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SPLENDID VS. SPARTAN

DESIGNING FOR QUALITY IN A CODE-DRIVEN WORLD



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Cutting-edge controls and task and ambient luminaires help Glumac's new 'Office of the Future' beat Title 24 lighting allowances by 75 percent

BY ELIZABETH HALL



Forward-thinking 20th-century employers imagined the workplace of the future as a paperless paradise where computers replaced typewriters and work was streamlined. Today, typewriters have gone the way of the dodo, but not everything in the modern office has been updated.

According to the National Lighting Bureau, 2.2 million U.S. commercial spaces have lighting that is more than 30 years old. Since lighting accounts for 18 percent of energy use in office buildings, these buildings waste energy by using outdated systems (*Building Energy Data Book*). For visionary employers of the 21st century, lighting may be the next office-space frontier.

One such innovator is Glumac, an engineering firm that specializes in sustainable design. Glumac not only encourages clients to think outside the box for lighting and building systems upgrades, it recently took the same approach itself when transforming a 8,672-sq ft gutted space on the first floor of an 11-story office building in Irvine, CA, into its new office. The project was recognized as the first “Office of the Future” by the North American Office of the Future Consortium, a group of eight leading utilities and non-profit, The New Building Institute.

Glumac had one goal for the new office lighting: beat California’s Title 24 by up to 40 percent. Glumac lighting designer Carlos Inclán and electrical engineer Jennifer Berg realized, however, that energy-efficient illumination is only as good as the environment it creates. “You must be splendid before you are Spartan,” says Inclán. “If a design is just Spartan, users will find a way to defeat the system.”

Putting their coworkers’ comfort first, Inclán and Berg used glare-free sources in private and open office areas, maximized daylight, and added a comprehensive control system that manages both electric and natural light sources. The results far exceed expectations. The space uses a mere 0.24 to 0.3 watts per sq ft with controls, besting Title 24 standards by more than 75 percent. What’s more, it has earned the respect of employees and visitors alike, who are surprised with the quality of the lighting. The new office is currently awaiting LEED Platinum certification.

WINNING COMBINATION

Innovators see opportunity where others don’t. Inclán knew he had found the right solution for the open office area with the Tambient

NEXT-GENERATION WORKSTATION



Combination task and ambient luminaires mounted on individual workstations and shared work tables (left) provide comfortable, glare-free light and require fewer fixtures to achieve necessary light levels.

PROJECT

line of luminaires from The Lighting Quotient, combination task and ambient luminaires fitted with T5 lamps. The luminaire's specially designed furniture mounting—it sits above seated and below standing eye height—produces visually comfortable light on work surfaces and ceilings without shining light directly into the viewer's eye. By combining task and ambient functions, fewer luminaires are needed to produce necessary light levels.

The luminaire may be a lighting designer's dream, but it can also provoke skepticism from architects and interior designers used to working with traditional ceiling-mounted or recessed fixtures. For the installation at Glumac, architect Gensler was hesitant about the furniture mounting. What architects don't realize, notes Inclán, is that "it's not a matter of the fixture, it's a matter of what it does to the space. The most efficient fixture is a bare-naked T8, but it's so ugly. No one wants something like that in their workplace, so we need to strike a balance between efficiency and aesthetics. The Tambient fixture is a balance."

Inclán used two variations of the fixture in Glumac's Irvine office. Luminaires mounted on individual workstations in the open office feature a symmetrical uplight that illuminates the 21-ft-high ceiling and an asymmetrical downlight that lights the workspace, while fixtures on the freestanding shared workstations have symmetrical uplights and downlights to accommodate workers on both sides of the tables. Both types of lu-

minaires use lenses and louvers to reduce glare and include integral on/off switches.

The luminaires are also linked to occupancy sensors (WattStopper) and photosensors (Echoflex) that use EnOcean wireless technology to dim the lights according to incoming daylight. The sensors are set to maintain 30 footcandles on workspaces. Ballasts, sensors and photocells are housed in one portable wireless package so that they can be moved along with modular office furniture. "An added bonus is that any item plugged into these receptacles, such as monitors and printers, will also automatically turn on/off with the occupancy sensor," notes Berg. For the shared workstations, Berg worked with The Lighting Quotient to add emergency lighting to the Tambient, so that one fixture serves three functions.

