

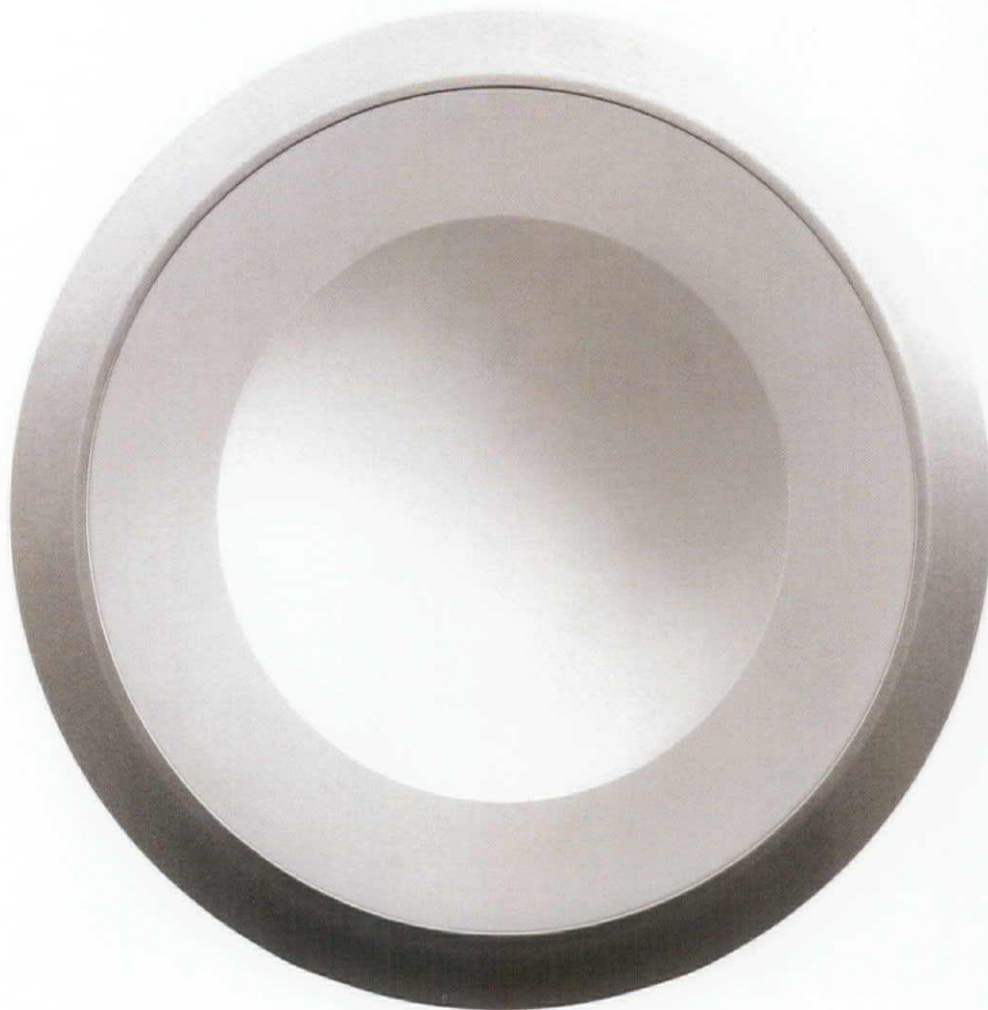
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architectural lighting

In This Issue: Economic Impact Report,
Lighting Controls, Museum Tracklighting

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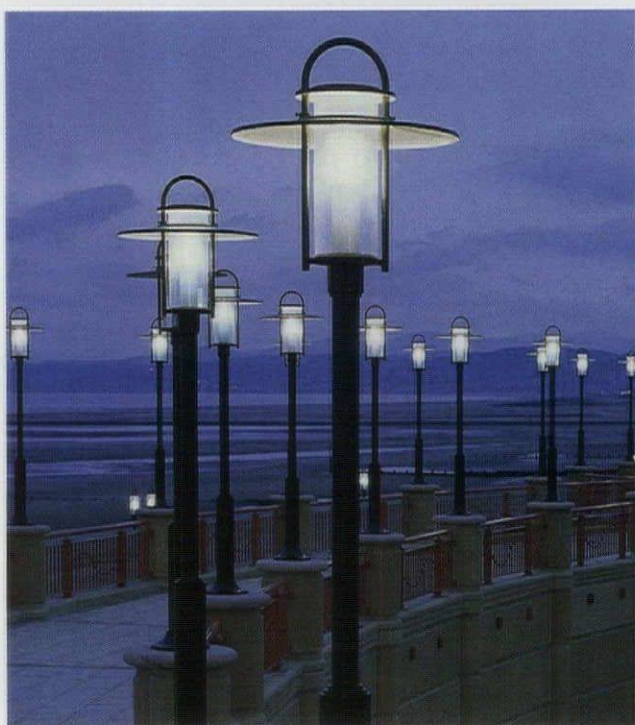
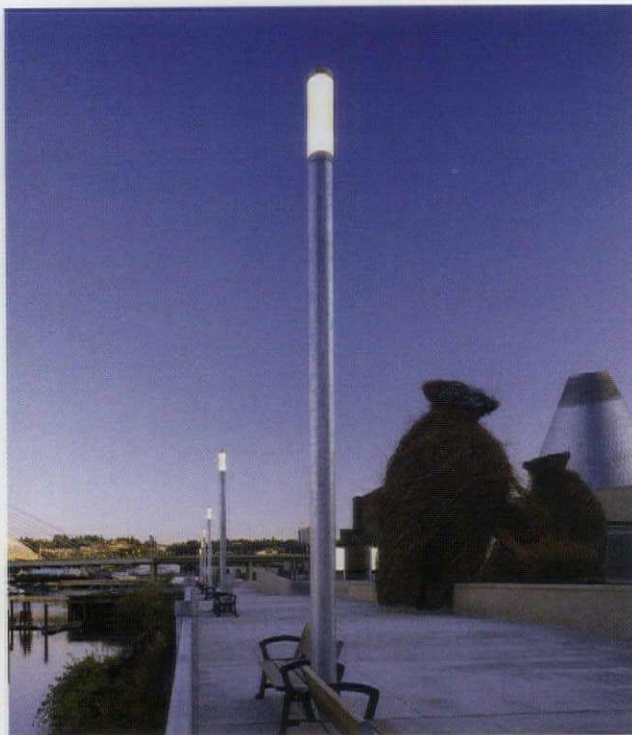
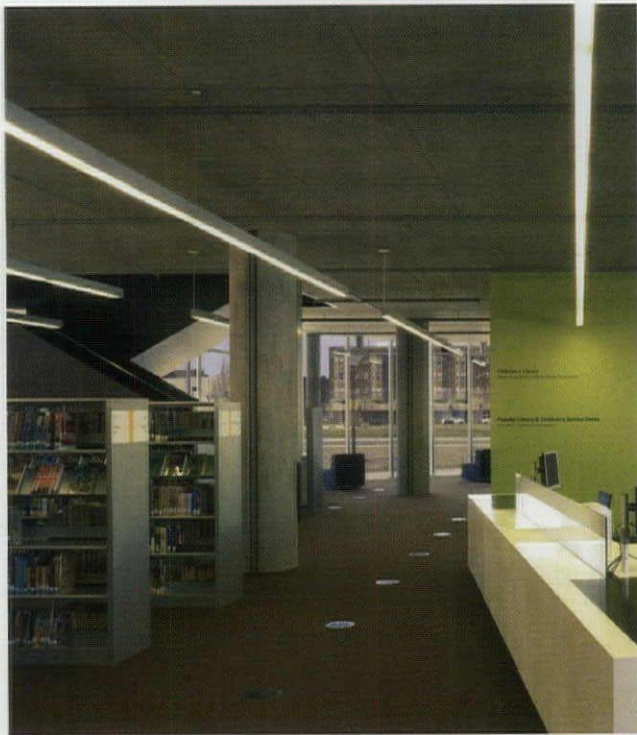
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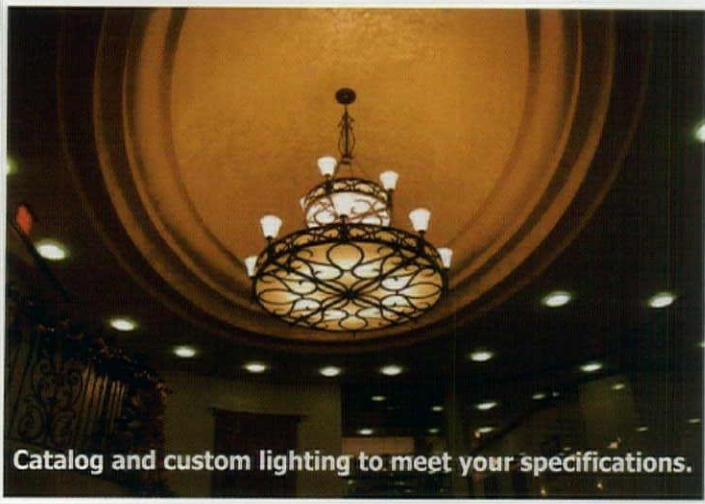
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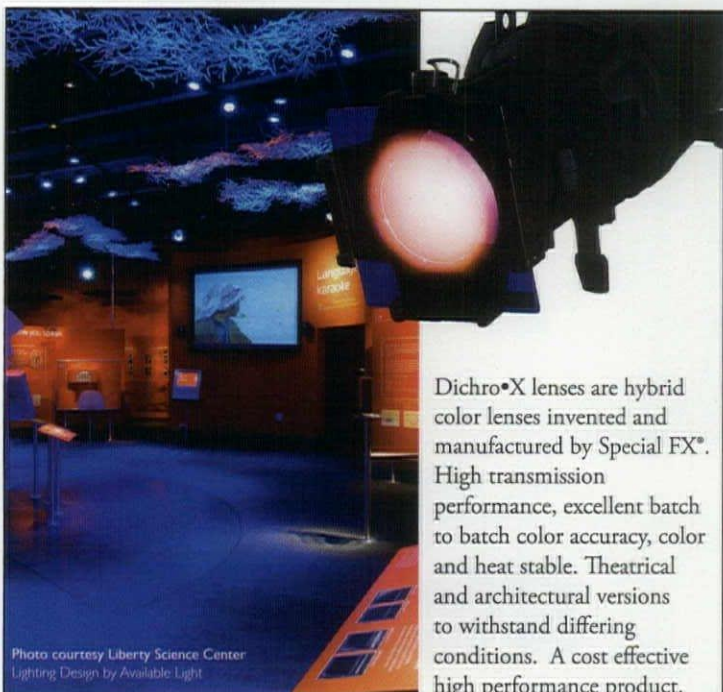


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architectural lighting

JAN/FEB 09

VOL 23, NO 1

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AL architectural lighting (Vol. 23, No. 1 USPS 000-846, ISSN 0894-0436) is published seven times per year (bi-monthly, except monthly in March and June) by Hanley Wood, LLC, One Thomas Circle, N.W., Suite 600, Washington, DC 20005. Periodicals postage paid at Washington, DC and additional mailing offices. Printed in the USA. POSTMASTER: Send changes of address to Architectural Lighting, PO Box 3580, Northbrook, IL 60065.

Canada Post Publications Mail Agreement No. 40612608. Return undeliverable Canadian addresses to: Bleuchip International, PO. Box 25542, London, ON N6C 6B2.

Distributed free of charge to individuals or firms engaged in the specification of lighting products in the US. Per year, all other US subscriptions: \$48; Canada, \$60; foreign, \$96. Payable in US dollars. For subscription inquiries, address changes, and single copy sales (\$10 in the US, \$15 in Canada, \$20 for other countries, payable in advance) write to Architectural Lighting, PO Box 3580, Northbrook, IL 60065 or call 847.291.5221 or toll-free 888.289.8410.

