

TAKING CONTROL OF LIGHTING

By Denise Fong | July 2010 | Maintenance Solutions

PART 1:

Lighting Controls: Punch Lists, Commissioning, Recommissioning

Comprehensive maintenance of lighting systems can provide hidden treasures for institutional and commercial facilities. Depending on the statistics cited, the type of building, and the climate, lighting systems can account for 15-40 percent of a building's total energy use.

Given those statistics, many jurisdictions have added lighting-control requirements to energy codes to shave off waste associated with lights being on unnecessarily. But the savings can only occur if maintenance and engineering managers ensure technicians maintain the systems properly.

Commissioning is one tool managers can use to make sure the savings occur, but what does commissioning entail, and when should it occur? Managers can choose from several different degrees of commissioning. The most appropriate approach can vary, depending on the complexity of the systems. What surprises some people is, annual recommissioning is necessary to keep many systems operating optimally.

Punch Lists & Commissioning

What is the difference between using a punch list and commissioning a lighting system, and who should perform the commissioning?

The purpose of a punch list is to verify: the contractor installed the right fixtures, lamps, ballasts, and control devices or systems; they are in the right location; and they work. Punch lists typically are the responsibility of the system designer.

Commissioning a system involves checking photocells, occupancy sensors, programmable ballasts and control systems. The commissioning agent should be someone other than the system designer, which ensures the agent's objectivity.

If the project is small and the systems are simple, such as photocells or motion sensors talking directly to a ballast, the commissioning should take place near the end of construction, around the same time as the punch list. For more complex systems with multiple devices, multiple control points, and a control system, commissioning starts in the design phase.

The agent is responsible for writing the sequence-of-operations document describing in narrative form the way the system will function. The agent develops this document with the owner and manager to ensure it has the required functionality.

Commissioning documents supplement the construction documents and provide instructions for the contractor on the initial settings the manager expects. Near the end of construction, the agent uses the documents to verify everything is working as designed. This series of events ensures the project achieves the expected energy savings.

PART 2:

Lighting Controls: How to Optimize Performance

Depending on the control devices, it often is necessary to recalibrate them annually. Because devices such as photocells and occupancy sensors do not have parts that fail and that technicians must replace regularly, managers often assume once contractors install the devices, technicians never need to touch them again. But that belief is not true.

Lenses accumulate dust, and occupants can knock some adjustable devices out of alignment. Also, departments often reconfigure the physical space, prompting technicians to reposition or relocate devices. Checking these devices annually assures the system continues to perform as designed and saves energy.

For more complex lighting systems, the control system can provide ongoing monitoring. It tracks whether lamps and ballasts work, as well as the amount of energy they use. Technicians can pull reports detailing performance deficiencies, and they can make changes efficiently without the need for troubleshooting. This benefit saves labor costs and reduces occupant frustration over slow response times.

Energy reporting can track periods in which lights are dimmed or off, and patterns often emerge. When a report does not fit an established pattern, the incident indicates something in the system is failing.

Sometimes, problems identified in commissioning are simple fixes technicians can perform. For instance, a photocell could be facing the wrong direction and, as a result, never detect the changing light conditions nor trigger lights to dim.

This scenario might seem obvious, but it is surprising the frequency with which this happens, with neither the contractor nor the person doing the punch list noticing it.

PART 3:

Lighting Controls: Five Key Maintenance Practices

Managers can schedule technicians—not the commissioning agent—to perform several key procedures to ensure the optimum performance of the lighting system:

Use correct replacement lamps. While all four-foot fluorescent tubes might look alike, they can have different performance characteristics. Most manufacturers offer several versions of their T8 lamps that vary by output, life and energy use. If the system is designed to use a particular lamp, keep using that lamp. Some lamps that use the lowest amounts of energy are not dimmable, so managers should not specify them for use with photocells. When changing lamps, they should review lamp specifications first.

Clean fixtures annually. A fixture's output can diminish by 10 percent a year just from dust accumulation, even in a relatively clean environment. If technicians clean only when they relamp, the system can lose as much as 40 percent of its output.

Verify other replacement components match the original. New ballasts, transformers and drivers at least should have the same performance characteristics. Instant-start ballasts typically use fewer watts than rapid-start ballasts, but they drive the lamp harder on start-up. In situations where lamps go on and off frequently, they are not a good choice, as they might result in more frequent lamp burnout, and the need for more frequent lamp replacement could torpedo the opportunity to save a few watts.

All ballasts have a published ballast factor. Maintenance and engineering managers can use it as a multiplier to determine whether a lamp actually will produce the predicted amount of light. It is tempting to specify a ballast with a lower ballast factor to save energy, but if the system produces only marginally acceptable light levels, the few extra watts of energy saved might result in complaints from occupants about low light levels.

Check dimming pre-sets periodically. This step can help verify they meet original performance requirements. Wall-box dimmers can have a high-end trim hidden behind the face plate that can extend the lives of incandescent lamps and save energy. Setting the pre-sets 10 percent below full output can double lamp life. For other light sources, they simply save energy because when the dimmer is set to full, the output actually is less, allowing for associated energy savings.

Check scene pre-sets to assure they meet original requirements. Dimming systems have pre-sets that, once set, rarely need changing. If that is the case, locking them either

mechanically or electronically will prevent system problems. If technicians can change the pre-sets, they should check them periodically to see if they still comply with the sequence of operations. If changes in room activities force a change in the settings, technicians also should update the sequence of operations.



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