After the fixtures were painted silver to match Glumac's furnishings, "they just disappeared," says Berg. "Architecturally, it's very clean. Your ceilings become nicely lighted rather than having these hot spots." The end result is "a lighted space rather than individual sources of light," says tambient division, president, Dave Pfund. "It's a powerful reorganization of luminance." Ultimately, the luminaires won over their toughest critic, the architect, who "was amazed by how clean they look," recalls Berg.

DOING MORE WITH LESS

Sources that minimize glare were also used in the hallways, lobby and private offices with the same idea

Concept

Pole- and furniture-mounted lights were initially considered to illuminate workstations in the open office.



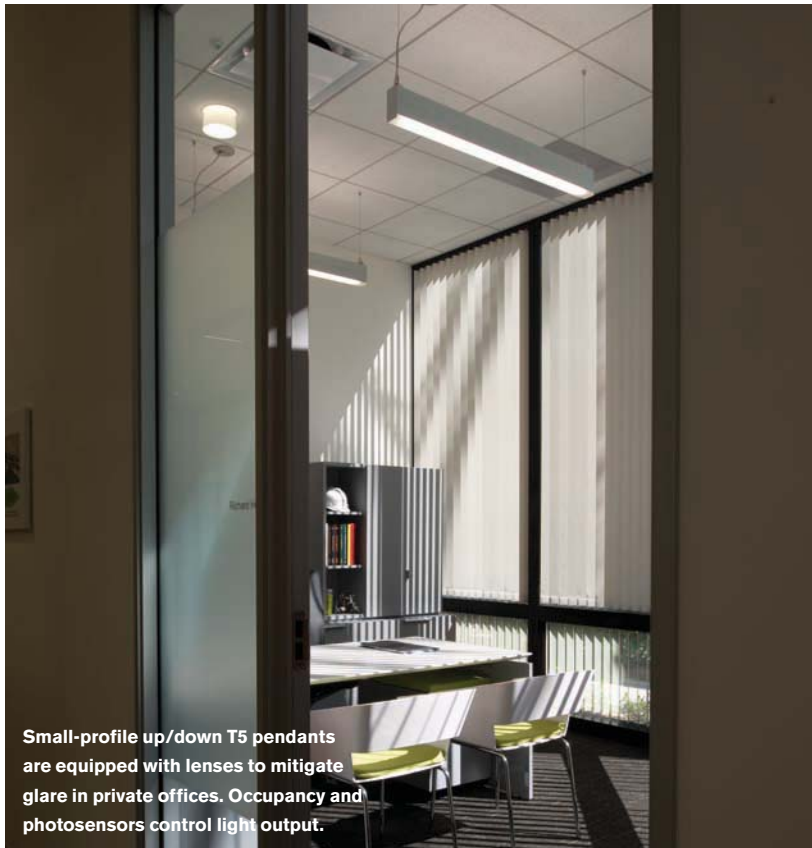
Concept

Inclán looked at different downlights with protruding "skirts" that create ceiling glow for the lobby, hallways and private office areas.