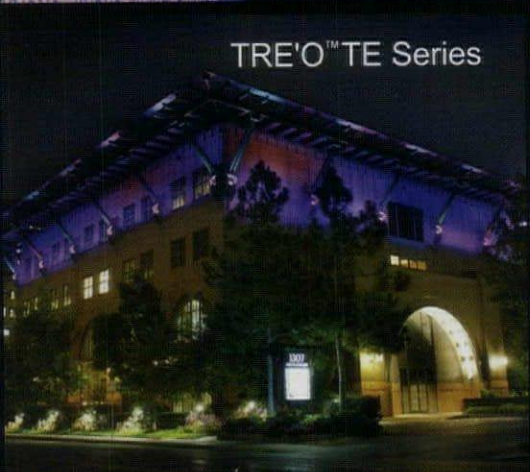


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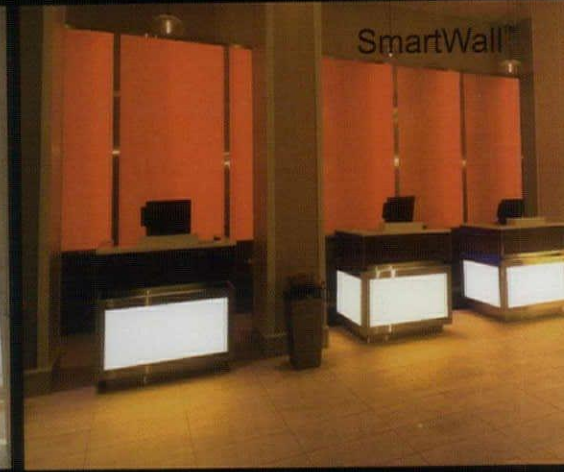
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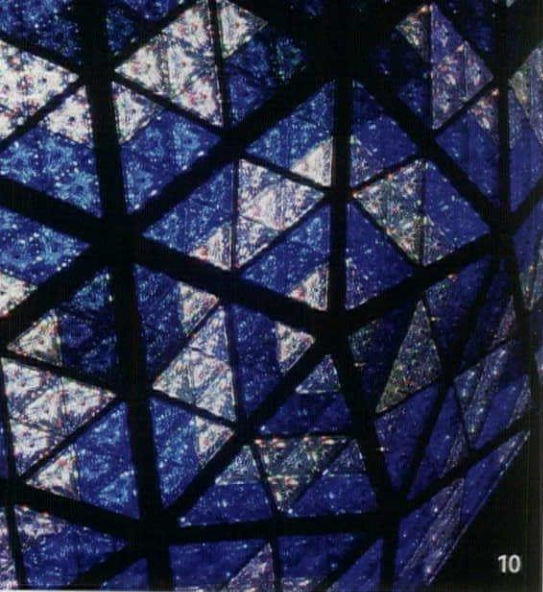
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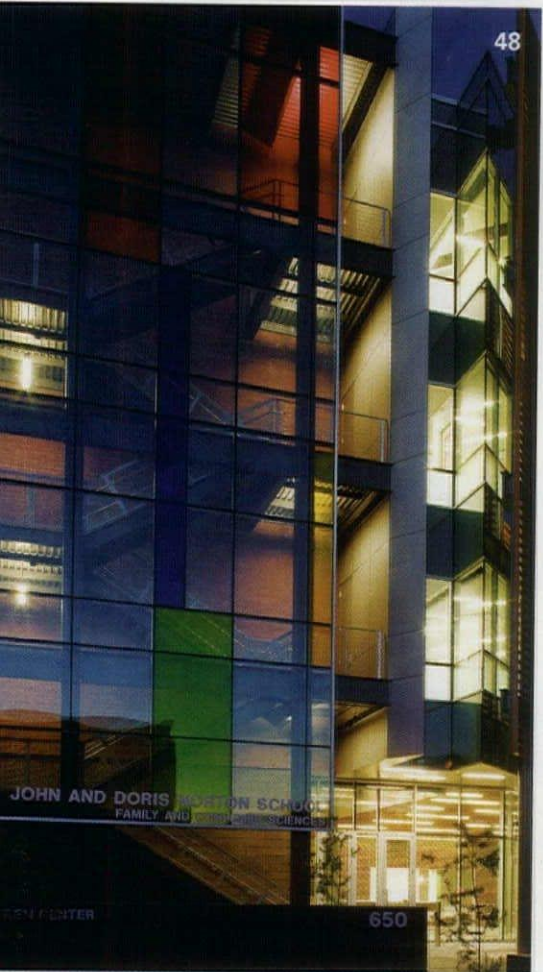
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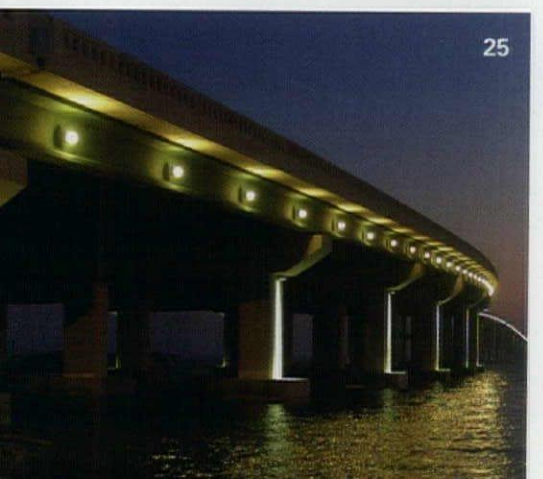
INSIGHT



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JAN/FEB 2009

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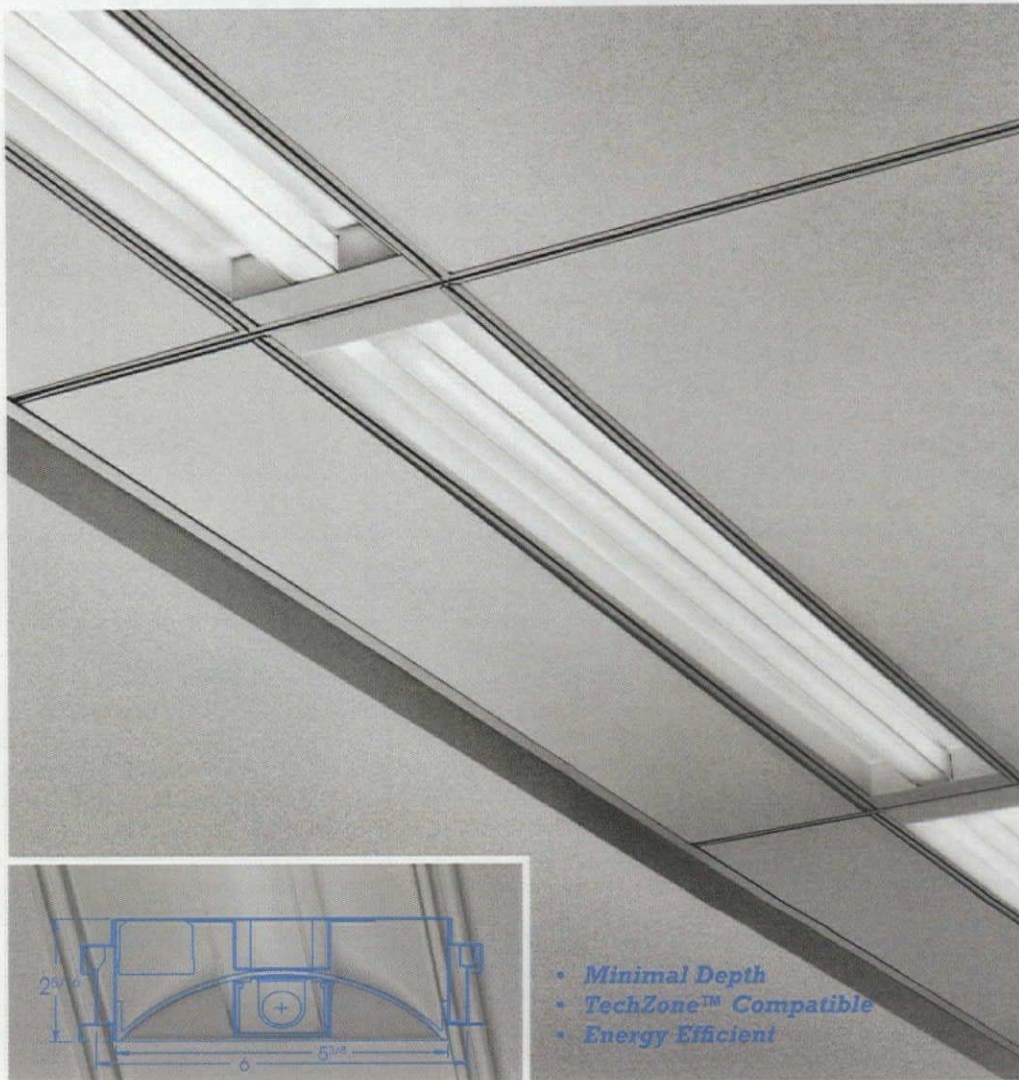
➡ **Online at archlighting.com:**

Hanover Bridge, Hanover, Minn. / One of the oldest pratt through truss bridges in the state features a lighting design that adheres to historical restrictions.

Stage Craft / A student workshop in Winston-Salem, N.C., transforms the façade of the Millennium Center with light.

Cover: An aerial view of "The Road," a chronological gallery of motorcycles located on the second floor of the Harley-Davidson Museum in Milwaukee.
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Are We There Yet?

It appears that the economy has caught up with the lighting industry. It's not that lighting designers and manufacturers were

unaware of the global economic slowdown this past fall or weren't starting to feel a few of its effects. Rather, the lighting community was in constant demand at the end of 2008, still working through a project cycle that kept everyone extremely busy. But with the start of the new year, despite widespread hope that the calendar change somehow would wash the slate clean, the economy remains as turbulent as ever. There is no doubt 2009 will be just as rocky. In the first full week of January alone, I have heard an enormous amount of concern voiced by lighting designers and manufacturers as they try to get a read on the economic landscape. They're asking questions like, "Are projects being canceled or delayed?" and "Have you heard of anyone having to reduce staff?"

Such concerns are real. The lighting community has grown substantially since the recessions of the early 1980s and 1990s, and the current state of affairs invites a comparison: Are lighting designers and manufacturers drawing from their past experiences and perspectives as a guide to present conditions? The architecture community, for its part, has developed a series of tools that architects and other design professionals can use. The American Institute of Architects (AIA) initiated its Architecture Billings Index in response to the 1990s recession; it is a gauge that all of the lighting designers and manufacturers whom I have spoken with cite as a key reference as they plan for future project work cycles. More recently, in the face of the present economic troubles, the AIA has set up a section on its website devoted solely to navigating today's economy. The resource can be found at aia.org/navigatingeconomy.

Lighting organizations in their own way are trying to get a read on the economy and gather data. The International Association of Lighting Designers (IALD) has sent a 10-question economic impact survey to its membership, asking firms how they are being affected by the economy, whether they have had to make cutbacks, and what kind of growth they anticipate in 2009. According to Marsha Turner, executive director of the IALD, the results will be released in February. The IALD survey is a good first step, but the downturn suggests an opportunity for the lighting community to create an ongoing set of economic indicators that respond to the specifics of lighting practice. Tools such as these will always be of use, recession or not.

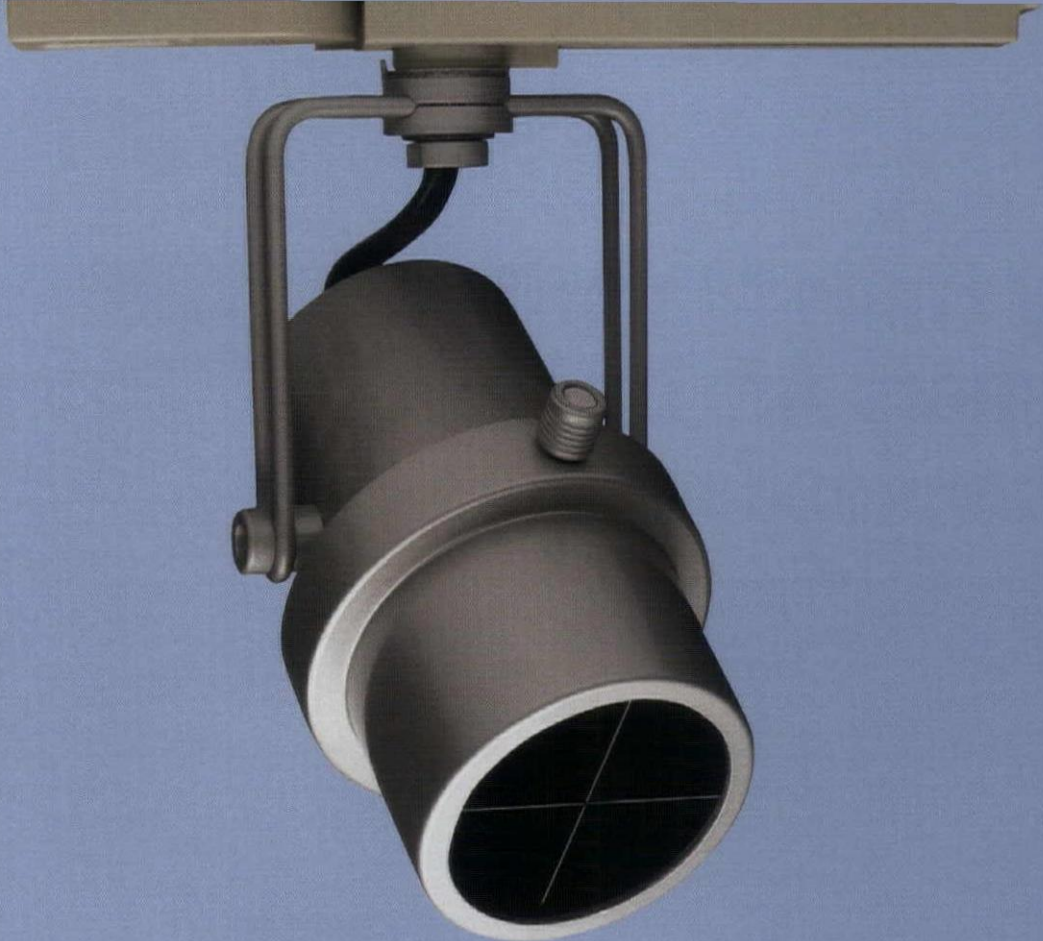
ARCHITECTURAL LIGHTING has had the economy on its mind since summer 2008, when the mortgage crisis emerged. For the past six months I have been taking the industry's pulse through talks with key members of the lighting community. These discussions are synthesized in the report, "The Road Ahead," on page 19. It is the first of what will be several related conversations throughout the year that will assess the issues at stake for the industry.

You'll also notice, as you flip through the pages of this issue, that we have economized in another sense—through the magazine's layout. In our continued efforts to evolve editorially, we have reorganized the publication's internal structure into new sections—a series of departments, followed by features. The reorganization enables us to present more editorial content in the front pages of the magazine, expand our product coverage, and offer two new article types: Critique and One-on-One. The Industry Exchange now appears online.

Despite the uneasy feeling present conditions leave us with—like a cross between Sisyphus and Godot: rolling, rolling, rolling ... waiting, waiting, waiting—I am confident that the lighting community can withstand the current economic pressures. There is no doubt the downturn will take its toll on companies and individuals. Still, I think the lighting industry is well suited to adjust. In the way that designers borrow and adapt techniques and fixtures from one application to another (as the features in this issue demonstrate, through the crossover between theatrical and architectural lighting), flexibility is key. Manufacturers, for their part, have the opportunity to focus on research and development and to advance energy-efficient luminaires.

Perhaps the greatest challenge of these times also is the lighting community's greatest opportunity—to craft an agenda and speak with a cohesive voice. There are many threads of dialogue within lighting arenas, but more often than not these discussions remain internal. With a new president who already has voiced great interest in energy-efficiency issues, particularly when it comes to public buildings and infrastructure, the lighting community needs a consistent message. At a time when many things seem out of our control, this is one item—a united and purposeful voice—over which we do have command. The key now is to determine what message the lighting community wants to put forth and how to articulate it. Let the work begin.

