LIGHTING AND CONTROLS

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Healthcare facility lobbies are often large day-lit spaces where control of electric lighting becomes essential.

TRENDS FOR HEALTH AND HEALING

BY LAUREN MACLEOD & TOD MOORE

Healthcare facilities such as hospitals and long-term care facilities are increasingly leaning toward providing greater controllability of the patient and caregiver environment. Integrated control systems provide flexibility as well as user friendly devices that help to reinforce personal comfort and well-being. Nationwide energy codes are dictating mandatory controls to reduce electrical and mechanical loads in some space types.

Additionally healthcare institutions are interested in implementing controls to reduce their energy use and related operational costs. Energy rebate incentive programs are widely available on state and federal levels that will contribute to reducing the initial installation cost whether for new construction or for existing facilities. Controllability has become a key element in today's design arsenal in order to to maximize energy saving strategies.

One way controllability in lighting has been addressed is by manufacturers designing lighting control systems to utilize the facility's converged network technology infrastructures, including structured cable systems and IP networks for communication protocols. This method using the building's technology as a means to achieve efficient lighting control scenarios further lowers the installation and operational cost of systems.

More often than not, we're seeing daylight integrated into the design of the public spaces. There have been many studies that confirm that people respond positively to views of nature and daylight, and that they actually heal faster with exposure to both. Architects are working in unison with their design teams to fill spaces with natural light and lessen the need for electric lighting. Lighting requirements — and related heat loads — can be reduced significantly through a daylight-harvesting system that dims electric lights when daylight is available. Fluorescent dimming has become both more

dependable and affordable and thus, more common. Many manufacturers are offering integrated systems of lighting and controls simplifying commissioning and making it inclusive to the lighting package.

Patient rooms and corridors

Patient corridor lighting has evolved from an old-fashioned notion of always having all the light 'on' to an engineered solution of switching every fourth fixture 'off' to a hospitality concept of controlling each group of lights separately according to the time of day and level of activity. In this scenario, we not only achieve maximum energy savings, but also the best quality of light for patient and staff comfort. Using a hospitality concept, we layer the light with general illumination, task lighting and accent or special feature lighting, each controlled separately. Using these elements in different combinations allows us to create the different scenes according to the time of day.

General lighting for corridors may be defined for daytime/active use and nighttime/quiet time and even late night. Light levels may be reduced by more than 50 percent at night and as much as 80 percent during late periods according to current methodology. This is most effective with a combination of dimming and switching and automatic time clock control. It is also achieved through the use of the indoor photocells, allowing relays to be programmed to switch on and off at exact trip points. Dimmed outputs can be programmed to maintain a specific light level with override controls provided at nurse stations.

Research indicates that patients are able to reduce stress and heal more quickly when they have control over their environment. Personal control options, integral to the nurse call system have expanded to allow the patient to control TV, lighting and shade preferences all in one hand-held device. The patient is able to turn on the TV, raise/lower or mute volume, and adjust up to two groups of lights in the room including dimming for reading lights. From the same device patients can raise and lower window shades, so they control when or how much daylight enters the room. Providing the patient with this independence to control their environment reduces their stress, increases their comfort and reduces the need for nurse assistance for these small but important daily tasks.

With the increasing demands on the bedside controls and the advances in nurse call systems providing an all inclusive patient interface or portal, the integration of all these applications is critical to the successful design of the patient space. By combining all of these controls, including patient entertainment/education, meal service and lighting controls into one interface, the challenges of systems integration become greater and require detailed planning and coordination. A detailed understanding of the different manufacturers and their various levels of communication among different systems is key. This is critical to avoiding the problems found in commissioning for the building when it could be discovered that 'system A' does not provide all the required data to 'system B' and the intended outcome cannot be met.

Patients gain independence with the option to control room functions such as window coverings from a handheld control device.

Nurseries and treatment rooms

It's now becoming standard practice to include programmed lighting systems in nurseries to assist newborns in aligning their circadian rhythm with the natural day/night cycle. Lighting and controls are designed to emulate the 24-hour cycle through both color temperature and time of day. Cooler color temperatures and low

light levels of morning light cycle into the warmer color temperatures and higher light levels of afternoon light. Evening lighting stays in the warmer ranges and gradually dims to allow for an uninterrupted sleep cycle. Low light levels and amber colors at night allow the caregiver to check on newborns without turning on overhead lighting. Exam lights above infant beds also are circuited separately so as not to disturb babies in adjacent cribs.

As this is a 24/7 ongoing event, we often work with manufacturers that provide an integrated lighting and control system that is factory programmed to create the automatic changing of color and intensity. Manual override switches are provided at owner-preferred locations in the event the room is not occupied.

Special considerations are taken when patients need to undergo repetitive treatments over a period of time. As part of the design team, we discuss how best to create an environment to promote calmness and a relaxed state of being. Lighting systems may be integrated with elements of sound, color and movement. Color-changing RGB LEDs and fiber optics are commonly implemented in the design to create patterns of light that change over time. Palm-size hand-held DMX controls allow the patient to select from a series of preprogrammed scenes or create their own scenarios, color or brightness levels.

Comfort through lighting means better healing

When a patient is undergoing treatment — especially over a period of time — we want to ensure that they are as comfortable as possible to create the best healing place possible. We want the patient to be at their best place for healing by allowing them to select their own environmental preferences; whether the shades are up or down, the light levels bright or dim, the colors warm or cool.

Solutions don't need to be complex or expensive, just offered. It could be something as simple as dimming room lights or turning on table lamps in place of overhead fluorescent troffers. Something as simple as a glowing table lamp has a warming, soothing effect on us all, even when we're healthy.

Getting treatment for an illness is certainly nothing like going to a spa. As designers and caregivers, we can make it feel and look like one. The intent is not to make treatment rooms into spas, but to take the same basic concepts of design — those same lighting principles that we apply for all places to promote comfort and relaxation.

Conference facilities and learning centers

Videoconferencing whether for simple meetings or for viewing of medical procedures is now commonplace in healthcare facilities. Particularly with the advent of high-definition 'telepresence' systems providing levels of clarity and definition not available in the past, the lighting systems need to take into consideration these new technologies and be designed to accommodate them. Desktop or handheld touch screen controls are designed to be user-friendly with graphically illustrated interfaces of the system. A touch of a symbol allows for changes between events such as in-room meetings, videoconferencing, video presentations or speaker presentations. Light levels automatically change to a preset scene while presentation screens and window coverings lower. At the touch of another symbol everything returns to the original preset scenario.

Often these same rooms are used for board meetings or fundraising events where we may also want to create festive or event-appropriate lighting. The layering of lighting effects and controls is all important in creating the 'scenes' that allow us to design to the many different functions within the space.

Lighting designers work with the owner to set the different scenes which are then stored in the system memory. The only thing the end-user needs to do is touch the appropriate symbol for the event.

The key to designing conference room controls is to design for flexibility. Technology is moving so quickly that if you design specifically for one event such as video conferencing, you're limiting the uses for that space. If the room is designed to allow for flexibility in not just lighting levels, but in lighting effects, chances are that when the next method of communication comes along, you'll only need to modify a 'scene' on a control system. Lighting requirements for telepresence uses are different than they are for videoconferencing, but the overall concepts remain the same: Layers of lights or lighting systems allow you to program to whatever the room needs are. ■

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