lighting controls for gyms.

by Eric Strandberg LC

A gymnasium is a space that may be used infrequently throughout the day. I am frequently disappointed when I see that the electric lights are on at full power and the space is unoccupied. Leaving the lights on unnecessarily wastes energy (and money), and increases the maintenance frequency (also costing money). There are two main types of lighting that are frequently used in gymnasiums; high intensity discharge (metal halide), and fluorescent (both the long tubes and compact fluorescent). Metal halide is difficult and expensive to control easily whereas fluorescent is much easier. The remainder of this article will assume that fluorescent is the system that is being controlled.

• Occupancy Sensors

The first level of automatic control that should be considered is occupancy, and in a large open volume like a gym, occupancy control is fairly straightforward. When the gym is vacant for a pre-determined interval say, half an hour, all or most of the lights turn off. This saves energy and keeps the lamps from burning unnecessarily, thereby reducing maintenance costs. There are two main types of occupancy sensors; infrared or ultrasonic (there are also "dual technology" sensors that combine both). Infrared works by line of sight and is well suited for big open areas like gyms. More than one is usually required for a space the size of a gymnasium. However, if the space will be occupied continuously on a regular basis and there is a trained custodial staff to turn lights off after hours, then an automatic occupancy control system may not save enough power to pay for the installation and set up. This question should be addressed early in the design process.

"...I am frequently disappointed to see the lights in day lighted spaces on at full power and the space unoccupied."

• Daylight Controls

Daylighting controls only make sense in a space that is fairly well daylit, usually with skylights. Controlling the electric lights based on changing daylight contributions in the space can yield considerable energy savings. This is done by using a photocell to monitor light levels either inside the gym or outside the building and then adjust the lights accordingly. If the sensor is looking at light levels inside the space it is called "closed loop". If the sensor is just looking at outside light levels it is called "open loop". Closed loop is best applied when fine adjustment of the light levels is important like in an office or a classroom. Many times fine adjustments of light levels are not as critical, and there is a fairly wide range of acceptable light levels, like in a day lit atrium, mall concourse or a gymnasium. In these cases, an open loop system can be effectively used. Open loop systems tend to be a considerably simpler to set up and commission.

The lamps in the fixtures can be dimmed, switched off completely, or switched off separately. Dimming has the advantage that lighting gradually fades up or down and it is hardly noticeable. This is important in areas like classrooms, meeting rooms or offices, where having the lights abruptly change would be very disruptive. A potential disadvantage of dimming is the increased cost of dimming ballasts (although their cost is coming down every year). Switching can be either all on/ all off, or, stepped. In regions with a majority of clear bright days a very simple system of just turning off all of the lights in the main daylit area should be looked at. A few lights may want to be left on in corners or in the least daylit portion(s) to avoid the perception of too little light.

"Stepped switching" can be a cost-effective choice for gyms. The advantage of stepped switching is that one does not have the expense of dimming ballasts, but there is frequently the added cost of more complex wiring to allow for varying light levels. Careful planning and communication with the supplier should minimize any rewiring in the field. Another advantage of switching is that when a light is switched off its power consumption is zero, whereas most dimming ballasts still consume a few watts even when dimmed down as far as they will go. There are methods to switch off the dimming ballasts when they are dimmed down, but this adds to the cost & complexity of the system.

If the Gym is a multi-purpose room as found in, say, a grade school, one may also want to adjust the lighting based on varying activities like sports, assemblies, or performances. This would be an added benefit of a multi-level control system, but is not the focus of this article.

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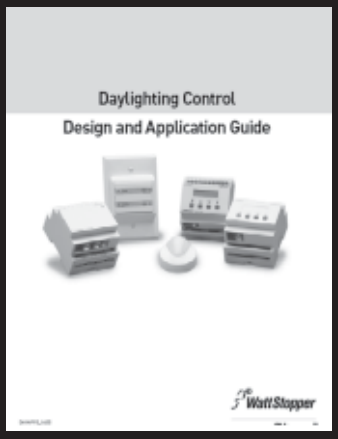

New Daylighting Controls Design and Application Guide Available

Daylighting controls transform a day lit area into an energy-saving opportunity. The U.S. Environmental Protection Agency estimates that potential energy savings can exceed 40%. Furthermore, since peak electrical load patterns tend to parallel periods of the most plentiful daylight, daylighting control is a natural choice for load reduction. An optimal daylighting control system saves energy while being virtually unnoticeable to the building occupants. Lights dim without distracting occupants, or switch off when daylight levels increase so that the light level change is not noticeable.

In this guide you'll find:

- A decision matrix that helps identify the best daylighting controls for a specific project
- Detailed steps for designing and implementing a daylighting control project:
- Control system vs. stand-alone controller
- Creating control zones
- Selecting a photocell location and controller location
- Establishing target setpoints
- Startup, calibration and testing
- Application examples for specific building spaces

This guide is a free download from www.wattstopper.com