ELIZABETH DONOFF
EDITOR



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Survey Finds Majority of Consumers Are Unaware of the Incandescent Bulb Ban

Osram Sylvania has released the results of its first annual Socket Survey, documenting consumer interest in energy-efficient lighting—including the discovery that a majority of consumers are unaware of the ban on most incandescent bulbs, as mandated by the Energy Independence and Security Act of 2007. The law addresses four areas of lighting: incandescent bulbs, incandescent reflector lamps, metal halide fixtures, and the federal government's own use of lighting. The requirements include a 30 percent increase in efficiency in A-line bulbs, which will force a current 100W incandescent bulb to be rated at 70W but still produce the same number of lumens. Most specialty and decorative bulbs will not be affected by this requirement. Incandescent reflector lamps will have to match halogen lamps' efficiency standards, with a few exceptions.

Metal halide lamps, effective as of Jan. 1 this year, are required to use a pulse-start metal-halide ballast if the lamp is rated at or more than 150W and fewer than 501W; that

the law also requires federal buildings that have been constructed, altered, or acquired after December 2008 to use the most energy-efficient lighting fixtures feasible.

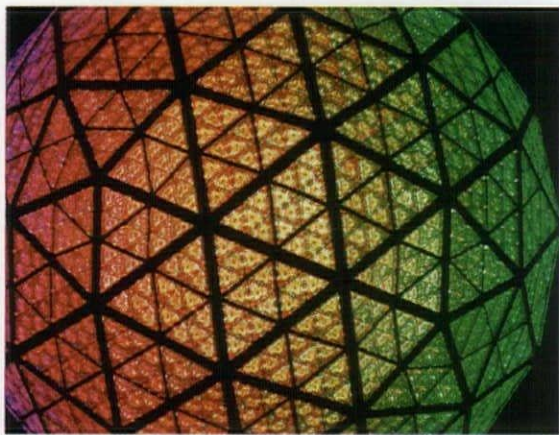
Three hundred homeowners and renters were surveyed by telephone using random-digit dialing. The questions evaluated interest in energy-efficient lighting and overall awareness of how the lighting industry is changing. The survey also covered topics such as LED technology and compact fluorescent lamps (CFLs), and how well-informed consumers are on the transition. In a statement, Sylvania's CEO and president Charlie Jerabek said, "The survey results are a

Consumer Findings:

- 78 percent were not aware of the mandate to phase out incandescent light bulbs starting in 2012.
- 88 percent rank energy efficiency as a key factor when buying light bulbs.
- 85 percent know CFLs use less energy than incandescent bulbs.
- 77 percent know that CFLs last 10 times longer than traditional bulbs.
- 70 percent believe that CFLs are cheaper than traditional bulbs, when considering the life span of each.
- 68 percent have adopted CFLs; 76 percent will or are willing to switch in the future.
- Only 21 percent have LEDs in their homes.

ballast must have a minimum efficiency of 88 percent. (Several lighting manufacturers' websites have overviews of the new requirements and exceptions.) A section of

call-to-action for a comprehensive awareness campaign to help consumers make the transition from traditional light bulbs to newer technologies, such as LEDs and CFLs."



Times Square Ball Is Here to Stay

What has 32,000 LEDs, is 12-feet wide, weighs 11,875 pounds, produces 4.3 billion color options, has 2,668 Waterford Crystals, and will be staying around all year? The Times Square Ball, of course. Revealed on Dec. 31, 2008, the new design from Focus Lighting will be a permanent fixture atop One Times Square. As Times Square Alliance President Tim Tompkis said in a statement, "Like Times Square, it's not afraid to show off. That's why we're proudly putting it on display year-round so visitors to the neighborhood can enjoy a true Crossroads of the World icon."

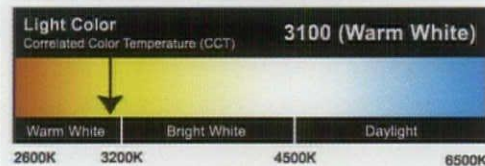
Just the Facts

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LED Product

Light Output (Lumens)	840
Watts	9
Lumens per Watt (Efficacy)	93

Color Accuracy	87
Color Rendering Index (CRI)	



Visit www.lighting-facts.com for the Label Reference Guide.

All results are according to IESNA LM-79-2008: Approved Method for the Electrical and Photometric Testing of Solid-State Lighting.

The Department of Energy (DOE) is taking a page from the Food and Drug Administration's playbook. Since 1994, most food products have featured the Nutrition Facts label, and the DOE is pushing for the lighting industry to follow that lead for LED products. The label, shown at left, is part of the DOE's SSL Quality Advocates program and is meant to encourage manufacturers to simplify information about LED products for consumers. Using the industry-standard IESNA LM-79-2008 to measure product performance, the label displays the metrics in an easily digested and consistent format. Lumens, efficacy, watts, correlated color temperature, and color rendering index are all shown. But this is just one of the DOE's latest programs—visit archlighting.com for a more complete roundup. **ANDREW SLOCOMB WEST**

FROM LEFT: COURTESY COUNTDOWN ENTERTAINMENT; COURTESY LIGHTING-FACTS.COM

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NEW OR IMPROVED

LUMINAIR 1.1 SYNTHÉ FX

Synthe FX has updated its Luminair software that offers wireless control of DMX fixtures and consoles using Apple's iPhone or iPod Touch. The software allows a user to adjust color temperature, intensity, XY focus controls for movable fixtures, and other DMX features. It also shows the consoles' current settings. The DMX network must be Art-Net compatible. • synthe-fx.com • CIRCLE 125



SPRINGLAMP CFL/LED LIGHT BULB TCP

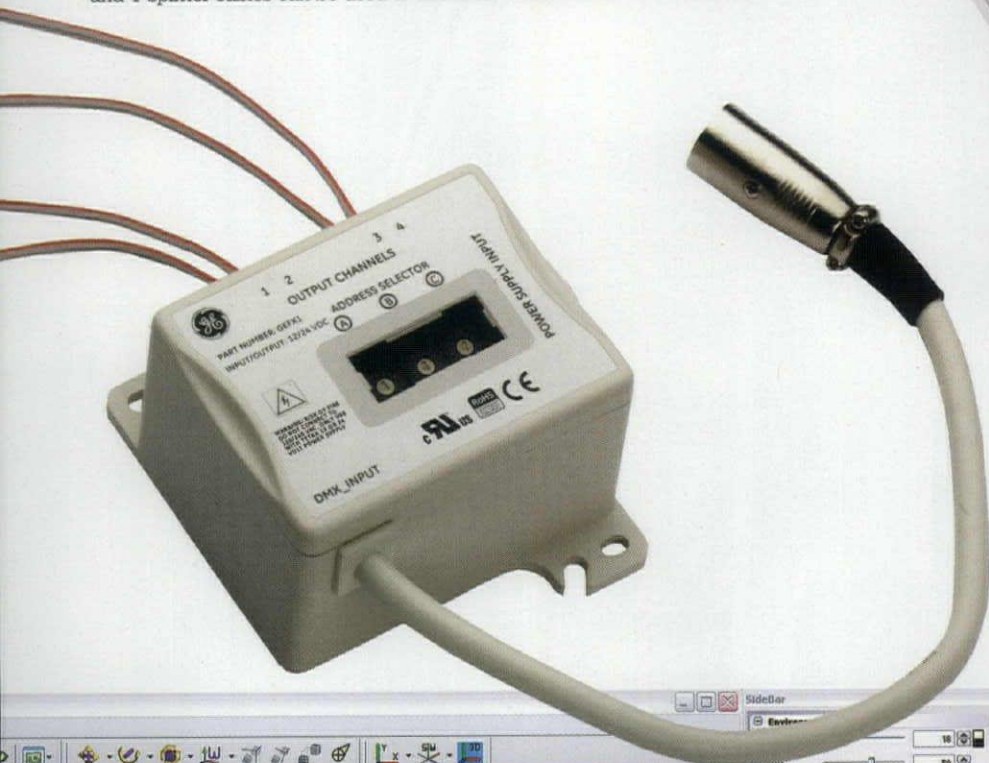
TCP has introduced a compact fluorescent light bulb that uses an LED for a low-wattage "night light." Comparable to a 50W/100W/150W incandescent, the bulb uses the LED for the low-intensity 1W setting, and switches to the CFL for the 3W and the 19W settings. TCP reports color temperatures similar to classic incandescents—rated at 50K—and a life of more than 10 times longer. It is designed for table and floor lamps. •

tcp.com • CIRCLE 126



TETRA FX GE LUMINATION

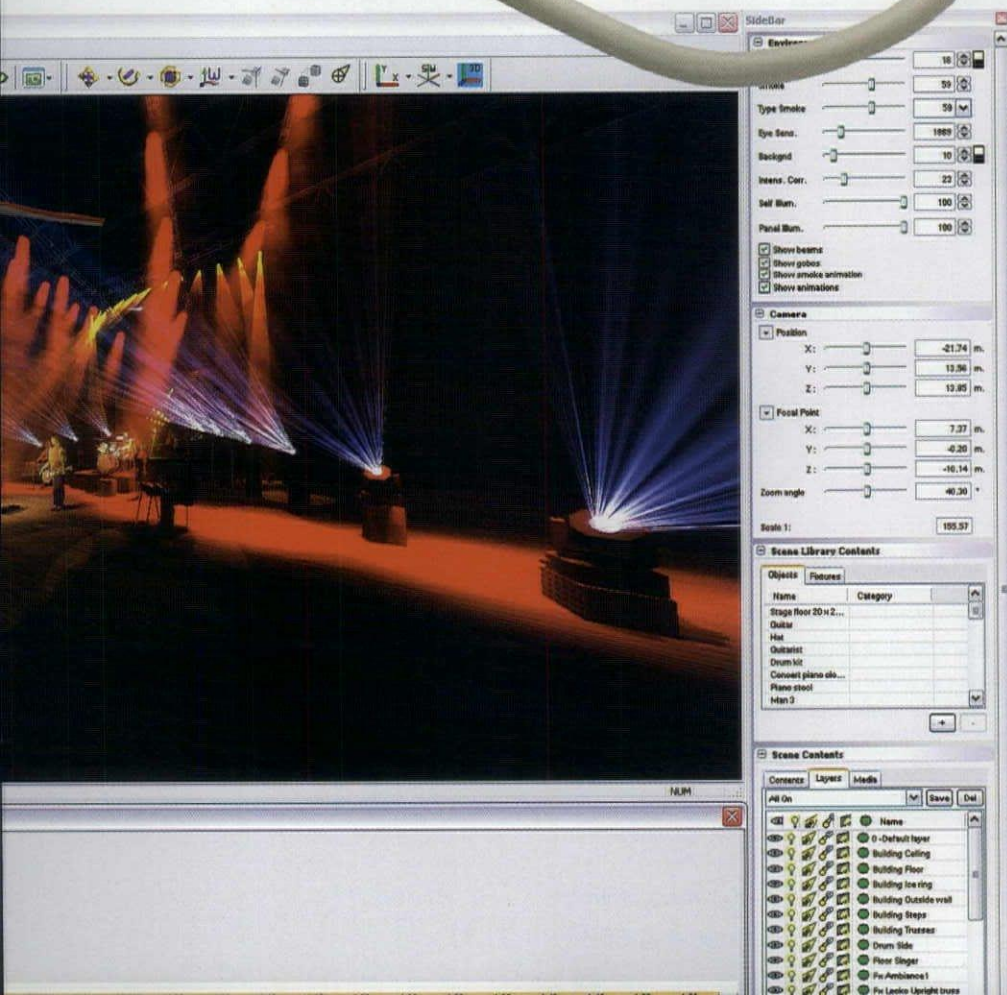
This new LED special effects controller gives lighting designers a wide array of control over Tetra LED lighting systems, both 12V and 24V versions. Up to 512 unique controller addresses allow designers to control individual fixtures. Four Tetra systems can be connected out of the box, and Y-splitter cables can be used to add more. • lumination.com • CIRCLE 127



GOLITE BLU PHILIPS

Philips has released its answer to the winter blues. This new light-therapy device has smart features that help regulate mood, energy, and sleep with varying levels of blue light that is reported to help with seasonal affective disorder. Using no UV or near-UV light, goLITE BLU produces even light with no glare, and the rechargeable battery makes it easy to move from the office to home, or anywhere else you might need a little happiness. • lighting.philips.com

• CIRCLE 128



SHOWDESIGNER 5 MARTIN

ShowDesigner 5 from Martin Professional gives lighting and set designers a new 3-D lighting simulator for use in stage, club, and architectural applications. The software offers a realistic rendering of how fixtures will look, including a camera animation that uses timeline control. It is available in five packages to meet a variety of design needs. • martin.com • CIRCLE 129



