



Multifamily Facility Management Services

IMPROVE EFFICIENCY OF INTERIOR LIGHTING

Description:

A number of new technologies can make interior lighting significantly more efficient. The impact that any particular lighting improvement has on operating costs depends heavily on the hours of operation. Obviously, fixtures which are operated 24 hours a day will benefit more from high efficiency improvements than similar fixtures that only operate 8 hours a day. As a result, it is important to select lighting retrofits wisely to gain the most benefit. Below, are some possible lighting improvements that can make interior lighting more efficient:

Delamping and Downwatting

Some areas in multifamily or small commercial buildings may have more fixtures than needed. For example, halls, corridors, lobbies and waiting rooms are often over-lit. A simple solution is to remove some bulbs from each fixture or to disconnect entire fixtures. Since fluorescent bulbs are wired in pairs to one ballast, if only one bulb is disconnected, a “phantom tube” will need to be installed to keep the fixture working. Also, when disconnecting pairs of fluorescent bulbs, the ballast should also be disconnected. Instead of removing lamps, it may be feasible to reduce lighting levels by using lower wattage lamps in place of higher wattage ones, or by using lower wattage ballasts (called low power output or LPO ballasts). Painting walls and ceilings a white color can increase light levels and allow further reductions. It is also possible to delamp or downwatt in a way that reduces overall lighting while providing higher levels of illumination at specific places, such as work stations or display areas.

A light meter should be used to determine where to reduce lighting levels in the building and to make sure minimum lighting levels are maintained. Light meters can be purchased for about \$50 or possibly rented or borrowed from a local lighting contractor or utility company. Detailed information on minimum lighting levels for various situations can be found in the Illuminating Engineers Society Lighting Handbook (available from IES, 345 E. 476th Street, New York, NY 10017). General guidelines are summarized on the following page:

<u>Foot-candles</u>	<u>Type of Activity</u>	<u>Examples</u>
5 - 10	simple tasks	storage room
10 - 20	occasional visual tasks	lobby, reception, stairway, corridor
20 - 50	high contrast tasks	conference room, laundry room, warehouse
50 - 100	medium contrast tasks	office area, kitchen
100 - 200	low contrast tasks	office area, display area

Replace Incandescent Lamps

Generally, standard incandescent lamps are not a good business investment. In spite of their low purchase price, they are the most expensive to operate because of their short lamp life and high energy consumption. In indoor applications, incandescents can easily be replaced with more efficient fluorescent lamps or fixtures. Fluorescent replacements use less electricity to produce the same level of lighting (typically 9 watts versus 40 watts). In addition, fluorescent tubes last 5 to 12 times as long as incandescent lamps, reducing operation and maintenance costs.

In multifamily and small commercial buildings, incandescent fixtures are typically found in hallways, lobbies, entryways and in common areas (such as laundry rooms, lounges or public bathrooms). Some of these areas (like hallways) are especially important since they are often lit 24 hours a day. Frequently, replacement fluorescent lamps engineered with self-contained ballasts and standard incandescent bases can simply be screwed into the sockets of existing incandescent fixtures in these locations. This is the least expensive option, but may not be practical in all cases. For instance, if theft or vandalism is a factor in the building, these screw-in replacements are probably not the best choice. In addition, since the screw-in fluorescent lamps are often larger than conventional incandescent bulbs, they may not fit all existing fixtures. As a result, another option is to hard wire new fluorescent fixtures in place of the existing incandescent fixtures. A variety of new and inexpensive fluorescent fixtures are available in either ceiling mounted or wall mounted styles, and many retain the same look as existing fixtures. Some of these styles are vandal-proof as well.

Another option for specific types of indoor applications is metal halide lamps, which are becoming available in new small fixtures and low wattage lamps. Metal halide may work better than fluorescent lamps in certain areas because it provides a nice bright white light and has excellent color rendition. Metal halide lamps are about six times more efficient than incandescent lamps and about twice as efficient as fluorescent. However, they cost considerably more than either incandescent or fluorescent lamps. Their expected life is about the same as fluorescents. Possible applications are for areas with high ceilings, in retail areas for spot or track lighting, in entrances, stairwells or for security lighting. Since restart time is longer on metal halide lamps, applications which do not require frequent switching are usually best. However, if faster restart is essential, metal halide fixtures are available with this feature at additional expense.

Upgrade Existing Fluorescent Lamps and Ballasts

Many small commercial and some multifamily buildings have four or eight foot fluorescent fixtures that should be retrofitted with new high efficiency fluorescent “T-8” lamps, and improved electronic ballasts. These new fluorescent lamps use only 32 watts each, compared with 40 watts each for the older fluorescent technology. In addition, there is a slight increase in life with the T-8 lamps. The energy efficient ballasts consume less power, run cooler and last up to twice as long as standard ballasts. The electronic ballasts also create less “flicker.”

While upgrading existing fluorescent lamps can be done as old lamps fail, it is most cost effective to complete the retrofit on all fixtures in the building at one time. This not only minimizes labor costs, but also allows beneficial system design changes to be completed at the same time. For example, fixtures can be re-wired to maximize the number of lamps using each ballast, providing additional energy and cost savings. Other system changes that can be done at the same time include delamping or eliminating certain fixtures in areas that are over-lit, and changing the location of specific fixtures to provide better lighting for occupants or for specific tasks.

Relamp Exit Signs With LED Lamps

Older lighted exit signs usually use incandescent lamps which are the most expensive to operate because of their short life and high energy use. One option is to retrofit these signs with compact fluorescent lamps. However, an even better option is to use new low power LED lamps since they have several distinct advantages. First, the LED lamps cost the least to operate, using only 1 to 2 watts per fixture compared to about 15 to 20 watts for a fluorescent exit light and 40 watts for an incandescent exit. Second, LED lamps have a life expectancy of 20 years, greatly reducing maintenance costs. In the same application, a fluorescent lamp would be expected to last about 2 years and an incandescent about one. Finally, LED lamps do a better job of spreading light throughout the fixture. Existing incandescent exit signs can either be upgraded with an LED retrofit kit, or replaced with a new LED exit fixture. A qualified contractor can determine which option is the least expensive in a particular application.

How to Implement:

Trained maintenance staff can replace bulbs, but replacement of fixtures, upgrades to electronic ballasts and any re-wiring of existing fixtures can only be done by qualified and licensed electrical contractors. Any alterations to the lighting should maintain the minimum code-required lighting levels. In addition, contractors should follow recommended procedures for the disposal of any lamps or ballasts removed from the building.

Lighting ideas are changing rapidly, with new products being introduced all the time. In addition, lighting applications considered impossible a couple of years ago are now being used effectively. As a result, it is useful to be alert to changes in lighting design and to the availability of new products.