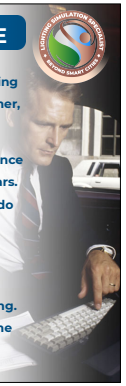
BEYOND
SMART CITIES
LIGHTING SYSTEMS - CEM
REFRESHER ONLINE TRAINING COURSE
KRISHNAJI PAWAR, LEED AP BD+C,GSAS CGP,ISO 14001:2015,GCP
ENERGY SPECIALIST CURRICULUM

BEYOND
SMART CITIES
EFFECTIVE LIGHTING MAINTENANCE
FOR ENERGY PROFESSIONALS
KRISHNAJI PAWAR, LEED AP BD+C,GSAS CGP,ISO 14001:2015,GCP
ENERGY SPECIALIST CURRICULUM

WHAT SHOULD YOU LEARN
Lighting Operations &
Maintenance

LIGHTING OPERATIONS & MAINTENANCE

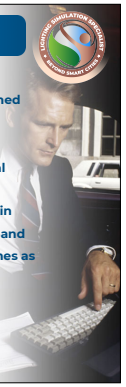


- Lighting operations and maintenance ("O&M") are the practices that keep lighting systems working at peak performance during the life of the building. As a designer, your choices can make it easy or hard to maintain your lighting system.
- Lighting design is only as good as its execution. Good operations and maintenance are necessary to keep the lighting systems working as designed through the years. Neglect, poorly-chosen replacements, and misunderstanding of systems can undo all the improvements of good lighting design.
- Good lighting O&M is measured by system performance. The system should continue putting out the lux or foot-candles of illumination in the proper places while using the watts of electricity specified in the lighting design for the building. Commissioning agents usually perform these audits. As technology improves, the performance may even be improved to exceed design specs.

OPERATIONS MANUALS

- Good design process can help ensure good operations and maintenance routines. The lighting designer should create a manual for operations staff that makes the lighting design intent clear, lists maintenance and replacement schedules, and makes it clear what parameters should be measured during commissioning, as well as how often such measurements should be done.
- Green buildings often do not perform as well as predicted during the design. Without a manual, operations personnel are left to troubleshoot systems through piecemeal guesswork. This is never as effective as the whole-systems approach that can be laid out by an operations manual.
- Schedules : An important part of the O&M manual is schedules for cleaning fixtures, replacing bulbs, and measuring energy use and lighting levels. Performance measurements should be done monthly or at least quarterly, to provide operators with enough data to tell when systems are beginning to perform poorly.

OPERATIONS MANUALS +



- Flexibility : When building occupants bring in their own lights, it may be an indication that the lighting system is not working as designed, or was not designed to meet the current users' needs. Have the flexibility to work with users to meet their needs while ensuring energy efficiency. This may mean changes to the original design, or helping occupants choose efficient products for their personal use.
- Cleaning : Keeping lamps and fixtures clean may be the most important factor in keeping their performance high. However, it is often neglected. Walls, ceilings, and other lit surfaces should also be kept clean, as their reflection of light is sometimes as important as the fixtures themselves.

OPERATIONS MANUALS +

- Replacement : Bulbs should be replaced not only when they break, but on a schedule according to how the brightness of the lamp decays over time. Some bulbs lose over a third of their initial brightness over a few years. When replacing bulbs, bulk purchases can significantly reduce costs for the same quality products. Scheduled replacement also facilitates this.
- Operation of Control Systems : Lighting control systems are often run by timers. Such timers should be set to match the activity schedules of different spaces. These schedules change over the years as building use changes, and controls schedules should change to match. Sensors for daylighting controls, such as occupancy or brightness sensors, should be regularly checked for proper operation. Sensors that start shutting off or turning on lights at the wrong times get manually disabled by occupants, and are no longer able to do their jobs.

LIGHTING MAINTENANCE ACTION CHECKLIST

- Group relamp to reduce lumen depreciation and maintenance costs
- Clean fixtures at the time of relamping, more often in dirty locations
- Write a lighting maintenance policy Design your lighting projects to incorporate effective maintenance
- Get help when needed from lighting management companies, consultants, distributors, manufacturers, etc.