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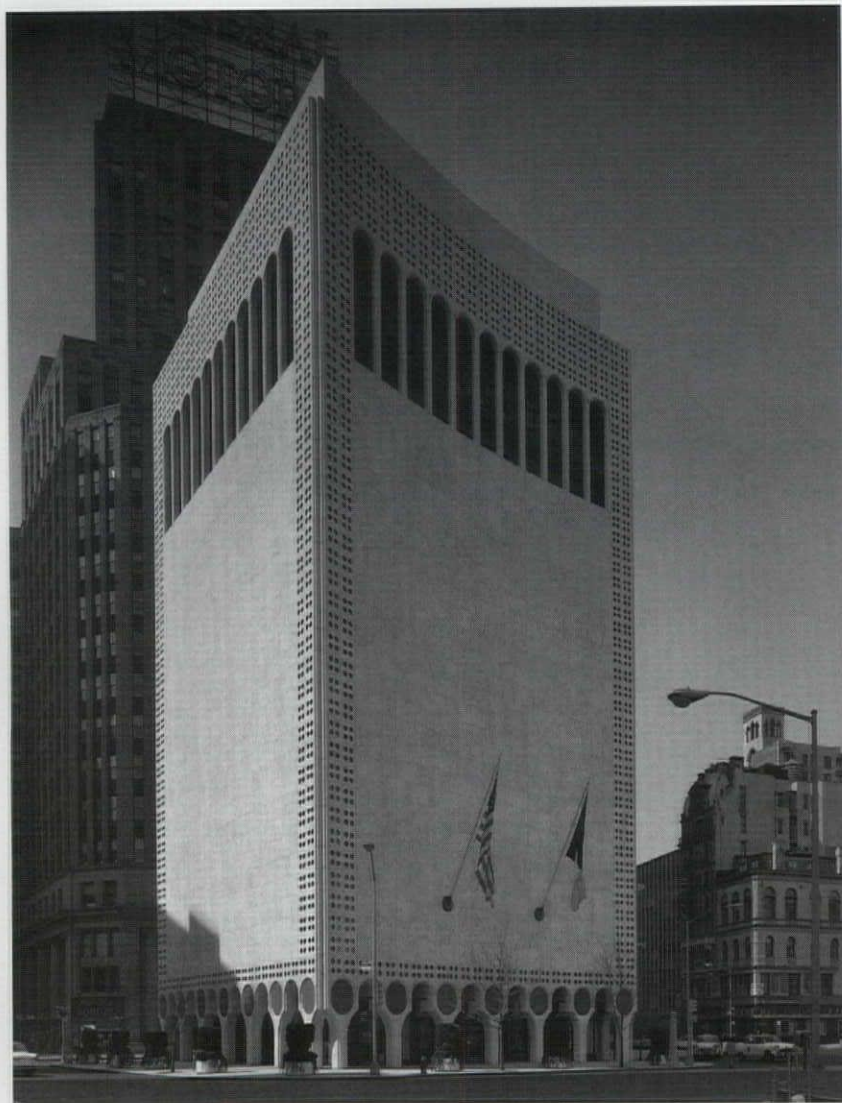
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H is for Hindered



Two Columbus Circle—past and present—poses an interesting challenge in deciphering the changing nature of the city and its built environment. The original 1963 building by Edward Durrell Stone was criticized at the time for being too decorative (above left). The re-clad structure by architect Brad Cloepfil (above right) falls short of expectation.

One of the most anticipated projects of 2008, the Museum of Arts and Design (MAD) in New York earned the distinction, upon its opening in late September, of being one of the most negatively reviewed projects of the year. While the museum is not the most compelling new piece of architecture, it offers a complicated backstory unlike any other, and the fact that the museum was built at all is a testament to perseverance in the face of finicky New York politics. Fan or not of the new building, you have to give Brad Cloepfil, of Portland, Ore.-based Allied Works Architecture, a lot of credit for working within such a set of restrictive guidelines.

The original Two Columbus Circle was the work of architect Edward Durrell Stone. Completed in 1964, its most distinctive feature—its white marble façade with ground-floor colonnade—was mocked as decorative. The architecture critic Ada Louise Huxtable, then of *The New York Times*, dubbed the façade “a die-cut Venetian palazzo on lollipops.”

Designed to house A&P supermarket heir Huntington Hartford's figurative modern art collection, the museum never really excelled in any way. The irregular-shaped site—a trapezoid lot between Broadway, Eighth Avenue, Columbus Circle, and West 57th Street—further complicated by a floor plan that accommodated more square footage for the building core than usable space, made for a poor circulation layout and floor plates that were too small to view the collection. Completely self-contained, the galleries were unevenly illuminated with linear washes of light and offered no connection to the city beyond. Only five years after it opened, the Gallery of Modern Art closed.

Multiple organizations subsequently occupied the space, including the New York City Department of Cultural Affairs for almost 18 years, but the building never offered a comfortable home to any of its tenants. Then, in 2002, MAD—formerly the American Craft Museum—purchased the building. It was the right move for the museum, then located on West 53rd Street, to move out of the shadow of the



Lighting tries to make a statement at MAD by way of a series of vertical and horizontal cuts on the façade, which Cloepfil refers to as "ribbons of light," but the effect doesn't bring enough illumination into the galleries to achieve the desired quality of light, and the tracklighting layout competes with the artwork.

neighboring Museum of Modern Art and emerge as a cultural institution in its own right.

When the first proposals for Cloepfil's transformed Stone building were made public, the design caused an uproar and garnered an outcry of unfavorable responses from prominent architects such as Tod Williams, Billie Tsien, and Robert A.M. Stern. They, along with preservationists, lobbied for the building to be granted landmark status, arguing that Stone's building represented an important work of 1960s modern architecture in addition to having a distinctive presence in New York's streetscape. One cannot help but wonder if the efforts to designate the building were because it actually merited saving or because every time a notable edifice in New York faces the threat of demolition, the ghost of Penn Station rears its preservation head.

MAD, coming in at a final cost of \$90 million, attempts to make something new out of Stone's quirky 54,000-square-foot building, but client constraints and construction execution restricted the design intent. Zoning regulations prevented Cloepfil from altering the height of the building and changing its footprint. What he could and did do was strip the existing structure back to the concrete frame and reclad

the entire building with grayish-white rectangular terra cotta tiles and sections of fritted glass. In the right light the tiles have an iridescent quality, but in overcast skies the façade turns a dull gray. Traces of the "lollipop" colonnade can be seen from inside the ground floor lobby, a conscious decision by Cloepfil, but that is the only visible remnant of the original façade. If you are unfamiliar with the previous building, you would be hard-pressed to know it even existed.

To give MAD a workable new home, Cloepfil smartly repositions the building's core along the West 57th Street side of the site away from Columbus Circle. In addition to four floors of gallery space, the 10-story museum now houses an education center, a renovated 155-seat below-grade auditorium, an upper-level events space, and a top floor restaurant that will open in spring 2009. All in all, it is more than three times the space the museum had in its previous location on West 53rd Street.

But, lighting's role in the new museum has a confused and lackluster presence. Gallery recessed tracklighting, with adjustable spotlights, competes with the artwork, and calls attention to itself because of the low ceiling heights. The track is not laid out in a way that appears to be coordinated with Cloepfil's attempt to bring natural light into the galleries through a series of horizontal and vertical cuts on the façade, which he refers to as "ribbons of light," and offers a view of the city and Central Park. Unfortunately these light slices, which also trace through the wood floor via opaque glass panels, do not have the staying power to create the sought-after quality of natural light in the galleries and are not articulated cleanly enough to deliver the intended impact: Looking out one of the narrow glass openings, what catches your eye is a fine horizontal cable—a bird deterrent wire. It is a greatly missed opportunity for MAD, which promotes the importance of craft, that it has built itself a new home where the quality of construction does not measure up to the level necessary to successfully carry out Cloepfil's minimalist intentions.

Similar to the New Museum of Contemporary Art on the Bowery, MAD offers a different kind of museum-going experience—a series of short disjointed vignettes separated by vertical movement via an elevator. Stairs, fire stairs to be exact, offer secondary vertical access between floors, but the starkness of these spaces with their concrete stairs and back-of-house fluorescent lighting counters the celebratory nature of a museum visit.

Another missed opportunity occurs on the building's façade, where a band of windows for the ninth-floor restaurant were required by museum director Holly Hotchner and the museum's board of directors. It is unfortunate that the museum did not trust the architect to create a solution that would provide views from the restaurant out to Central Park while keeping with the new architectural language of the façade.

With challenges at every turn, the southern site along Columbus Circle long has been riddled with complexity. The real issue facing any tenant is not about reworking a building but about how to transform an urban space. In that sense, the new design of Columbus Circle itself, by noted American landscape architect Laurie Olin and his Philadelphia-based firm, Olin, is a great success. Now pedestrian-friendly with a fountain, benches, and hard- and green-scapes circling the statue of Christopher Columbus from which the circle derives its name, it is one of the more successful public spaces the city has seen in some time. In that sense the nondescript façade of MAD offers the right foil for this urban crossroads, helping to convert it into a place that is a far cry from the uninhabitable traffic circle it once was. MAD would be well served to take advantage of this "front lawn." Opening weekend brought 8,000 visitors to the museum, but only time will tell if it can sustain that kind of attendance. Will it be a one-visit museum or a return destination? **ELIZABETH DONOFF**



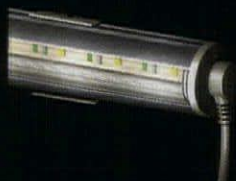
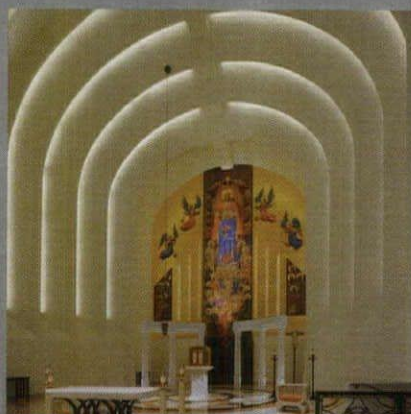
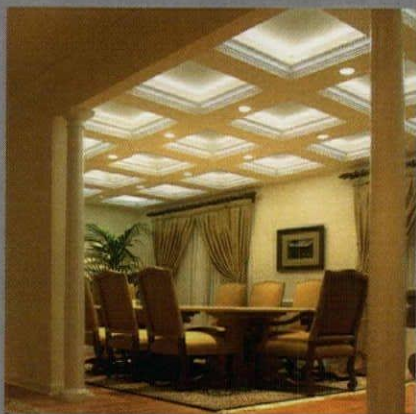
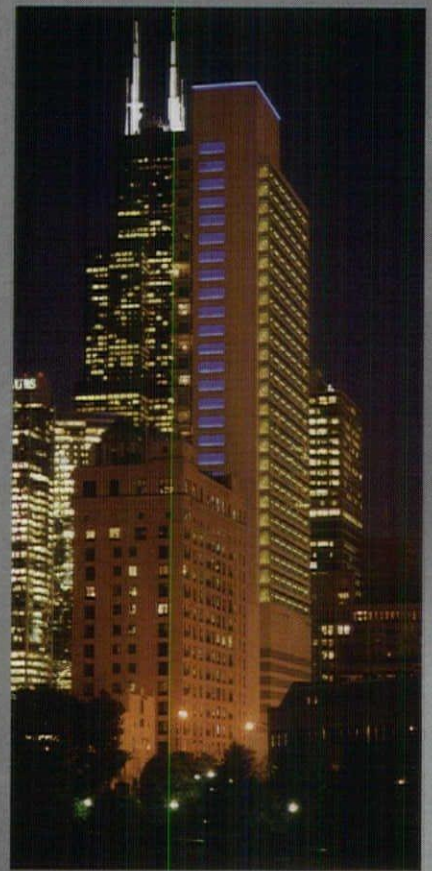
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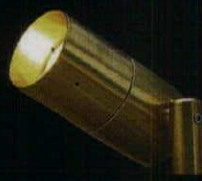
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[The Road Ahead]

HOW THE ECONOMY IS AFFECTING THE LIGHTING INDUSTRY

The current economic turmoil is forcing individuals and businesses to address an unprecedented set of challenges. While certain sectors such as the housing market have been completely blindsided, the lighting industry, both in design practice and manufacturing, is reacting somewhat differently. Firms and lighting companies have remained busy and it is only now, at the beginning of 2009, that the lighting industry is starting to see the impact of project slow-downs. What follows is an overview of some of the issues at hand for the lighting community as it navigates present economic conditions.

THE EFFECT ON DESIGN FIRMS AND DESIGNERS

Overall, the lighting community has experienced unprecedented growth over the past several years. The architectural community at large is more focused than ever on the value of good lighting. Lighting designers, in the U.S. and abroad, were still indicating at the close of 2008 that they remained extremely busy and could not hire enough staff to support their project load. "There are just not enough lighting designers out there to meet the demand," says lighting designer Brian Stacy, of Arup Lighting in New York. This is in part due to the limited number of university-based lighting design programs and the correspondingly small number of graduates entering the workforce each year. Additionally, there is a gap between entry- and senior-level professionals; past recessions removed the ever-valuable midcareer designer from the continuum as they left lighting for other industries.

While many architecture firms are being forced to cut significant percentages of their staffs, at present lighting design firms are not facing a similar situation. With a growing group of newly unemployed architects and designers looking for work, as well as recent architecture graduates entering a profession that is not hiring, one wonders if architecture's misfortune could be lighting's gain? Lighting designers could take advantage of tapping into new employee streams. But the opportunity may vanish quickly. As projects are canceled or put on hold, and the effects trickle down to lighting designers, they may lose

the chance to recruit this potential human resource. The lighting community may be equally at risk of losing its own group of recent and new graduates from lighting programs, as they search for employment in other fields during these difficult economic times. "There are some upcoming graduates we'd like to hire," says Glenn Heinmiller, principal at Cambridge, Mass.-based Lam Partners. "But given the economic situation, we need to be especially careful about our employment commitments."

ON THE MANUFACTURING FRONT

Many companies such as B-K Lighting, Day-Brite Lighting, Erco, Litecontrol, Martin, Selux, and Visa Lighting indicated stellar growth overall through the end of 2008, commenting generally that they had seen some of their highest sales figures to date. Brian Golden of Hanson, Mass.-based Litecontrol notes the company had experienced record shipments at the end of 2008. "There is no doubt that 2009 is expected to be difficult," says Nick Bleeker, director of business development for Tupelo, Miss.-based Day-Brite Lighting.

Initially, when the U.S. housing and mortgage crisis began to reveal itself in summer 2008, lighting manufacturers were operating under production schedules with a 12- to 18-month outlook. From June to December 2008, manufacturers reworked these timelines to a more immediate three- to six-month window that will require designers and manufacturers to be much more efficient in their project planning. "We anticipate a slowdown in the next quarter as jobs are being pushed off by a month or two," Golden says. Since November 2008, lighting manufacturers have seen a decline in quotes, an indicator in a general slowdown of new work.

