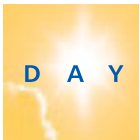


# enlighten

THE BIMONTHLY NEWSLETTER OF THE DAYLIGHTING COLLABORATIVE

[www.daylighting.org](http://www.daylighting.org)

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## COMFORT AND SUSTAINABILITY IN SCHOOLS

By Bill Sturm and Chris Wollmuth, Serena Sturm Architects

The design team for a new school in Grayslake, Illinois—Prairie Crossing Charter School—chose design strategies with the specific intent of creating a healthy, comfortable environment to best enhance learning. These strategies also resulted in an exceptionally sustainable building as evidenced by its award of a USGBC LEED Gold rating.

**DAYLIGHTING STRATEGY** Given the benefits of sunlight (connection to the natural cycles and a full spectrum of light) maximizing daylight in interior spaces was a priority. With select view glass complemented by an almost continuous clerestory in the classrooms plus a combination of roof monitors and interior glazing, all regularly inhabited spaces including corridors are flooded with natural light. Given the risks of heat gain and glare, however, this ample glazing was carefully configured to deliver daylight's benefits without its pitfalls. This included protecting windows with overhangs by way of perimeter porches and positioning roof monitors to face north, away from the most intrusive light of the day.

**ELECTRIC LIGHTING** Even with extensive daylight, electric lighting was a necessity. This design, however, focused on electric light as a *supplement* rather than a primary source of light. As such, fixtures were configured and controlled to allow them to be turned off in a stepped sequence whenever daylight levels increased appropriately. To mimic the quality of diffuse natural light, the electric lighting utilized direct/indirect fixtures to create even light levels with color adjusted, high efficiency and long lasting fluorescent lamps.

**SYNERGIES** While initially formulated for daylight, the window configuration—view glass at classroom exteriors, interior glazing to corridors and roof monitors—also provided an optimal avenue for naturally induced building ventilation. Once corridor and monitor windows were made operable (with electric motors in the case of the roof monitors) a dependable path was created for natural ventilation, which reduced cooling days as well as associated energy costs required for the mechanical movement of air.

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## Join the Daylighting Collaborative

If you'd like access to daylighting design information, new tools, trainings and the "Ask the Expert" forum, please join us by clicking [www.daylighting.org/join.php](http://www.daylighting.org/join.php).

## Training Update

### Best of Benya: Lighting Design with Efficiency

Back by popular demand, Jim Benya presents the latest and greatest information on lighting design with efficiency. Even if you have attended Jim's sessions in the past, this one will be well worth your time.

Now available online through Energy Center University, the Daylighting Collaborative's professional education training partner at [www.ecw.org/bestofbenya](http://www.ecw.org/bestofbenya).

### DID YOU KNOW...

Daylighting is the second most utilized design measure to increase overall building performance and achieve 50% better than current practice, according to market research conducted by the New Buildings Institute.

See details at <http://www.newbuildings.org/gtf/documents/AboutTheDatabase.pdf>

*continued from page 1*—COMFORT AND SUSTAINABILITY IN SCHOOLS

**MECHANICAL SYSTEMS** The Prairie Crossing Charter School design prioritized space conditioning at the level of students to insure comfort—in this case relatively low in the classroom given the elementary school ages. The school's curriculum made exploring the school landscape an integral part of the teaching process so scrutiny was given to the placement of any exterior equipment. Distribution concerns were addressed by leveraging the natural convection characteristics of radiant heating and ceiling distributed air cooling. A geothermal system provided the driver as it was free of exterior equipment (and its distracting ambient noise to a building's interior connected closely to a site) and was a highly efficient system at its best in a radiant configuration.

These strategies, along with more readily recognizable low VOC finishes and less visible construction dust management were utilized with the intent of making an unsurpassed healthy learning environment. Persisting long after initial occupancy, the faculty recognized a calmer student body, one whose attention was easier to hold, and one noticeably more focused during the inevitable challenge of a long school day. In final analysis, many of these integrated strategies served the dual purpose of advancing a healthy, supportive learning environment while also surpassing initial goals of sustainability. ■

Sustainability is at the core of Serena Sturm Architects approach to design. Bill Sturm is a founding principal of Serena Sturm and a member of the Daylighting Collaborative Advisory Committee. Chris Wollmuth is an architect with the firm.

## TECHNOLOGY AND RESEARCH UPDATE

### DAYLIGHTING REQUIREMENTS IN THE NATIONAL BUILDING ENERGY CODES—THEY'RE HERE!

By Eric Richman, Pacific Northwest National Laboratory

Requirements for the control of electric lighting in daylit areas have historically been avoided in the national building energy codes. This is potentially a rich source of energy savings but as most lighting designers and architects know, daylighting design is not simple! The complications of daylighting design makes crafting daylighting control requirements that could be applied generically in a national energy code a difficult task.

However, that is currently changing. The Department of Energy's (DOE) Building Energy Codes Program (BCEP) managed by Pacific Northwest National Laboratory (PNNL) has been supporting the ANSI/ASHRAE/IESNA 90.1 committee in developing improvements to the 90.1 Standard. With subcontract support, the 90.1 Lighting

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## The Daylighting Collaborative welcomes three new sponsors:

**Leviton** is a North American producer of electrical and electronic products

**Sensor Switch** develops occupancy sensor products and technology for lighting control

**Sunoptics Prismatic Skylights** manufactures skylights for high performance prismatic daylighting

We're grateful to all our sponsors for their generous support and collaboration in developing and delivering the resources the building design community needs to [light every building using the sky](#).

continued from page 2—**TECHNOLOGY AND RESEARCH UPDATE**

Subcommittee has championed the incorporation of daylighting design and control requirements for the upcoming 2010 version of the nationally available ANSI/ASHRAE/IESNA Standard 90.1 for commercial building energy use. California's Title 24 state energy code was first with basic daylighting control requirements specifically designed for the California solar climate. The inclusion of similar expanded requirements in the 90.1-2010 Standard will make daylighting use and control applicable to all states that adopt this national code. The 90.1-2010 Standard will include specific requirements for the control of lighting in skylit and sidelit spaces. The Standard will also require the design and installation of skylights in appropriate larger open spaces.

The requirements have been incorporated in the 90.1-2010 Standard through addenda to the 2007 version that have been publicly reviewed as part of the ANSI consensus process. Specifically the new additions to the 2010 Standard will:

- Require electric lighting controls for daylighting. The requirement will mandate controls for electric lighting in larger spaces where sufficient skylights (including rooftop monitors) and sidelighting (windows) are in place to provide effective daylighting.
- Require the design of skylights in building spaces with daylighting capability. This will require that skylights be designed into the roofs of larger spaces where daylighting capability exists and the use of electric lighting controls would be an effective energy efficiency measure.

The new control requirements are expected to encourage (beyond mandate) the use of additional daylighting controls where it is practical to do so. As more building designs and projects are required to consider daylighting controls, their use will become more commonplace and part of standard design options.

The requirements for designing skylights into appropriate spaces will similarly make the application of skylights in appropriate areas more commonplace. This trend can also be expected to encourage the advancement and refinement of daylighting controls as more applications are designed and product needs increase. ■

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**For more information** about sponsorship opportunities, contact Peggy Heisch at [pheisch@ecw.org](mailto:pheisch@ecw.org) or 608.238.8276 x139.