lighting commissioning.

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Among the most frequently over looked elements of any lighting design project is how the lighting system will be controlled. This has been true for many reasons; cost, requisite design time, confusion over contract scope, aversion to the perceived risk of implementing new technologies. As we move forward with the practice of lighting design, these issues will need to be overcome if we are to best serve our clients needs and meet existing and emerging energy code requirements.

The two principal reasons to use advanced lighting controls in our projects are energy savings and user satisfaction. Devices like occupancy sensors and daylight harvesting systems have been shown to be capable of providing energy savings of 25%-50% or more.

Providing manual dimming controls increases user satisfaction, and hence productivity, by allowing each user to modulate the lighting according to their individual needs and preferences. Whatever lighting control solution is ultimately chosen for each project we design, our task as designers does not end with the specification, or even installation, of the lighting controls hardware. As designers, we must ensure that our systems are properly commissioned and operational before occupancy.

Commissioning has been well defined by Florida Power and Light as "a systematic process of ensuring that all building systems perform interactively according to documented design intent and the owner's operational needs."

Outside agent commissioning has been done for years on other building components such as HVAC systems. When lighting control meant switches and contractors, commissioning lighting control systems was simply not an issue. Considering today's ever more complex lighting control systems, we must ensure that the controls we have specified function optimally in order to provide our clients with the best possible value.

The actual steps required for proper commissioning will be somewhat different for each type of system, building, and end user type. That said, there are some steps that we can all take that will be help the process.

• System design:
During the design process, be very clear about system performance expectations. This information may include items such as time out settings for occupancy sensors, control group schedules, and threshold light levels for daylight harvesting systems. Include this information in conspicuous locations within the contract documents.

• System Programming:
As part of the finish out process on each project, any microprocessor based controls, such as dimming or relay systems, must be programmed and tested. Time of day, override, and event scheduling must be programmed and tested as well.

• Calibration:
Any sensors used on the project must be properly calibrated for optimal performance. This may include sensitivity on all occupancy sensors or setting light level thresholds for photo sensors.

• Maintenance Staff Training:
The staff that will maintain the lighting system should be provided with complete training on all elements of that system. In particular, device calibration and system programming should be stressed. Maintenance staff should also be provided with a complete Operations and Maintenance manual documenting all major system elements.

• End User Training:
End users should be acquainted with the functioning of major system elements and why they are installed. This is particularly true of occupancy sensors and daylight harvesting controls. This type of training can do away with the dixie cup over the photosensor phenomenon and may eliminate costly service calls for occupancy sensor that are functioning properly.

Check list of items to consider:

- Calibrate Occupancy / Daylight Sensors
- Calibrate Lumen Maintenance Levels
- Program Time of Day Scheduling
- Program Preset Dimming Scenes
- Interface with BMS / Fire / Security
- Interface with AV systems
- Program User PC Controls
- Explain and Demonstrate System Functions and Programming to Owner

A final word, in case I wasn't clear, a lighting control system that isn't properly commissioned is generally a waste of your design time and your client's money.

An expanded, downloadable PDF of this article is available at *www.lightingdesignlab.com/articles/*

Commissioning Resources

National Conference on Building Commissioning
www.peci.org/ncbc/index.html

Commissioning and O&M Resources
http://www.peci.org/cx/index.html

Minnesota Sustainable Design Guide Commissioning Checklist (PDF)
www.msdg.umn.edu:16080/MSDG/text/commissioning.pdf

LBL Daylighting Commissioning Tips (PDF)
windows.lbl.gov/pub/designguide/section9.pdf

Seattle City Light Building Commissioning Assistance and Handbook
www.cityofseattle.net/light/conserve/business/bdgcoma/cv6_bcam.htm