

PROJECT

Bad office lighting has become a cliché. For most people, the term is synonymous with the dimly lighted corridors, unshielded, glary sources, and unsightly fluorescent luminaires that plague commercial buildings around the nation. Yet, all that's needed to transform a space from dreary to cheery are some well-designed upgrades and a dose of sunshine. As one lighting design practice discovered, the right tools can change even the darkest of places—a windowless warehouse to be exact—into a well-lighted workplace.

When Lighting Design Alliance's Los Angeles office decided to relocate to a new space in Long Beach, CA, daylighting was not at the top of its priority list. "In our previous turn-of-the-century, Craftsman-style building, every office had windows. But most employees would close their blinds, which gave me the perception that they didn't care about views or about natural light," explains Chip Israel, founder and president of LDA.

So when Israel announced that he had purchased

a 22,000-sq ft windowless cosmetics factory with the intention of turning it into a LEED-Platinum office building, he was surprised by the reaction of his staff: "Everyone was upset because there were no windows. We found out that people wanted higher light levels, but they had used blinds because of the glare from the outside." Faced with a choice—change the space to allow natural light or deal with unhappy employees—Israel opted for the former. The resulting renovation proved to be a learning experience for Israel, who discovered how to make daylighting work for an existing space.

The project received a 2008 GE Edison Award for Excellence in Environmental Design and a 2009 IES Illumination Award of Merit. It is awaiting LEED-Platinum certification for Existing Buildings.

LET THE SUNSHINE IN

The first hurdle was tackling the building's challenging shape. West-facing windows, in what had previously

DAYLIGHT SAVINGS

Photos: RMA Architectural Photographers (unless labeled otherwise)



A 22-ft-tall entryway added in the renovation boosts daylight in the reception area. Custom luminous louvers block sun from perimeter offices.

been corporate offices, bring natural light to the front of the long, narrow building, but the two-story former factory area in back was windowless. To correct the imbalance, transom windows and light shelves were used to bounce light from the reception area into the building's interior. Transparent glass in the 22-ft-tall entryway was added during the renovation to create a formal entrance. Flanking the entrance, translucent glass reduces glare and heat in the reception area. Custom luminous louvers block the setting sun from the front offices.

While the transom windows and light shelves cover the front office area, more was needed to light the back. LDA initially considered adding a sawtooth roof, but found it meant "redoing the whole roof structure," notes Israel. "Instead, we made giant windows to the sky." More than 50 skylights were added to the building. These include 4-ft by 4-ft clear skylights with sun-tracking mirrors and a giant Lumasite ceiling spline, lit by a continuous row of skylights, which runs

the length of the design studio. Nine 8-ft by 8-ft clerestory monitors were also added. The monitors' north-facing side is made of clear, low-e glazing that allows indirect light, while the other three sides are constructed from frosted acrylic laminated with heat-rejection film. In addition, solar tubes were used to illuminate lower-level restrooms.

More important than adding natural light, was ensuring it was utilized correctly. "I've been in a lot of daylighted spaces that provide threshold-vision illumination, but 15 ft away you have a perimeter office with a lot of light, and it was never that comfortable," says Israel. "There are more and more studies coming out about circadian rhythm. With this in mind, we wanted the design to be about more than just vision. In other words, we wanted to address the physiological and psychological aspects of daylighting as well."

To achieve this, the skylights have translucent plastic that mitigates glare. The material refracts daylight

Offering more than just low lighting loads, skylights and solar systems helped turn a windowless warehouse into a sunny office

ELIZABETH HALL



Sun-tracking, fiber-optic spotlights paired with ceramic metal halide accents light the hanging glass sculpture in the reception area.

By day, a ceiling spline is illuminated by a continuous row of skylights. At night, color-changing LEDs set behind the acrylic are programmed into light shows. On either side of the spline, 4-ft by 4-ft clear skylights house sun-tracking mirrors that focus light onto social areas below.



and channels it into the space, so that “there is light even at “6:00 a.m. when the sun comes up. It hits the side of the plastic and it actually bends the light down,” explains Israel. “We have good daylighting from very early in the morning to very late at night because we can take advantage of that east and west light, which you wouldn’t be able to normally due to glare.” On the north-facing façade, a clear glass window was added to provide a visual connection to the outside.