GAUGING THE FUTURE

In an effort to assess business cycles, designers and manufacturers alike are paying close attention to several construction- and lighting-specific economic indexes, including the American Institute of Architects (AIA) Architecture

REPORT

Billings Index (ABI) and the National Electrical Manufacturers Association (NEMA) Lighting Systems Index (LSI). In December, the ABI, for the second consecutive month, posted its lowest level since the survey was initiated in 1995: 34.7. The ABI has fallen below 50 for eight consecutive months. (Scores above 50 represent billing increases.) Inquiries for new projects scored at 38.3, also a historic low. A regional look indicates that the Northeast (39.5) remains busiest in terms of project activity followed by the South (36.8), West (33.5), and Midwest (31.4). In terms of project types, mixed practice (44.5) remains strong followed by institutional (40.8), multifamily residential (30), and commercial/industrial (26.7).

The LSI, the key index for lighting manufacturers, declined by 4.3 percent in the third quarter of 2008. And while the index has fluctuated over the past several quarters, overall it has contracted by 7.5 percent in the past year, and by 12 percent since the start of 2006. (Data from 2002 is used as the index's 100-point benchmark.) The third quarter of 2008 represented a point level of 92.5. Previous lows date back to the fourth quarter of 2006 (93.5) and the first quarter of 1999 (94.5). The low mark for the third quarter of 2008 indicates the reduction of domestic shipments for all six lighting equipment segments—ballasts, emergency lighting, lamps, lighting controls, luminaries, and solid-state lighting—with large lamps posting the greatest overall decline.

Not surprisingly, demand for residential lighting equipment was weak. Housing starts are limited, and builders still do not have a sense whether the market has hit bottom. Very few lighting design firms have concentrated their practices solely on residential work, and it appears that manufacturers will continue to feel a greater impact in this sector than designers.

IS GREEN DESIGN AT RISK?

With banks limiting credit and consumers being extremely cautious about new purchases, even energy-efficient lighting equipment, such as compact fluorescent light bulbs, has experienced a decline in sales according to the LSI. Belt-tightening consumers view the higher first-cost pricing of such products as a deterrent. While this might seem like a small point, it actually calls attention to a much more troubling scenario: The economic recession could stunt the growth and success of the green building movement.

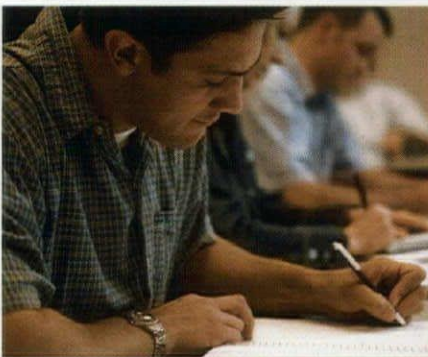
Contrary to what the LSI indicates for the green residential market, lighting manufacturers who create products for the commercial sector remain confident that lighting specifiers will continue to request energy-efficient products. "It's about producing luminaires that optimize performance," Day-Brite Lighting's Bleeker says.

There is broad consensus, well beyond the building construction and design communities, that green initiatives will be a key element in economic recovery. Such is the premise of Thomas L. Friedman's recent book, *Hot, Flat and Crowded: Why We Need A Green Revolution—And How It Can Renew America*. Friedman believes that renewed focus on energy

34.7

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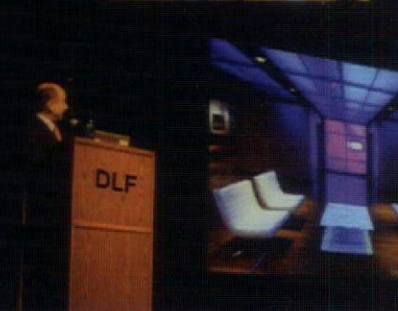
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REPORT

efficiency and sustainable initiatives will not only help re-establish the credibility of the U.S. on the world stage, but also create a new "green" economic sector that will result in business and job growth.

BUSINESS SECTORS

For months, observers looked to a relatively strong commercial sector to offset declines in the residential markets. But the ABI's recent

numbers have shown the commercial sector to be weaker than many had hoped. "The commercial marketplace, unlike the residential markets, is not based on bad loan practices or inflated values. It is responding to the recession," says Jimalee Daikin, vice president of sales and marketing at Milwaukee-based Visa Lighting. "When the economy turns, the commercial market should easily follow."

Reduced lending is slowing the commercial market, and both lighting designers and manufacturers are concerned about what this will mean down the road for new projects. The challenge is figuring out when the gap will occur.

For some lighting manufacturers with a smaller percentage of overall market share, this scenario presents opportunities. "There are still

small market opportunities, areas where it just doesn't make sense for the larger companies to invest," Daikin says. "This is the way smaller lighting companies can maintain growth." While the principal lighting conglomerates—Acuity, Cooper, Hubbell, and Philips—are looking for ways to reduce costs, such as pulling back on certain brands, other lighting manufacturers can start to expand into sectors where they once had only minor specifier access.

"The value of the independent lighting company remains strong," says Litecontrol's Golden. Many manufacturers agree that healthcare still appears to be a strong market sector, as does institutional work. Yet according to Mark Seiber, president of U.S. operations for Erco Lighting, the swiftness in the evaporation of speculative development has been overwhelming. Even emerging markets like China, Russia, and parts of the Middle East are not immune to the financial crisis and are starting to experience recessions of their own.

STAYING THE COURSE

If 2008 showed us anything, it is that the reality of business is no longer "business as usual." Nonetheless, many manufacturers agree that customer service and support cannot waiver in the current economic climate. All see it as a vital business practice. "If anything, we need to increase our responsiveness," Daikin says. "As specifiers reduce their forces, the workload on the remaining members is heavier. It is our job to minimize their effort to obtain technical information and design support." The strategy holds another lesson for manufacturers and designers alike: When the downturn ends, clients will remember who treated them well when the going wasn't so good. **ELIZABETH DONOFF**

4.3%

AMOUNT THE LSI DECLINED IN
THE THIRD QUARTER OF 2008

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BILOXI BAY BRIDGE, BILOXI, MISS.

CHALLENGE: RECONNECTING TWO COMMUNITIES SEVERED BY THE DESTRUCTION OF A BRIDGE DURING HURRICANE KATRINA

Project Biloxi Bay Bridge, Biloxi, Miss. **Design Team** Illumination Arts, Bloomfield, N.J. (lighting designer); Touchstone Architecture and Consulting, Tallahassee, Fla. (architect); Parsons Transportation, Chicago (engineer) **Photographer** Ken Douglas, Illumination Arts, Bloomfield, N.J. **Project Size** 1.6 miles long **Project Cost** \$338.6 million **Manufacturers** Kim Lighting, MagniFlood, WE-EF Lighting



Creating a horizontal necklace of light across the Biloxi Bay to connect the communities of Biloxi and Ocean Springs, Miss., with a continuous line of light, 55W QL lamps with a color temperature of 4000K are mounted to the side of the structure with custom-made brackets.



The bridge, which at its highest point sits 95 feet above the Biloxi Bay, is illuminated vertically at the bridge piers with surface-mounted metal halide floodlights varying from 100W to 250W. The vertical lines of light are meant to emphasize the strength of the bridge as rebuilt after Hurricane Katrina, while also tying it to the water and earth below.

SOLUTION On Aug. 29, 2005, portions of U.S. 90—one of the South's most-traveled scenic highways—were wiped out by Hurricane Katrina, including the Biloxi Bay Bridge that runs between Biloxi and Ocean Springs, Miss. These two communities, with their close social and economic ties, heavily relied on the connection because of the quick access it allowed between them. The construction of a new bridge was vital to signal the recovery of the area. Wanting to rebuild as quickly as possible, the engineers kept the structural design of the concrete bridge fairly plain. This is where the lighting design, completed by Bloomfield, N.J.-based Illumination Arts, came into play. The scheme ennobles the humdrum design of the bridge and symbolizes the reconnection of Biloxi and Ocean Springs.

Lighting design for bridges is one of Illumination Arts' specialties, as principal Ken Douglas notes. But the Biloxi Bay Bridge was different. With this project, Douglas says, there was "a lot of attachment to it, there was much more emotion involved. This area was wiped out, and this bridge was a symbol [to the community] of coming back." Through discussions with area residents, Douglas and his team came to understand just what the structure meant to the two communities, which led them to the reconnection theme.

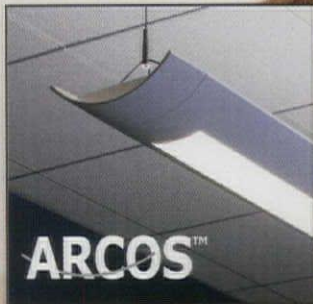
A necklace of light extends along the sides of the bridge deck, 95 feet above the surface of the water. Using 55W QL lamps with a color temperature of 4000K, mounted to the structure with custom-made brackets, Douglas intended to create a continuous horizontal line of light connecting the two communities on either end of the bridge. In

contrast, to emphasize the strength of the bridge and tie the deck to the water and earth below, surface-mounted metal halide floodlights varying from 100W to 250W vertically illuminate the bridge piers.

At each of the shoreline abutments of the 1.6-mile-long structure, 70W metal halide accent lights are used to highlight the underside of the bridge. Douglas points out that these accent lights were the result of forward-thinking to provide adequate illumination levels for people passing under the bridge through a shoreline park area.

When the bridge reopened to traffic in fall 2007, the community celebrated with a large party, complete with fireworks. "The reopening was a statement that the community was being rebuilt and overcoming what happened," Douglas says. Once again, these two cities are connected. The bridge allows access between Biloxi and Ocean Springs in about a five minutes—as opposed to the 45-minute post-Katrina, pre-reconstruction detour.

While creating a bridge lighting scheme initially might have seemed old-hat to Illumination Arts, in this instance, Douglas and his team had their work cut out for them. It wasn't easy to visually reconnect two cities using light, especially not with a fast-approaching deadline and a community with pressing questions and concerns. But the effort was successful—and in the end, that's all that matters to Douglas. "We had to give them a beautiful structure they could be proud of," he says. "This is more than just a bridge to the people who live there. We wanted to pick up on their emotions and represent those emotions with the lighting." **JENNIFER LASH**



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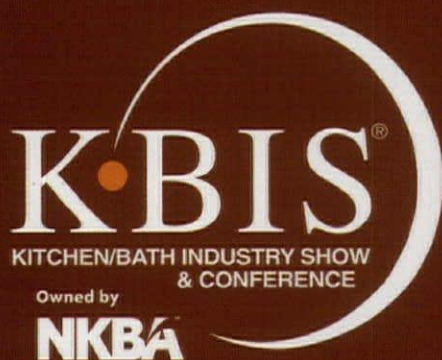
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Light Motif

STRATEGIES FOR MUSEUM TRACKLIGHTING



The new exhibition space at the Shirley Sherwood Gallery of Botanical Art at the Royal Botanic Gardens, Kew, London, uses a flexible track system to illuminate the collection. Mounted below the clerestory in the main gallery, the track is not visible outside the museum's glass façade. Linear T5 fluorescents uplight the gallery soffit (above).

In museums, tracklighting is a workhorse. For decades, it has been the go-to solution when dealing with the demands for flexible gallery lighting. A simple piece of track is the vehicle to precisely place a spotlight to illuminate artwork, to get the right angle to reveal the modeling of a piece of sculpture, to control glare on a painting, or to conserve light-sensitive pieces such as drawings or photographs. While it seems like an easy solution, tracklighting has its drawbacks and detractors. In the past 10 years, museum architecture has become increasingly expressive and more complex formally. With attention on unique designs, architects and curators are challenged to find ways to incorporate track without deterring from gallery ambience.

"The challenge is how do you design a grid or pattern that puts light in the right place and is part of the architecture," explains Washington, D.C.-based lighting designer George Sexton, who has worked for years developing recessed track systems. Full integration of the track system into the architecture is not just visual—it also has to be cost effective, maintainable, and energy efficient. The Museum of Modern Art and the New Museum of Contemporary Art in New York; the Bloch Building Addition at the Nelson-Atkins Museum of Art in Kansas City, Mo.; and London's Shirley Sherwood Gallery of Botanical Art at Kew Gardens are four museums that each illustrate innovative lighting design based on the traditional track motif. **MIMI ZEIGER**

METHOD



Tungsten halogen spotlights illuminate the Kew galleries (above left). The reception area is outfitted with track-mounted compact fluorescent wallwashers (above right).

Project The Shirley Sherwood Gallery of Botanical Art at the Royal Botanic Gardens, Kew, London

Tracklighting System Suspended hi-track system with tungsten halogen adjustable spotlights

Lighting Designer Speirs and Major Associates, London **Manufacturers** Erco, Lutron

Kew Gardens is home to a renowned collection of botanical art, but until the opening of a new gallery this past April, most of the 200,000 examples were, for reasons of conservation and climate control, stored in the Kew library and inaccessible to the public. London-based architects Walters and Cohen designed the exhibition space as a “box within a box”—a central gallery surrounded by smaller rooms. Lighting design firm Speirs and Major Associates used a flexible track system to light the rotating collection. Mounted below the clerestory in the main gallery, the suspended track is not visible outside the museum’s glass façade. Linear T5 fluorescents uplight the gallery soffit.

The three-circuit suspended hi-track system adapts to the varied nature of the botanical artworks, which encompass a variety of media: watercolors, drawings, oil paintings, and sculpture. The artworks in the main and side galleries are illuminated with track-mounted 20W and 35W narrow- and wide-beam tungsten halogen adjustable spotlights with UV filter and spread lens accessories, while the walls of the reception area are lit with track-mounted 55W compact fluorescent wallwashers. The system also conforms to strict conservation requirements (maximum 50 lux) and achieves low light levels by reducing the lamp wattage, using interchangeable accessories and individual spotlight dimming via a simple lighting control system.

METHOD



Recessed linear track with MR16 lamps is the system used in the galleries at the Museum of Modern Art (above left). A custom linear fluorescent track solution was developed for the New Museum of Contemporary Art to achieve the architect's desired cool color temperature (above right).

Project Museum of Modern Art, New York

Tracklighting System Recessed track with adjustable spotlights

Lighting Designer George Sexton Associates, Washington, D.C.

