The Evolving Workspace: Putting Light to Work in Office Design

Once upon a time, office space was a combination of cubicles and file cabinets, computer terminals and conference areas.

Yet changes in technology over the last decade are transforming the workplace. Flexible arrangements, evermore powerful mobile devices and myriad telecommuting tools have freed corporate professionals from unwieldy desktop machines and the too-familiar meeting room. The office as an everyday destination is rapidly becoming an outmoded concept.

However, in an effort to continue to reap the benefits of real-time, face-to-face collaboration, many organizations are bringing employees back to the office to make the best use of the time everyone is together. This trend toward team building, as well as efforts to enhance internal brand visibility and accommodate a growing workforce demographic (namely, Generation Y or Millennials), is driving managers and designers to rethink how workplaces are—or are not—working.

Without a doubt, workplace design is anything but one-solution-fits-all. Every organization has a unique set of goals and challenges to address, but current research and emerging practices suggest that a little attention to office lighting design can go a long way in making your workspaces work better, feel comfortable and invite collaboration.
Rethinking Office Lighting Design

First, we should confront a harsh reality: Most workplaces are over-lit. The intensity of light cast on a surface (the “illuminance” of light) is measured in foot-candles (fc). The Illumination Engineering Society of North America (IES) recommends a 30-50 fc range for ambient office lighting, but most workspaces are lit to an average of 60 fc.

According to Jason Brown, PE, CEM, LC, Application Solutions Manager for GE Lighting, workspaces that are too bright may affect both employees’ productivity and a building’s bottom-line energy costs. Working closely with the IES and generally focused on more efficient design, Brown has found that a “layered” design is often a good solution to over-lit offices.

“Pairing lower levels of ambient light with task lighting provides optimal visual conditions,” Brown explained. “When ambient and task lighting are layered in this way, direct lighting is brought closer to the work surface, thus reducing the lumens [light output] needed to adequately light the space. High-level illumination is used only where it is needed, at the task, not across the entire space.”

Studies have shown that reducing ambient lighting and using localized lighting for specific visual tasks creates a more comfortable experience for workers and can significantly reduce energy consumption. Starting in 2006, the California Lighting Technology Center (CLTC) and the California Energy Commission PIER Program combined to study office lighting and developed a layered lighting design based on the task/ambient concept*. The studies showed that making LED-based localized task lighting the primary layer of light in offices resulted in a 50 percent savings in lighting energy and overwhelming user satisfaction.

The New York Times Building in midtown Manhattan is a case study in the benefits of task lighting and its potential influence on worker productivity in a cutting-edge work environment. The lighting scheme of every floor of The Times Building is divided into zones, each with its own lighting levels that fit the needs of the workers, depending on what type of tasks they perform and also based on the amount of ambient daylight. Designers implemented digitally controlled task lighting to achieve the lighting scheme, and as a result of these changes, Times Company executives have reported increased satisfaction from their employees.

* California Energy Commission; Task/Ambient Lighting: Efficient, Stylish, and Portable - PIER TECHNICAL BRIEF; CEC-500-2008-051-FS October 2008

Most workspaces today are over-lit. To avoid this, it is best to layer different types of lighting in a workspace, such as ambient and task lighting.
A Layered LED Look

LED lighting is an increasingly attractive option for achieving a layered design. There are many available lighting solutions that address needs particular to office settings, including technology to help minimize screen glare and ensure low luminance contrasts around workstations.

**Ambient Office Lighting**

For general lighting, new LED options offer dual benefits of aesthetics and efficiency. Recessed ceiling troffers like GE’s Lumination™ ET and BT Series LED Lighting Fixtures can improve the quality of the lit space when “on,” yet appear completely free of a visible light source while switched “off.” The ability to direct light where it’s needed is a key advantage of today’s advanced LED optical designs. At Nela Park headquarters in Cleveland, GE lighting designers retrofit 5,000 square feet of office space with 51 Lumination ET Series LED lighting fixtures that now do the work of 96 fluorescent fixtures. Eliminating 45 fixtures was possible due to significantly improved light distribution—staff even noted the area felt “more spacious” following the switch due to the product’s inherent wall-washing ability.