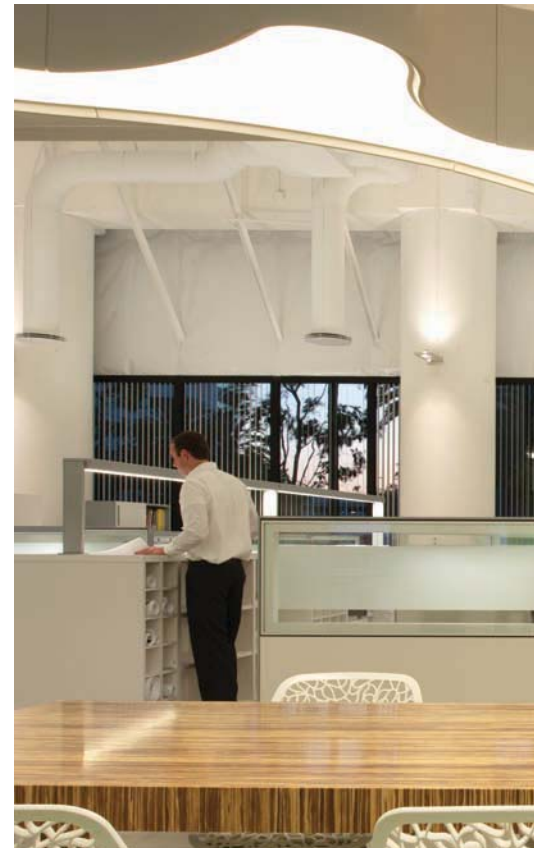


Photo: RMA Photography

PROJECT



Small-profile up/down T5 pendants are equipped with lenses to mitigate glare in private offices. Occupancy and photosensors control light output.



that inspired the lighting for the open office: “If you do away with glare, fewer footcandles go farther,” explains Inclán. In these areas, CFL downlights with glass “skirts” (Del-ray) that extend below the ceiling plane “mitigate contrast by sharing their brightness with the ceiling so that there are no batwings, just comfortable light. The sources become more polite and less abrupt,” notes Inclán. LED downlights were used in areas where space clearance prohibited CFLs.

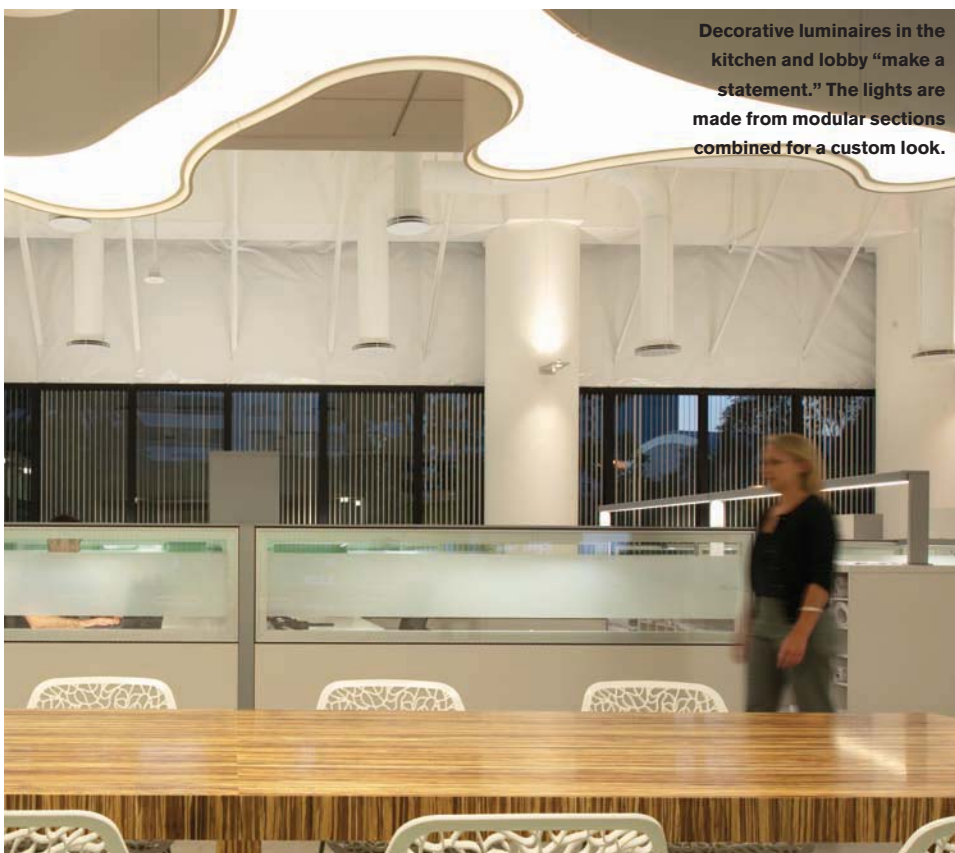
To balance the streamlined look of the open office, the team added character to the lobby and kitchen by using decorative luminaires (Vibia) made from modular sections that were combined for a custom look. “The fixtures do what

we want them to do . . . which is to make a statement,” says Berg. Fitted with 13-W CFL lamps tied to photosensors that reduce the load by half when daylight is available, the luminaires also save energy.

