). Which facility manager (fm) activities does the Standard impact? Everything and nothing. Everything because the Plans for Operation chapter gets into almost all of the day to day and long-term activities of facility operations and maintenance (O&M). Nothing because none of this is mandatory. Rather, it is mandatory for someone to make a Plan for Operation.

Design Obligations

Like many guidelines from ASHRAE and others, 189.1 is a design standard. It is not a building operations standard. Nevertheless, the sponsoring organizations and the consensus committee they set up all recognized that in order to achieve a truly high performing building one does not stop at design. The same care that went into the design ought to go into the construction and operation.

How can the designer be responsible for the operation of the building? He or she cannot. But the designer can think about the operational needs and be asked to develop a Plan for Operation—which is exactly what 189.1 requires.

This process of thinking about operation during the design stage has the advantage that the operations impact may be considered in design choices. For instance, knowing that outside air verification must be undertaken periodically and instruments that monitor this must be calibrated can influence design choices in a positive operations way.



PHOTO: STOCKBYTE

Ideally, the designer and fm would discuss these design choices (including how the building will be operated) and will collaborate throughout the design, construction, and startup process. The Standard encourages, but cannot require—such collaboration; instead, it fosters the opportunity for an integrated design byproduct.

Documentation For The Long Haul

Specifically, Standard 189.1 says a Plan must be completed; the owner, operator, consultant, contractor, or other professional can handle the job. Eventually, the Plan for Operation should be turned over to the fm, and in addition, the fm of a building designed in accordance with 189.1 will receive the following:

- **Systems manual:** giving information about the installed systems;
- **Final commissioning report:** outlining the intent of the building and its systems and how well the completed building meets this intent;
- **Service life plan:** detailing the expected life of the building and its components and maintenance activities; and
- **Transportation management plan:** describing operational plans for encouraging efficient transportation of employees to the building.

It is expected that the owner (defined as the party in responsible control of development, construction, or operation of a project at any given time) will retain this material for the life of the building.

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Facility Management & The New Green Code

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Drilling Down To Specifics

Since energy conservation is a significant component of green buildings, it should come as no surprise that 189.1 requires maintenance throughout the life of the building for HVAC systems and for vegetation that is designed to shade the building. HVAC maintenance records must be retained in either electronic or manual format.

Furthermore, since a sustainable building is expected to last, the service life plan includes requirements for

inspecting, maintaining, repairing, and replacing materials, products, and components of the building.

In addition, 189.1 requires verification of water and energy use. Daily profiles are recorded to show peaks in consumption. Data is then entered in the Energy Star Portfolio Manager (a U.S. EPA program), performance assessed after 12 to 18 months, and documents retained at least three years.

IAQ And Green Cleaning

Many indoor air quality (IAQ) problems in buildings relate to the operation of the HVAC system and/or indoor

sources. Since a high performing building should be operated to achieve good IAQ, required measures include the previously mentioned verification of outdoor airflow and retention of filters designed to remove outdoor contaminants in polluted areas.

A program is required to respond to occupant complaints. Furthermore, by either IAQ monitoring for a list of 36 contaminants given in the Standard or monitoring of occupant perceptions (using, for example, an IAQ questionnaire), fms can address IAQ issues that might have gone unreported.

The green cleaning plan must be in compliance with Green Seal Standard GS-42. Although 189.1 does not go as far as some environmentalists may desire, they do address several practical aspects of operations and maintenance.

Transportation management must include bicycles (the requirements are not specific), and if the project includes parking facilities there must be preferred spots for car and vanpools. These rules must be relayed to employees.

In owner-occupied buildings, there must be incentives for employees to use mass transit, pools, or non-motorized transport, telework, or flex work programs, rideshare, or carpool matching programs. Additionally, there must be access to emergency rides home. All these benefits must be “actively promoted” and maintained in a central location with a central point of contact.

None of the aforementioned requirements of 189.1 applies to buildings unless some other regulation, such as local law or a lease provision, invokes it. Nevertheless, someday soon, building portfolios may include a 189.1 compliant design, and fms may be asked to execute a Plan for Operation from the design team. **TFM**

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Do you have a comment? Share your thoughts by writing to schwartz@groupce.com.

Does Classroom IAQ Make The Grade?

By Thomas Aiken

Adhering to the indoor air quality (IAQ) guidelines in ASHRAE's 189.1 is crucial for facility managers (fms). Source control, air cleaning, and dilution are becoming increasingly important in facilities.

Maintaining good air quality is just as important to school fms for different reasons. Poor air quality in the classroom can reduce both the students' attention span and the quality of the teachers' instruction. In fact, the Indoor Air Quality Scientific Findings Resource Bank (IAQ-SFRB) reported that student performance increased between 5% and 10% when the ventilation rate was doubled.

Poor classroom IAQ can also have financial implications for schools. Not only do IAQ-related health issues increase medical costs, they can also increase absentee rates. This can affect school budgets in districts where an increase in absences results in decreased funding. On the other hand, the IAQ-SFRB study of an elementary classroom found that an increase in ventilation of one cubic foot per minute led to an estimated .5% to 2% decrease in student absences.

Many of the common complaints about IAQ reported to the U.S. Occupational Safety and Health Administration (OSHA) could be reduced and even eliminated by using non-toxic, water-based, odorless products in the classroom. In addition, the U.S. EPA recommends fms ensure

that building materials are not prone to moisture damage or mold growth. The EPA's comprehensive Tools for Schools website (www.epa.gov/iaq/schools) can help fms work with the administration to improve IAQ.

The recipe for clean air is simple: 21% oxygen, 78% nitrogen, and 1% argon. However, indoor air often becomes contaminated with odors and potentially harmful mixed gases called volatile organic compounds (VOCs). These VOCs include substances from sources such as bio-effluents, cleaning supplies, paints, glues, and other materials found in classrooms. If left unchecked, VOCs can cause physical symptoms like eye irritation, headache, difficulty concentrating, drowsiness, and dizziness.

While many traditional IAQ sensors measure only the amount of CO₂ in the air, advanced sensor modules use micro machined metal oxide semiconductor (MOS) sensor elements to detect a broad range of VOCs and correlate these measurements with CO₂ levels. These VOC sensors can help reduce utility costs when connected to a building's HVAC system by signaling fans to turn on when VOCs are present and off when air quality returns to normal. New sensors may have worthwhile benefits. ■

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