Lots of daylight means extremely high light levels, which could have led to an uncomfortable space had it not been properly managed. Israel recalls walking fellow designers through the space and asking them to estimate the light levels. “Everyone guessed between 60-80 footcandles. We asked if it was comfortable and

glare-free, and they said yes,” he says. “In truth, we actually peak at close to 400 fc. Everyone would say that’s too much, but it works in the space because it’s glare-free. It almost feels like you’re outside.”

TWO-IN-ONE

While ideal for daytime, the skylights and solar tubes pose a problem at night, when electric sources are needed. Israel didn’t want to overwhelm the ceiling plane with additional fixtures, so he came up with a solution: combine them. In the former factory area, metal halide monopoints (Lightolier) concealed in skylight shafts provide task lighting over the lounge and game areas, linear T5HO fluorescents (Lightolier) hidden within the clerestory monitors add ambient nighttime light over work-



stations, and color-changing LEDs (ColorKinetics) in the ceiling spline are programmed for multiple light shows.

To light open workspaces in the front of the building, the team created custom hybrid electrical and daylighting systems (components from Solatube, RSA Lighting and Neo-Ray). These are 2-ft by 2-ft daylight and fluorescent troffers. The systems use daylight captured on the roof that is guided down through translucent side panels. When the natural light wanes, the linear fluorescent lamps turn on. A variation of the hybrid system is even used in bathrooms. All electric sources are controlled by photocells, occupancy sensors and a Lutron system that monitors and adjusts the lighting continually throughout the day.

The result is a connected load that more than exceeds



Workstations in the front of the building are lit by custom hybrid daylight and fluorescent troffers.



Linear T5HO fixtures are hidden in large clerestory monitors in the back office.

Title 24 requirements. “A dimming ballast system allows us to fine tune the light so that our connected load is about 0.8 watts per sq ft, which is 20 percent below Title 24,” says Israel. With daylight harvesting vacancy sensors added in, the actual energy consumption is even lower. “We track our energy use and we’re really only using 0.1 watt per sq ft. Our connected load may be at 0.8 per sq ft, but 95 percent of our lighting is off 100 percent of the time.”

The success of daylighting in lowering the lighting load strengthened Israel’s belief that “the most efficient light source is the one that is turned off. I don’t care if it’s an LED, fluorescent or metal halide—we have them all here. Even if it’s an efficient source, it’s wasteful if you use it when you don’t need it.”



On the roof, solar-tracking reflectors direct daylight to clear skylights below. To the right, 8-ft by 8-ft clerestory monitors illuminate work areas in the back of the office.

Photo: Lighting Design Alliance/Brad Nelson

LESSONS LEARNED

So many new technologies were used in the renovation that “the office has become like a lighting lab or technology center,” says Israel. Some products, like the hybrid daylighting systems, exceeded expectations. Others weren’t as successful. Among them is a solar-powered system that uses focusable mirrors to track the sun and channel light into fiber-optic spotlights, which illuminate a hanging art glass sculpture in the lobby. “The system cost \$20,000,” says Israel. “But one cloud passes over and you lose 100 percent effectiveness.” Instead of viewing the system as a costly mistake, Israel looked at it as a lesson learned. “You have to prioritize and ask, ‘Where do I really want to save energy?’ You’ll never see a payback if you try to save 500 watts with a \$20,000 system. That money could be better spent on something like the photovoltaic panels that were used on the west façade and the roof.”

These lessons also benefit LDA’s clients. “One of our big clients is the Cheesecake Factory. We are pushing it to use the hybrid technology in its kitchens and back-of-house areas. The technology would also work well for banks and schools, which are usually single story,” says Israel, who also uses the facility as a teaching tool for the design community. “We can walk lighting designers and architects through here and show them the quality

of light. When we do, they feel it and they see that it can work. It’s almost infectious. If we can get them talking about that, it improves the quality of spaces.”

But perhaps the group most happy with the new space is LDA. “Some employees love it so much that they have brought in their families for tours. Even though it’s technically a windowless space, it feels happy.” ☺

METRICS THAT MATTER

Lighting Design Alliance Los Angeles Office

Watts per sq ft: 0.8 (exceeds ASHRAE/IESNA 90.1-2004 and California’s Title 24)

Illuminance Levels: Electric ambient = 35 fc; supplemental task lighting = 50 fc; daylighting = 400fc

Lamp Types: 3

Fixture Types: 4 (including custom)