Adopting an LED solution for the office area also resulted in an approximate 78 percent reduction in lighting energy use, saving about $2,600 a year. Further, the maintenance burden of replacement fluorescent lamps and ballasts was eliminated.

**Office Task Lighting**

Compact LED Lighting systems can add dramatic accents to office walls, workstations, lobbies, conference rooms or alcoves, suiting a wide range of task lighting needs. Typically mounted underneath desks and cabinets, within toe kicks and in other tight spaces where other technologies simply won’t fit, these ultra-thin LED solutions make it easier to achieve a layered lighting look in most areas. Strips of LED modules less than half an inch thick can even be cut to fit virtually anywhere, even around corners.

**Designer Office LED Fixtures**

Still another category of fashion-forward LED fixtures offers both ambient and localized illumination. Thin and uniformly illuminated, GE’s suspended Lumination EP Series LED Lighting Fixture is one such office lighting solution that delivers versatile light distribution patterns—both diffused ambient uplighting and effective task downlighting. This is attributable to GE’s Intrinsx™ technology that couples the LED light engine into the light guide and maximizes the performance and application efficiency of every LED in the luminaire.
In Control

Advances in lighting controls are likewise leading today’s workspace evolution. Occupant responsive technology offers both energy savings potential and the opportunity to enhance employee satisfaction.

The U.S. General Services Administration (GSA), as part of its Green Proving Ground (GPG) program, recently evaluated the performance of occupant responsive lighting technology in five federal buildings**. The technology consisted of a workstation-specific (WS) lighting system, dimmable ballasts, occupancy sensors at each WS luminaire and a Lighting Management Control System (LMCS) that coordinated these components. Seven sites were selected within the five buildings to capture a diverse group of occupancy patterns, work styles and baseline conditions. The evaluation specifically focused on: light level scheduling as determined by building managers; occupancy sensing and light level adjustments in response; and individual control where occupants adjusted light levels to suit their personal preferences.

Through the use of advanced lighting controls, calculated annual energy savings by site ranged from 27 to 63 percent with the variations being attributable mostly to the way space was used. Spaces where the tenant required illumination for variable levels of workstation occupancy showed the greatest savings while spaces where the tenants’ employees were at their desks most of the day showed the least. Surveys further demonstrated that occupants were generally more satisfied with the retrofitted lighting systems, noting they provided less glare and better quality light.

Moving Forward

As your organization attempts to keep up with ever-changing technologies and evolving trends in workspace and lighting design, it is sometimes difficult to know where to begin. A professional lighting analysis is a sure first step for learning more about existing systems and options. GE Lighting, including many electrical products distributors, utility companies and independent energy experts offer such services and may even travel to the property to perform an on-site audit, typically at little or no cost.

The decision to “change one lamp or fixture with another” is never so simple, but a lighting analysis can offer both reassurances about what design changes might look like and present a clear picture of immediate and eventual energy and maintenance savings. This can also spur a reimagined lighting system that rearranges existing fixtures, incorporates new installations or creates additional energy savings through the use of advanced lighting controls. Your trusted partner can also help guide you to lighting efficiency rebates that can accelerate your project payback period.

Although the landscape of the contemporary workplace is guaranteed to change over time, the need for maximizing employee productivity and operational efficiencies are true constants—no matter the prevailing trend.

** GSA Public Building Service; FINDINGS, SEPTEMBER 2012 OCCUPANT RESPONSIVE LIGHTING Educational Add-Ons • Learn more about office lighting best practices from The Illumination Engineering Society of North America (IES). • Working out of house? Discover 5 tips for better home office lighting from About.com.