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Lighting
Practices and Innovations

Child Development Centre
Landmark building scores world high

Brock Plaza 2006
Project sets new course

Water and waste systems
Sustainability performance from building to city

Hamilton Fire Hall
Design merges building and site

CALL FOR ENTRY
SAB Awards 08
see details on page 16

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LIGHTING

Best Practice Embraces Efficiency and Innovation

J. LYNN FRASER

Rising energy prices, legislation, and a deepening awareness of global warming issues are propelling innovation in lighting design and manufacturing. The industry now views lighting and systems design as a collaborative process and the use of lighting by building occupants as being multi-layered. Energy efficiency, environmental responsibility, and innovation are now central to the lighting industry's best practices.

A I B C CONTINUING E EDUCATION S SYSTEM

ENERGY EFFICIENCY

In a recent study, the Intertech-Pira Research Group estimated that "up to 59% of the \$230 billion annual cost of global lighting energy, can be saved through the adoption of energy-efficient lighting technologies."

Energy efficiency and environmental responsibility mean designing for the interaction of the physical components of the building with the occupants while considering carbon emissions and energy consumption. Available daylight, task requirements, and location are all considered when designing for sustainability. This consideration of individual user's needs now extends to commercial buildings, where previously high levels of general lighting were typically the norm.

This reflects a growing "light awareness" according to Mark Lien of Hubbell Lighting's Lighting Solutions Center, Office



spaces, for example, would usually be lit from ceiling to desk with 40 to 50 foot candles [lumens/sf] of light. The trend

now is toward 20 foot candles, and adding task lighting while lowering light levels in areas of infrequent use.

By contrast, retailers have typically used incandescents as they produce high contrast pools of light to focus attention. But, according to Lien, retailers now have the option of using small metal halide lights that, although six to eight times more expensive to purchase, ultimately provide savings because of their long service life.

THE MOST ADVANCED LIGHTING SYSTEMS USE AN OCCUPANCY SENSOR SYSTEM, AND PHOTO SENSOR DAYLIGHT HARVESTING TO SAVE ENERGY. [1] LUMINAIRES, WHETHER A FEW OR MANY, CAN BE CONNECTED TO DIGITAL LIGHTING CONTROL SYSTEMS, SUCH AS IGEN, TO IMPROVE LIGHTING PERFORMANCE. [2] [courtesy Lightolier] SOME COMPANIES CAN FIT THEIR LUMINAIRES WITH INTEGRATED CONTROLS TO HELP REDUCE AND MONITOR ENERGY USE. [COURTESY AXIS LIGHTING] [3] T5/ T5HO FLUORESCENT BULBS AND T8 BULBS, WITH 5/8-IN. AND 1 IN DIAMETERS, RESPECTIVELY, ARE HIGHLY EFFICIENT AND CAN BE PLACED IN SMALLER SPACES. [4]

New lighting technologies, while more efficient, still contain mercury. Metal halides, for example, contain approximately 70 milligrams of mercury whereas T5 and T5HO fluorescent lamps have about 10 milligrams. Mercury-containing lamps should be separately recycled and some retailers now offer this service.

Some manufacturers offer more environmentally friendly alternatives. Steve McGuire, Environmental Marketing Manager for Philips Lighting, notes that Philips has created an integrated, screw-in 25-watt



THIN LEC PANELS USE A LOW AMOUNT OF POWER AND GIVE OFF LITTLE TO NO HEAT. THEY CAN BE USED INDOORS OR OUTDOORS. [courtesy CreeLite]

ceramic metal halide with low toxicity levels that can replace traditional 75 to 90 watt incandescent lights. They do not require special ballast or fixtures and last for 10,500 hours.

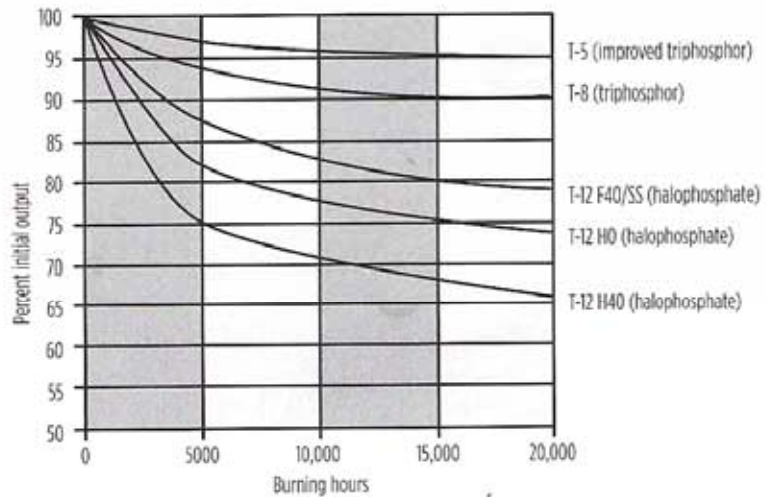
Sustainability for Dan Blitzer of the Philips Application Center, "means meeting the needs of people in a building within a sustainability context." The context will determine best practices for each application.