The private offices feature small-profile lensed up/down T5 pendant luminaires from Architectural Lighting Works. “The fixtures are very efficient and the lenses allow 90 percent light output while reducing the lamp’s brightness,” notes Inclán. The lights are controlled by a WattStopper Digital Light Management system that includes a ceiling-mounted occupancy sensor and a remote control dimming switch. Though every office has two luminaires, Berg programmed the lights so that only one turns on

automatically when the occupant enters the office. “You can manually turn on the second fixture, but we’ve discovered that most people won’t because it isn’t over their desks, so they don’t need it.

“Basically every light in the office, down to the storage closet lights, is controlled by occupancy sensors,” notes Berg. “Controls are one way to save energy without sacrificing what people think are light levels.” Maximizing daylight is another. Despite the fact that the windows have near pitch-black glazing and building-mandated shades, copious amounts of daylight enter the space. Since all private offices are located around the perimeter, they reap the benefits of the daylight through photosensors



that automatically adjust the pendants so that 25 fc is maintained on work surfaces. Throughout the space, white paint was used to maximize reflectance.

HOW IT MEASURES UP

Lighting isn't the only building system at Glumac that benefited from controls. "On the HVAC side, we built in our own direct digital controls," says mechanical engineer, Brian Berg. "We wanted to make a showcase of it, so we have various language protocols talking to one another to show that it was possible. We're wrapping the lighting controls into our controls." Using the EnOcean wireless technology, the HVAC team can gather real-time lighting energy use data and display

it graphically on a control dashboard. "When the daylighting levels go up, you can see the space lighting levels go down," notes Berg.

Eventually, the energy data will be displayed on a flat-screen in the lobby. Glumac will use the display as an educational tool to show visitors the benefits of saving energy. Rather than citing data in watts per sq ft, the team plans to use more digestible metrics, such as carbon emissions.

Similarly, the success of the office lighting can't be quantified purely in technical terms. According to Inclán, lighting is about more than just "fruitcandles," a term he credits Naomi Miller with coining. "Fruitcandles' in lighting are like calories in food: not at all representative of

visual comfort, or taste in cuisine. Look at the space's rather low connected load, but look at the even more impressive low energy use, which is because of the controls." Moreover, he adds, consider how the office feels. "Nothing convinces people that it works like having them walk through it." 🍷

METRICS THAT MATTER

Glumac Irvine Office

Watts per sq ft (with controls):

open office = 0.49; small office = 0.44; conference room = 1.05; break room = 1.39; reception = 1.11; storage = 0.37; server = 0.48; corridor = 1.04; plotter/copy = 0.79; total office average = 0.66; total office actual peak load = 0.36 (complies with ASHRAE/IESNA 90.1-2007 and Title 24)

Illuminance Levels: open office = 30 fc; private office = 25-plus fc

Lamp Types: 7

Fixture Types: 14



About the Designers: Carlos Inclán, IALD, Member IES (1998), has worked as an architectural lighting designer since 1986. His experience includes residential, commercial, civic, institutional, retail and hospitality/entertainment projects. Mr. Inclán has also done various chromatic light-as-art installations. He holds an architecture degree from Universidad Nacional Autónoma de México and a Master's of Science in Lighting from RPI's LRC.



Jennifer Berg, P.E., LEED AP, is an associate with Glumac, where she has worked as an electrical engineer since 1999. Projects include commercial, institutional, retail and hospitality. Ms. Berg received her B.S. in Engineering Science from Trinity University.