Manufacturers Edison Price Lighting, Litelab, Nulux

Lighting designer George Sexton has been working on museum projects since the early 1970s. He acknowledges that tracklighting is the most cost-effective means to put a fixture in the right place to correctly illuminate art without glare or reflection. His design for the Museum of Modern Art (MoMA) uses recessed track with adjustable spotlights. The track, known as busway, works better with present-day lighting codes, allowing for longer track lengths and fewer junction boxes, which ultimately is more cost effective. Sexton worked closely with the museum's exhibition team, architect Yoshio Taniguchi, and executive architect KPF, to achieve a highly integrated design.

Slotlux (a term coined by Edison Price) is a flexible and recessed linear system that is tightly designed into the ceiling construction. Used primarily in the MoMA public entry lobby spaces, the flangeless system is adjustable and versatile. The panels that give the fixture a streamlined appearance can be moved and replaced according to display demands and curatorial needs. Sexton developed a similar system with Price at Edison Price Lighting in the 1980s and has continued to refine its components with Price to accommodate MR16 lamps.

Project New Museum of Contemporary Art, New York

Tracklighting System Custom-designed track system with linear fluorescent and quartz halogen PAR lamps

Lighting Designer Tillotson Design Associates, New York

Manufacturers Bartco, Lighting Services Inc.

Japanese architects Kazuyo Sejima and Ryue Nishizawa, known together as SANAA, are masters of minimalism. Every detail of their New Museum of Contemporary Art (a stack of spare, white cubes in the once gritty Bowery neighborhood) is highly refined, including the lighting. When the architects first presented their concept to lighting design firm Tillotson Design Associates, the illumination scheme was simply expressed as a series of parallel lines of light. "The light is as much about the architecture as it is about the art in the building," says David A. Burya, a senior lighting designer at Tillotson. The challenge for the team was to find a flexible, neutral system that would create a bright environment suitable for contemporary art.

In terms of lighting, contemporary art requires less attention to preservation than older works, thus it is able to withstand fluorescent exposure. Tillotson worked with lighting manufacturers Lighting Services Inc. (LSI) and Bartco to design a custom bus scheme. It uses linear T5HO fluorescents adapted to mount on a busway spine the designers selected from LSI. Accent PAR38 spotlights link into the same track. Keeping with SANAA's minimalist aesthetic, the Bartco fixture was retooled to fit into the track, and refinements included removing extraneous knock outs and screw holes until the fitting was nearly just a piece of bent metal. All emergency lighting is integrated into the busway, which is fed from both ends, with one dedicated emergency feed, so the gallery ceiling remains a model of simplicity.

LEFT: TIMOTHY HURSELEY, RIGHT: DEAN KAUFMAN

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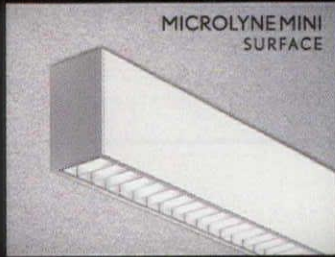
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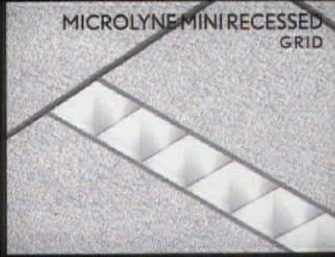
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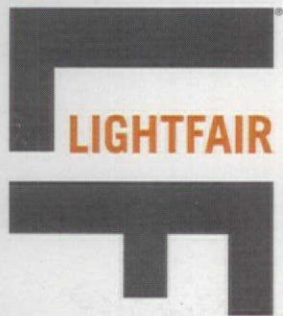


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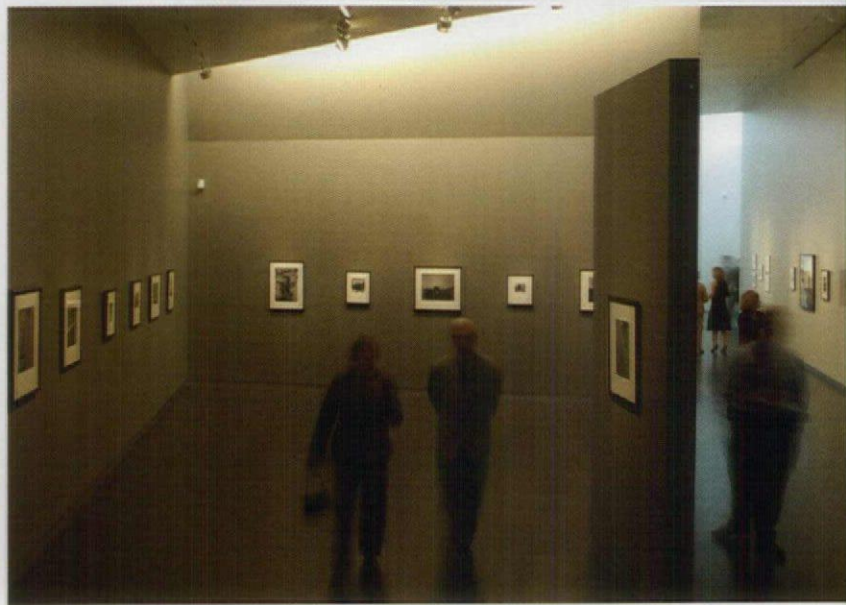
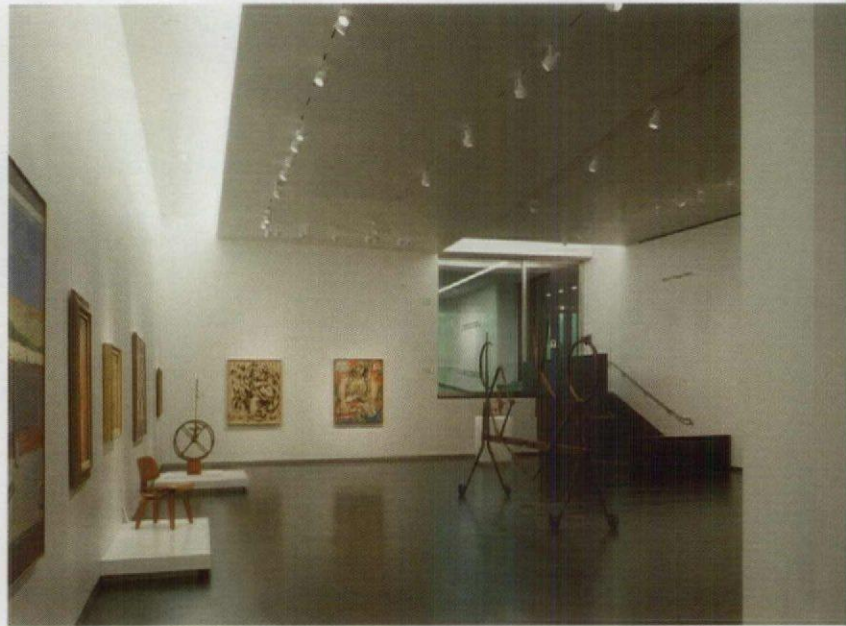
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METHOD



"Stitch track" was selected for the Bloch Building Addition to respond to the variety of ceiling heights throughout the building, which range from 12- to 20-feet high.

Project Bloch Building Addition, Nelson-Atkins Museum of Art, Kansas City, Mo.
Tracklighting System Stitch track system to respond to ceiling configuration
Lighting Designer Renfro Design Group, New York **Manufacturer** Edison Price

The signature of architect Steven Holl's Bloch Building Addition to the Nelson-Atkins Museum is five glass pavilions. The architect refers to them as "lenses," because they flood the below-grade galleries with daylight. Clerestories in the pavilions allow for a connection to the outside and shape the interior architecture. In addition to the tracklighting, the natural light offers a small amount of ambient illumination for the artwork. Moreover, ceilings in the galleries are not flat; they slope and peak to follow the rolling grass planes above. Lighting designer Richard Renfro's "stitch track" is a response to the challenge of the sculptural architecture. Unlike traditional linear track, stitch track deftly conforms to the unusual architectural topography. The recessed system looks like a dashed line sketched across the surface—12-inch segments alternate with 16-inch gaps. The track is connected and aligned in 8-foot units above the ceiling. Below, each stitch can hold two low-voltage track heads: either tungsten halogen PAR38 adjustable wallwashers with spread lenses or tungsten halogen AR111 adjustable accent fixtures. The lamp used depends on the ceiling height, which varies from 12- to 20-feet high throughout the galleries, and the kind of artwork being illuminated.

Renfro's and Holl's teams worked closely on the lighting solution, eventually blurring the line between architecture and lighting design. "At one moment in the back and forth collaboration the track became part of the materials of the building," Renfro explains. "The track is not just a tool to light art, but part of the architectural experience."

LEFT: JEFF NICHTEGALE; TOP RIGHT: ROLAND HALBE; BOTTOM RIGHT: MARK MCCONALD; COURTESY OF THE NELSON-ATKINS MUSEUM OF ART

Are You Using State-of-the-Art Lighting Controls?

Until the mid-1970s, buildings usually were designed without any type of lighting control. In fact, many also were designed without heating systems, because of the enormous heat produced by 24-hour operation of indoor lighting systems. In hot climates, you can imagine how this added to the amount of air conditioning required to cool an entire facility. No wonder that since the first energy codes were implemented in 1975, switches for every room is a basic requirement.

Even if you're designing superefficient buildings, you still have to provide lighting. Normally, efficient lighting with simple switching will consume 20 percent to 40 percent of the total electric energy use of the building, with most of it "on peak" when electricity is most expensive. With the best lamps and ballasts, a superefficient design can save a few more watts. But to significantly reduce lighting use, especially on peak, using state-of-the-art lighting controls is probably the most effective way.

PERFORMANCE CAPABILITIES OF COMMERCIAL LIGHTING CONTROL SYSTEMS

STATE-OF-THE-ART SYSTEMS	Daylighting	Small Zone Motion and Vacancy	Large Zone Motion and Vacancy	User Dimming	Tuning	Scheduling	Adaptation Compensation	Demand Management and Response	Scenes and A/V Interface	Cost
DALI-based (stand alone)	↑	↑	●	↑	↑	●	?	↓	(3)	\$-\$\$
DALI-based (with overlay)	↑	↑	↑	↑	↑	↑	?	↑	(3)	\$\$-\$\$\$
Zone-based	●	↑	↑	↑	↓	↑	?	●	↓	\$\$\$-\$\$\$\$
Legacy-based	●	●	↑	●	(1)	↑	●	●	●	(4)
CONVENTIONAL LIGHTING CONTROLS										
Conventional analog system with analog dimming ballasts throughout; without central relay panels	●	↑	↓	●	↓	↓	↓	↓	●	\$-\$\$
Building Automation System (BAS) with conventional relay-based zones (2)	↓	●	●	↓	↓	↑	↓	↓	↓	\$-\$\$
BAS overlay to complex legacy system with stand-alone small zones and analog dimming ballasts throughout	●	↑	↑	↑	↓	↑	●	●	●	\$\$\$-\$\$\$\$

↑ Performs well at modest cost

● Performs acceptably with minor cost or performance issues

↓ Function not possible or unusually expensive and/or difficult

? System might be capable

(1) When using the DALI option

(2) Systems employing large numbers of relays in central cabinets only

(3) Scenes are easy; standard A/V interfaces are not yet available

(4) The cost of legacy-based systems varies more widely than other systems

The overarching concept of state-of-the-art lighting controls is to offset the cost of high-performance controls by reducing the cost of equipment and wiring, including copper and steel, as well as the labor that normally is associated with lighting control systems. State-of-the-art systems have the following distinctions:

- Digital communications over a network of connected devices.
- Distributed intelligence, although a central computer may be necessary for multizone functions.

- Smart dimming ballasts and drivers with the ability to turn themselves on and off and respond to control signals for dimming, and/or smart zone controllers with relays and dimmers to control groups of incandescent lamps as well as modern sources with dumb ballasts and drivers.
- Reduced line voltage wiring with simple "hot" branch circuits and home runs.
- No line voltage control devices such as snap switches, dimmers, or line voltage motion sensors.
- No central panels, especially large panels with racks of dimmers or relays.

BRAINS EVERYWHERE

Contemporary light sources used in commercial lighting such as LED and fluorescent adapt to digital controls easily. Simple additions to ballast or driver internal electronic circuits permit a wide range of control options including on/off switching, dimming, and digital communications. Then "brains" are added so ballasts and drivers can remember their current state and perform complex functions such as individual addressing, programmed response, and the ability to communicate with a central control panel or building management system.

An alternate smart system takes the brains out of the ballasts and puts them in zone controllers. Zone controllers are a useful hybrid; they perform almost all of the duties of a smart ballast, but one controller can drive a large number of conventional lamps and ballasts that all switch and dim at the same time and by the same amount.

What makes this possible is the low cost of embedded controllers with memory. In the case of a fluorescent ballast, the added cost of brains and dimming should be only \$25 to \$30 more than a nondimming dumb ballast. The minuscule demand for these types of controllers has kept this price from becoming a reality, but that is changing.

STATE-OF-THE-ART COMMERCIAL LIGHTING CONTROL OPTIONS

There are three different approaches to commercial control systems.

Digital Addressable Lighting Interface (DALI)-based systems are simple to the point of elegance. A complete DALI system consists of a bus hub and sensors, ballasts, and input ports connected on a simple two-wire bus circuit. Programming is stored throughout the circuit's devices. Although DALI buses are limited to 64 nodes per bus, multiple buses can be used. A master "overlay" computer can be added that interconnects buses and enables interbus communication and powerful functionality. There also are systems, such as Lutron's Ecosystem, that essentially are DALI-based but not advertised as such.

Zone-based systems are hardware intensive and require a master overlay computer. For each zone or small group of zones there is a zone controller to which the loads, sensors, and input ports are hardwired. Systems include a controller for every zone and a digital network (usually Ethernet). The master overlay computer connects to and communicates with all of the zone controllers. Zone controllers can switch any lamp load and dim 10-volt analog ballasts and drivers.