Registered for LEED-Platinum for Existing Buildings

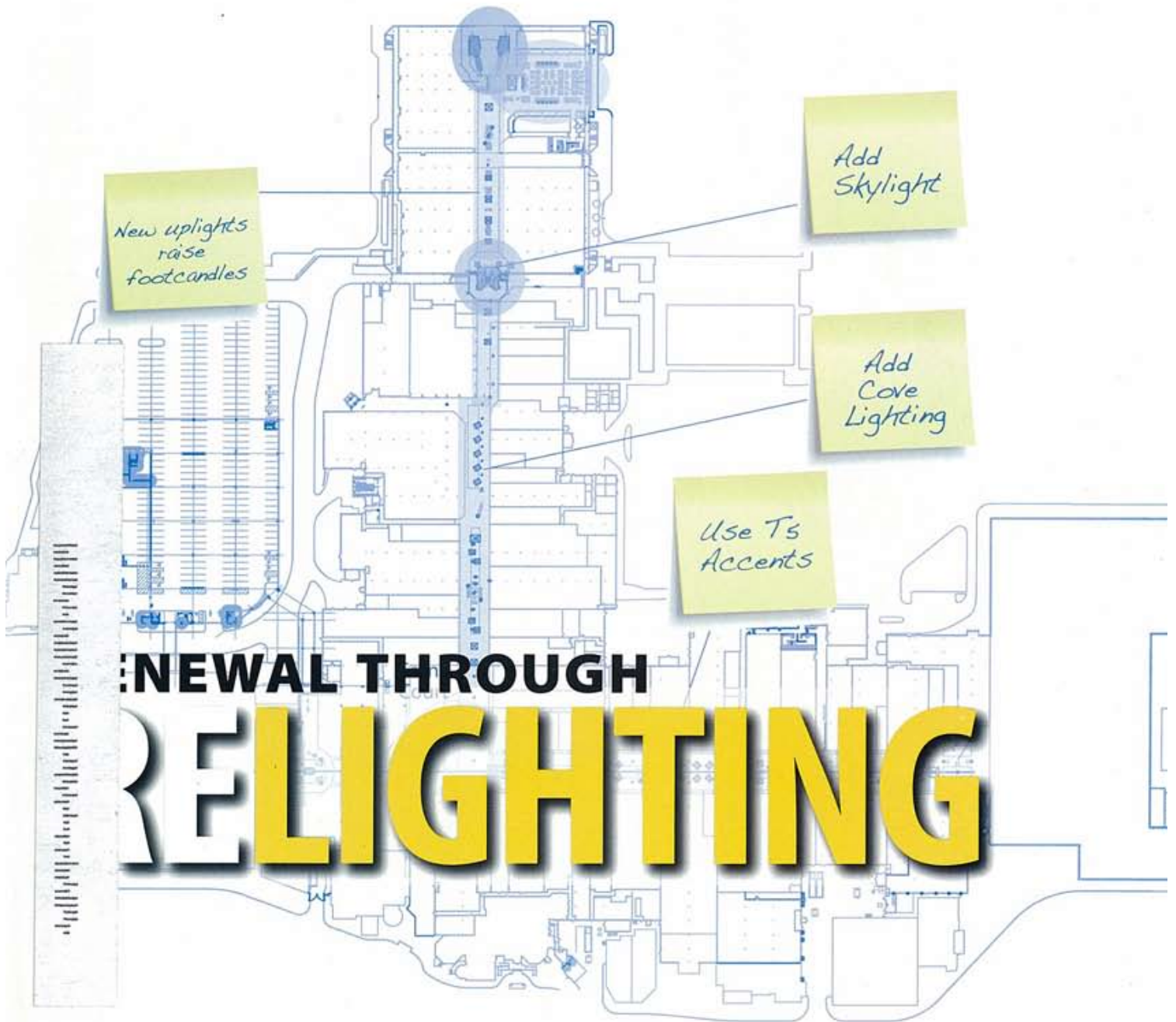


About the Designer: Chip Israel, LEED AP, FIALD, LC, Member IES (1994) has been a lighting designer for more than 20 years. In 1992, he founded Lighting Design Alliance. He has served as the past president of the IALD Education Trust and the Designers Lighting Forum and is currently a member of the IES Board of Directors.

LDA’s projects have received numerous awards, including IES Illumination Awards of Merit and GE Awards of Excellence and Merit. In 2002, Mr. Israel received the Martin Professional Lighting Designer of the Year, and in 2009 he was awarded The Penn State Outstanding Engineering Alumni Award.

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