Energy efficiency requires taking into consideration a building's overall consumption while also calculating factors affecting variations in consumption. Lighting in buildings accounts for 20 to 40% of total power use says Darrin Hoyle of Cooper Lighting. Decreasing power consumption and lighting loads is an important part of lighting design, and can be achieved by following the industry's best practices.

BEST PRACTICES

Design of lighting installations should consider peak consumption periods, length of occupancy in rooms, as well as daylight harvesting. "The best lighting system," he suggests, uses a variety of controls: an occupancy sensor system, dimming ballast, and photo sensor daylight harvesting monitored by a control network. Peter Horton of Watt Stopper Inc. agrees, noting that as "commercial buildings create 33% of carbon emissions any building over 5,000sf needs automatic shut off timers and motion detectors."

Choosing lighting specific to the task, the individual, and the location is of growing importance in the lighting industry. Dan Blitzer stresses the importance of: "task ambient lighting design, a non-uniform approach, and lighting vertical surfaces and work stations as well as local [individual] control." All of these



Lumen depreciation over service life for different fluorescent lamps

approaches mean a focused use of light that reduces overall energy consumption.

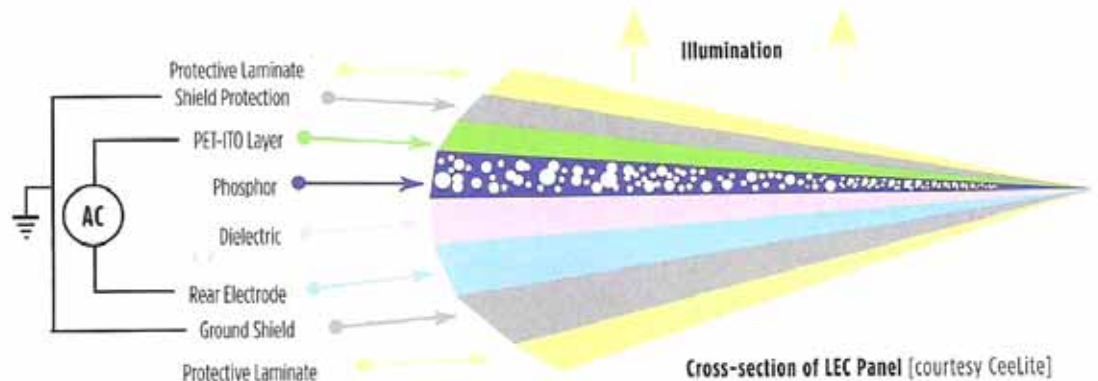
Like many, Michael Bolton of Douglas Lighting Control advocates taking advantage of daylight through perimeter windows and skylights. "Demand-response," another solution Bolton suggests enables utilities "to offer savings to users who allow electrical load to be reduced in peak periods. Both the utilities and the design community would have to work together to build that functionality into systems."

Retrofitting is another important energy saving strategy. Terry Hoffman and Steve Thomas of Johnson Controls note that their company is responsible for more retrofitting than any other manufacturer in North America and recycles more light systems. Mike Bolton also sees the importance of working with a building's energy efficiency and lighting system throughout its lifespan.

He notes that some renovators do not reconnect control and occupancy systems, thus affecting the building's energy efficiency for future tenants.

Best practices must also embrace the industry's manufacturing infrastructure. Hansi Mueller at SELUX notes that in their powder coating paint booth 98% of the paint is used, 80% of their water is recycled, and CFCs have been eliminated. Mark Lien reports that Hubbell's head office is certified LEED silver, and is the only lighting manufacturer with carbon neutral manufacturing.

On this same theme, Morris Feldman of Axis Lighting says their light fixture extrusions can be made of up to 80% recycled aluminium [60% post-industrial, 20% post-consumer], including an electro-static and recyclable powder coat finish. Their fixtures are designed for disassembly, with components having the opportunity of being reintegrated into the production cycle.



Cross-section of LEC Panel [courtesy CreeLite]