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Legacy-based systems are hardware and wiring intensive. Because they are based around old-fashioned relay and dimmer panel design, these systems are only marginally described as state-of-the-art. But they can offer the best of the old along with some of the new, giving designers the most options, including DALI. Because these systems were developed for networking amid relay and dimming cabinets, powerful overlay computer controls are standard.

HOW THEY TALK

There are two principal types of digital control networks: wired and radio frequency (RF). For commercial lighting, wired systems are the most common. This is partly because of the relative maturity of conventionally wired systems and DALI, which has been around since the mid-1990s. But it also is due to the immaturity of the RF lighting controls market and competing standards such as Zigbee and Z-Wave. However, many industry experts feel that commercial-grade wireless systems are just about ready to enter prime time. When finally available, they will play a huge part in retrofitting older buildings for efficiency.

CHOOSING A SYSTEM

The decision to use a full-function lighting control system hinges on its energy cost savings potential. There are eight principal ways that lighting controls save energy costs:

- Daylighting where electric lights are dimmed or extinguished in response to natural light.
- Small zone motion and/or vacancy detection where sensors see all occupants and extinguish lights when the space is unoccupied.
- Large zone motion and/or vacancy detection where sensors are combined with scheduling to provide night security and safety.
- User dimming where individual occupants can control lights.
- Tuning maximum light levels to be set to limit lighting power.
- Lights are switched on a fixed or programmed schedule.
- Adaptation compensation where interior lights are dimmed to ease adaptation of the eye and harvest energy savings at night.
- Demand management and response where building energy use is monitored and reduced in response to energy cost or grid emergencies.

Lighting controls also are expected to support the functional use of the space. The most common of these is the ability to change lighting scenes to support audio, video, and similar functions. While it is possible to achieve almost every level of control with conventional lighting controls, the cost and complexity can become profound.

SOFTWARE, PROGRAMMING, AND COMMISSIONING

Programming and commissioning costs should be included in system specifications and factored into estimates. It is best done by trained and experienced personnel. Consider making it a requirement of the manufacturer or a trained agent. The specifier should provide a detailed description of all the functions expected from every luminaire and component, but, without a significant investment in their own training, the actual programming and commissioning should be left to others. Also, make sure contractors are trained in lighting controls bidding, installation, and troubleshooting. Unless the contractor believes that installation cost savings will occur, the cost of state-of-the-art systems will be much higher than expected. **JAMES R. BENYA**

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EASY RIDER

Exhibition lighting celebrates Harley-Davidson's legacy of design and performance, and captures the lure of the open road

Pentagram partner Abbott Miller doesn't ride a Harley, but that doesn't stop him from recognizing the motorcycle's beauty. He cites Harley-Davidson's early history, when around 1920 the company linked bike performance to style, aesthetics, and self-expression. Today, the brand is still built as much on form as function. "Riders talk about the freedom and independence of riding a Harley, but at the end of the day they are design fetishists," Miller says.

Pentagram's new Harley-Davidson Museum in Milwaukee celebrates that legacy of design and performance. As a designer, Miller feels a kinship with the company's attention to detail—the obsession with how an object looks, feels, and functions. So, when tasked with creating the museum's exhibition spaces, he felt right at home. That attitude translated to the rest of the design team: Pentagram partner and architect Jim Biber and associate Michael Zweck-Bronner designed the base buildings and campus in conjunction with Minneapolis-based HGA Architects and Engineers. The result is a museum that has the style and functional ease of worn-in biking leathers and celebrates a legacy of design and performance.

Set on 20 acres at the edge of the Menomonee River, the 130,000-square-foot complex takes its cues from the site's industrial past. Biber and team shaped a streetscape of three separate, factory-like buildings—which house exhibition and event spaces, company archives, a restaurant and café, and a retail shop—from stripped-down materials such as brick and galvanized steel. The semi-urban arrangement recalls rally towns like Sturgis, S.D., where throngs of riders gather annually with their bikes lining the downtown sidewalks.

Biber strove to avoid small-town clichés. Old-fashioned light posts would turn the design into a theme park, so the outdoor illumination is decidedly unexpressed. Cube-shaped bollards with 39W T6 ceramic metal halide lamps take the place of the light posts. Many of the fixtures are mounted directly to a steel exoskeleton or attached to the buildings themselves. In-ground up-lights using 39W ceramic metal halide lamps wash the mural-sized "Harley-





Davidson" sign, and a linear LED fixture is used to illuminate "1903" (the year the company released its first bike) spelled out in glazed and unglazed black brick. "The design is elegant in a tough way," Biber says.

Miller continued the industrial aesthetic and straightforward, performance-driven approach to lighting in his permanent exhibits, a historical narrative that begins on the second floor. The show-stopping "roadway" formation of classic Harley-Davidson bikes is the core of the collection. Arranged chronologically through a double-height volume, the rows of motorcycles visually dominate both the ground-floor and upper-level galleries. The roadway presented a lighting challenge to Miller and John Newman of New York-based lighting firm Brandston Partnership: How to celebrate the dynamic, streamlined form of a motorcycle across 174- and 168-foot-long displays? General spotlights would create point reflections and break the design lines, so Miller and Newman looked to the history of automotive photography and found a technique that involved a larger continuous-base light source to highlight the bikes' tanks, fenders, and handlebars in a single racing stripe.

On the mezzanine level of the roadway exhibit, two long, parallel rows of direct linear fluorescent luminaires illuminate the bikes. Each pendant-mounted 1x4 fixture is equipped with two 28W T5 lamps with a micro-pyramidal optic. The diffuser controls brightness, limiting it to just underneath the filter. Newman worked closely with the manufacturer to design a spine that would support the long run of multiple fixtures. On the lower level roadway exhibit, a custom 174-foot-long extruded aluminum fixture, equipped with staggered T5 lamps, provided the solution. Hanging 28 feet below the ceiling, it is fed by 120-volt cables at both ends. "We were pushing the limits of extrusion die sizes," Newman says. "The whole thing is a puzzle: The complete extrusion is three parts, and the entire fixture fits together in 8-foot sections."

Just off the roadway on the upper level is the Engine Room display. Harley-Davidson's biomorphic engines are icons of engineering and performance, not to mention design. A motorcycle explodes into parts in the center of the room, but it is the display of more than two dozen engines against a bright orange wall that has a powerful, theatrical draw. The wall's color-saturated intensity comes from lighting: 8-foot-long 54W T5HO linear fluorescent striplights outfitted with dual elliptical reflectors and orange gels the exact shade of the wall paint color. To highlight the engines chrome with cool, sparkly reflections, Newman used narrow beam fixtures with MR16 lamps fitted with daylight-white color filters. The system is dramatic, but not expensive.

MR16 tracklight lamps are the workhorse fixture of the exhibition design. Their standard components adapt to the demands of each piece of Harley history. For instance, in a gallery devoted to racing clubs and rallies, the designers used a combination of MR16s with linear spread lenses and low-voltage festoon lights, hidden behind a fascia at the base of the display, to illuminate the racing bikes underside mounted on a wooden curved board track. A ceiling-mounted MR16 framing projector with a breakup gobo washes the wooden surface in a texture that recalls the salvaged floorboards used in the history gallery. Artifacts and photographs under the board track are lit with simple track.

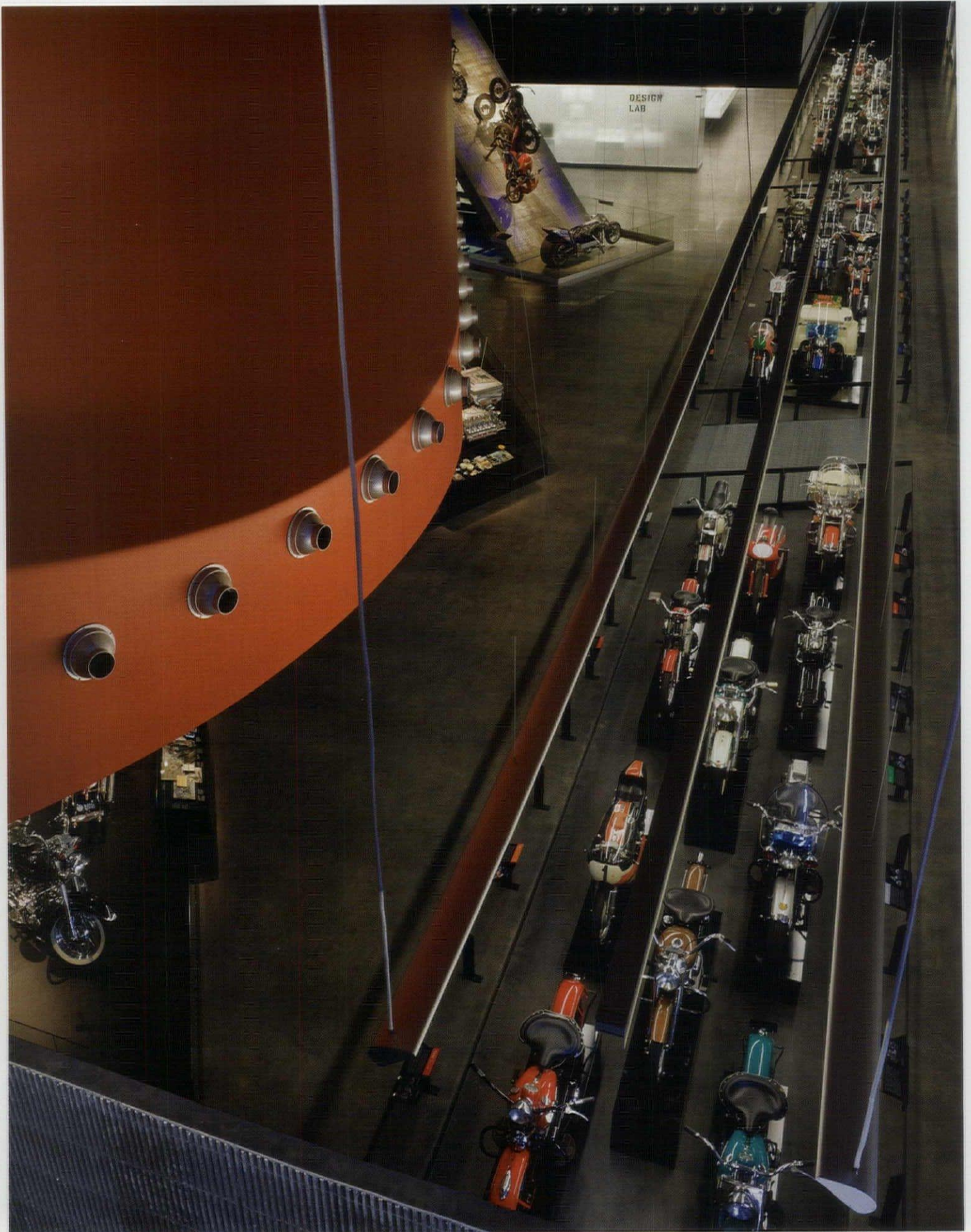
Much of the lighting in the museum is designed to disappear. Tracklighting and light boxes made up of T8 lamps, UV guarded for conservation, seamlessly integrate into the Harley-Davidson narrative. However, the Serial Number One motorcycle displayed on the second floor is the oldest Harley-Davidson model, and therefore is treated with special jewel-like attention. Enclosed in glass, the bike is illuminated from above and below by T8 fluorescent fixtures with 1x1 cell louvers on the upper source to control glare. Around the exhibition case is a dimensionally accurate luminous outline of the backyard shed where the company began. It is made up of 4-inch-wide electroluminescent film set in the floor and topped with frosted glass.

If Serial Number One is the epitome of the company's history, then the Design Lab represents the company's future. The difference between the two spaces is striking. "We wanted to tell the story that this is a modern company that isn't tied entirely to the character of the past," Miller explains. Here, new prototypes, design drawings, and manufacturing technologies are displayed under an even fluorescent glow. The soffit ceiling contains T8 lamps while 20-foot-long by 5-foot-wide rectangular, direct/indirect T5 pendant fixtures with luminous mitered corners add to the sci-fi atmosphere.

The museumgoer's journey ends astride a Harley. Pentagram didn't try to simulate a ride, but it used video and lighting to evoke something authentic and visceral. Visitors watch a video of a country ride on large high-definition screens.



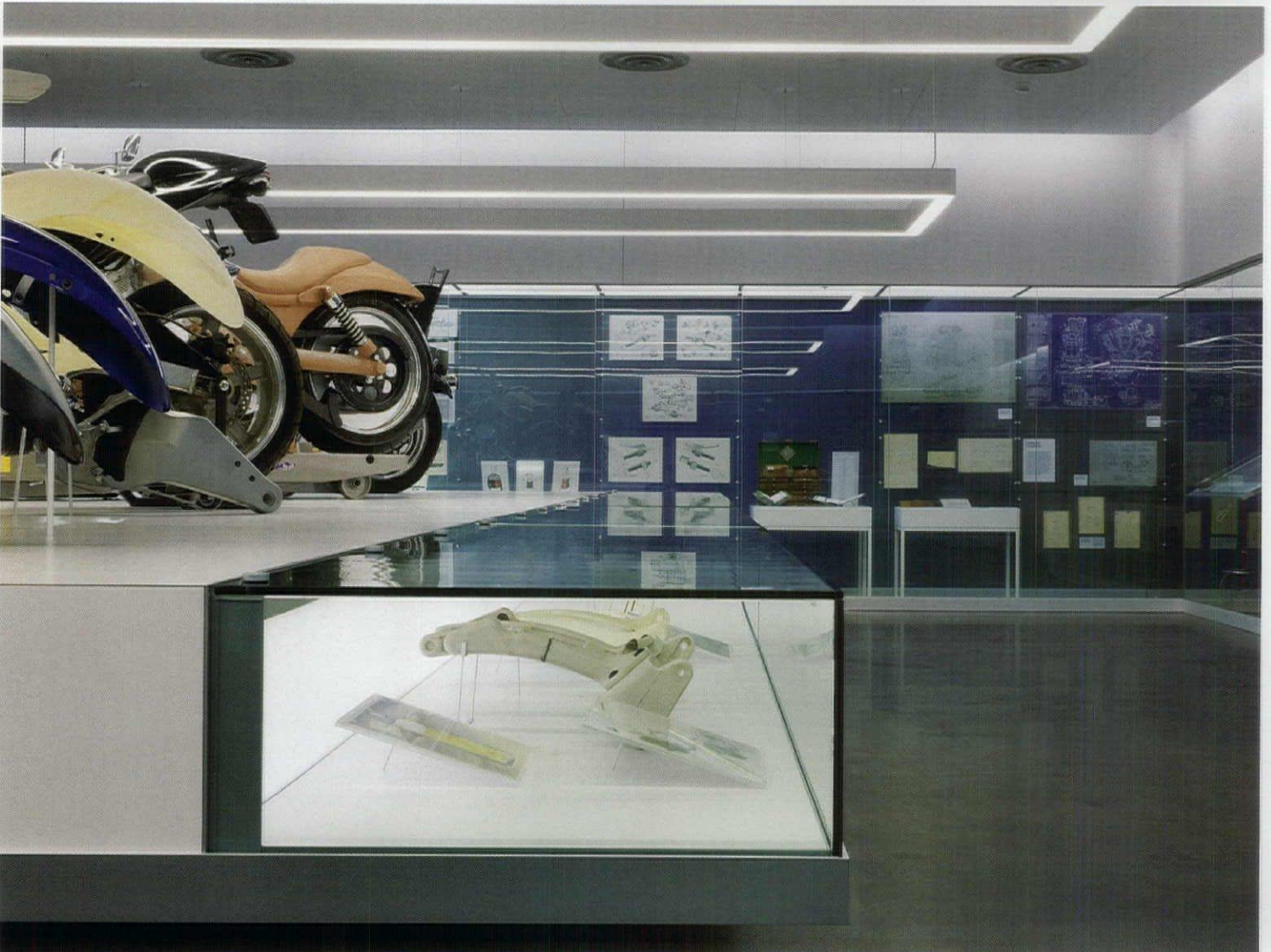
MR16 tracklights are the workhorse of the general gallery spaces (above), but exhibition designer Abbott Miller of Pentagram and lighting designer John Newman of Brandston Partnership pulled out all the stops for special displays. A custom 14-inch-wide extruded-aluminum fixture with staggered T5 lamps (facing page) illuminates a chronological "roadway" exhibit of Harley-Davidson bikes.

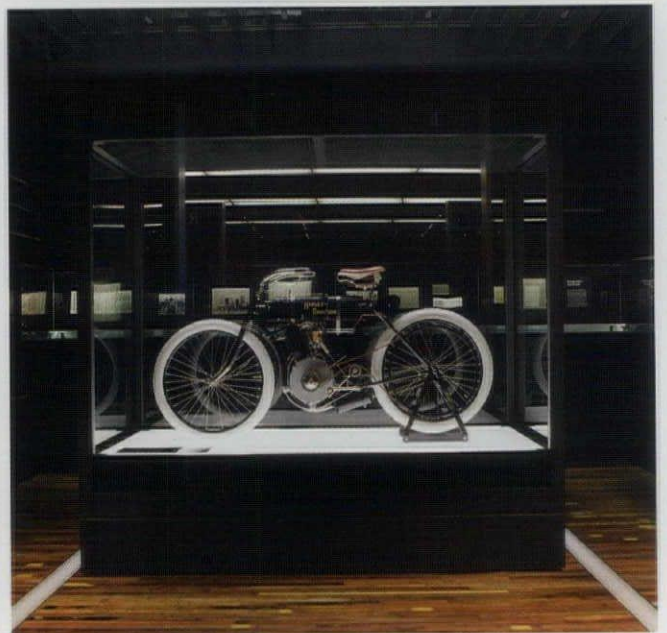
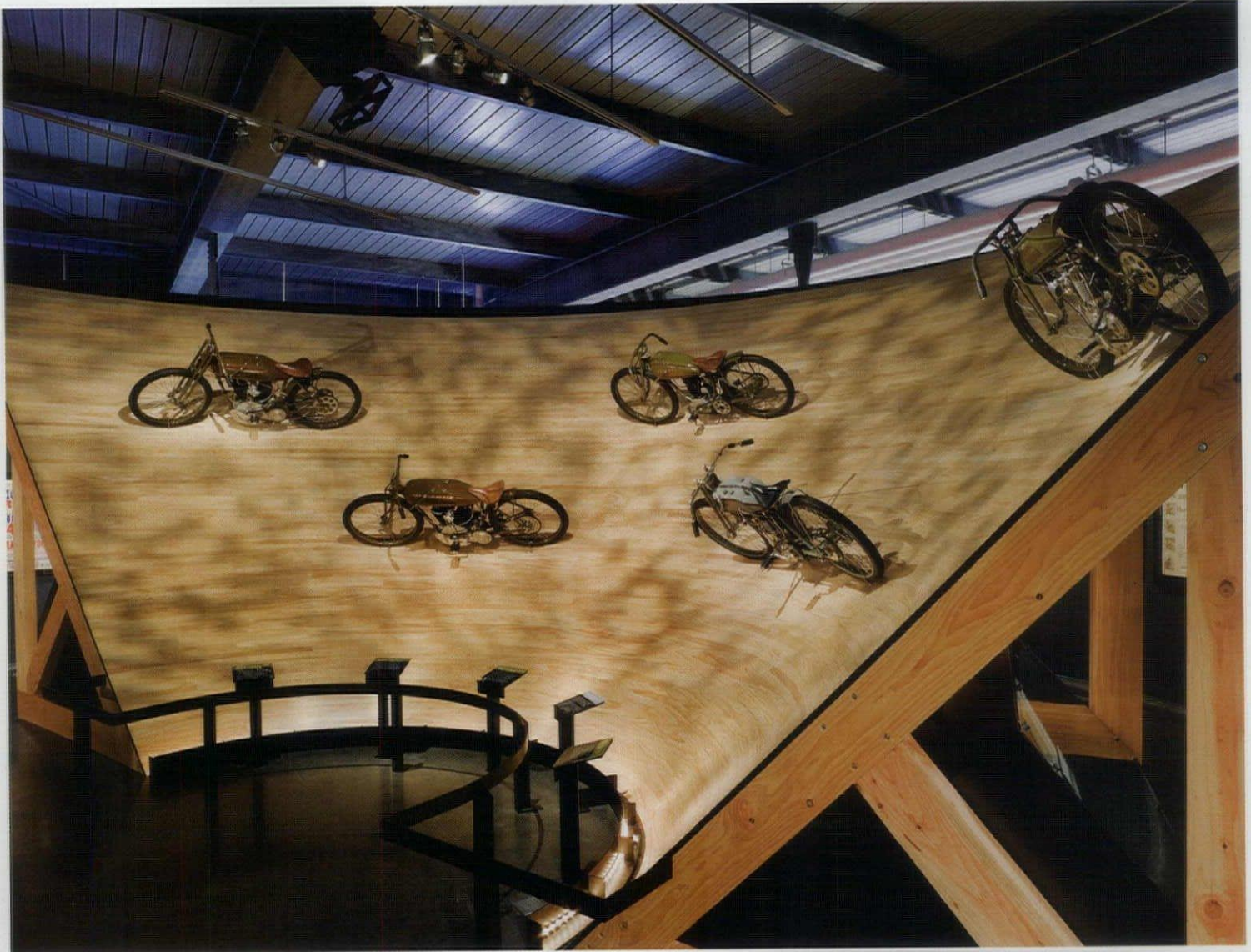


Individually controllable RGB-based LEDs installed around the TV are connected to a video processor. Software recognizes the color on the screen, and projects the same quality and color of light to create an abstraction of the video. It is an interactive experience. "After an hour and a half walking through the galleries," Miller says, "here is where the visitor can sit on a motorcycle and feel the open road in front of them," Miller says. **MIMI ZEIGER**

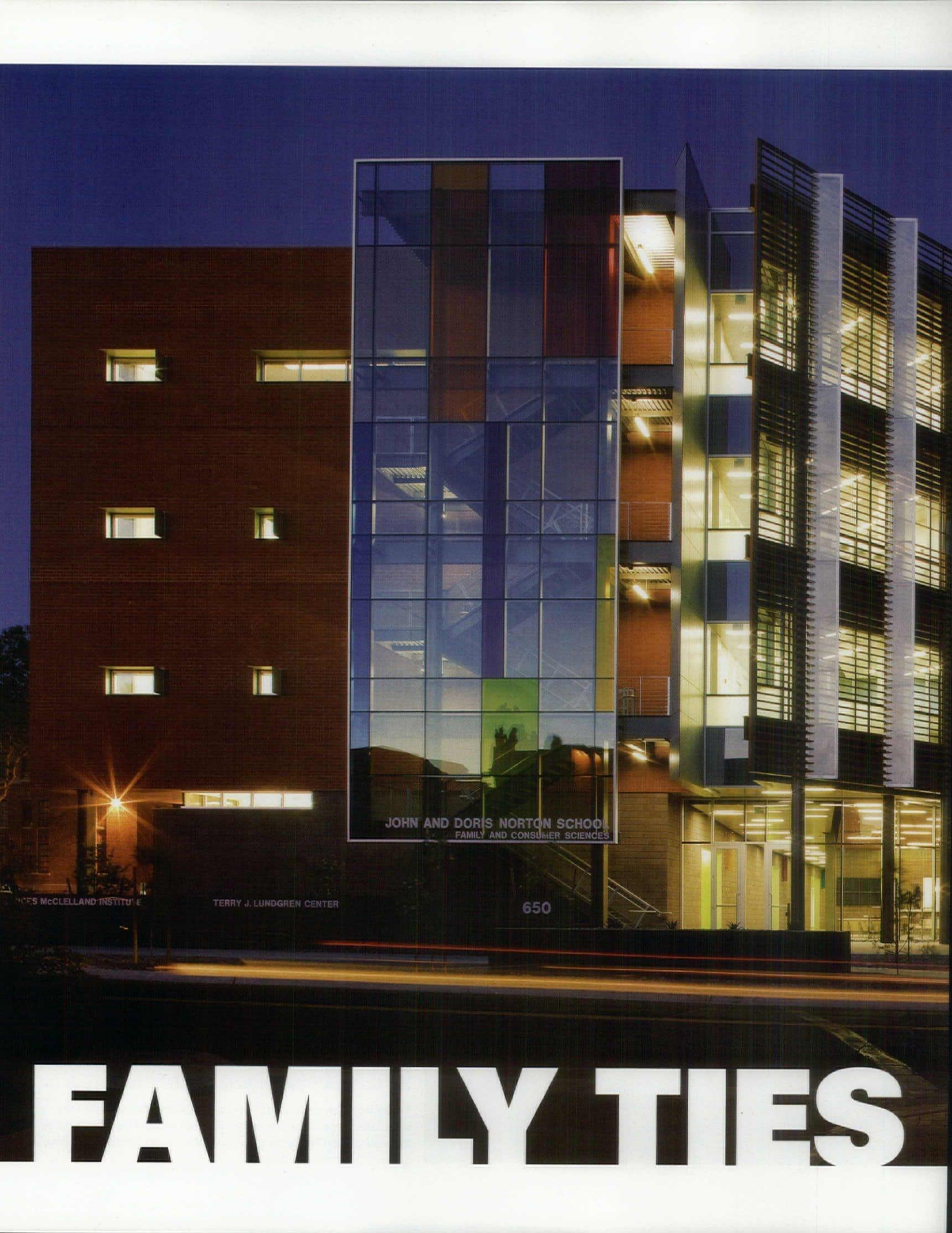
Project Harley-Davidson Museum, Milwaukee **Client** Harley-Davidson Motor Co., Milwaukee
Architect Pentagram Architects, New York **Architect of Record** HGA, Minneapolis
Exhibition Design Pentagram, New York and Baltimore **Exhibition Lighting Design**
 Brandston Partnership, New York **Project Cost** \$75 million **Photographer** Paul Warchol, New York
Manufacturers and Applications, Exterior Bega: Inground uplights and roadway lighting • B-K Lighting: Inground uplights at planters and in museum • Focal Point: Round fixtures under bridges • Hydrel: Inground uplights at Rivet Wall and sculpture
 • Kim Lighting: Harley-Davidson sign lighting • io Lighting (Cooper): LED strips at benches
 • LightWild: inground light tiles • Visa Lighting: Cube bollards and canopy uplights
Exhibit Altman: T6 metal halides • A+L Lighting: Linear fluorescents throughout • Ardee Lighting: Harley-Davidson sign LED backlights • Cathode Lighting Systems: Bridge exhibit linear lighting • CeeLite: Electroluminescent photo mural backlighting • Philips Color Kinetics: LED strip above projection screen • E-Light Technologies: Harley-Davidson shed LED outline • ETC: Dimming panels • GE: T8 lamps • io Lighting (Cooper): LEDs in gallery shelving • Juno: MR16 tracklights • LSI: Tracklights throughout • Phaylux: Design Lab exhibit direct/indirect pendants • Prudential: Linear fluorescent wallwasher • Roberts: Incandescent steplight • Selux: Direct/indirect pendant • Vode Lighting: Custom linear fixture for motorcycle "roadway" and wall-mounted gallery lighting • Winona Lighting: Linear fluorescent striplights in Engine Room display • Zumtobel: Direct linear fluorescent pendants in upper-level gallery

The museum celebrates the company's rich legacy, as in the Evel Knievel installation (below), and highlights ongoing innovations. The bright white Design Lab (bottom) features prototypes, design drawings, and manufacturing technologies under a soffited ceiling made luminous with T8 lamps.





Pentagram endeavored to create a rich visitor experience through authenticity rather than clichéd interactives, as in the jewel-box display of the first-ever Harley, the Serial Number One (above), and a slice of 1920s board track (top). A projection screen (left) captures the spirit of bikers on the road.



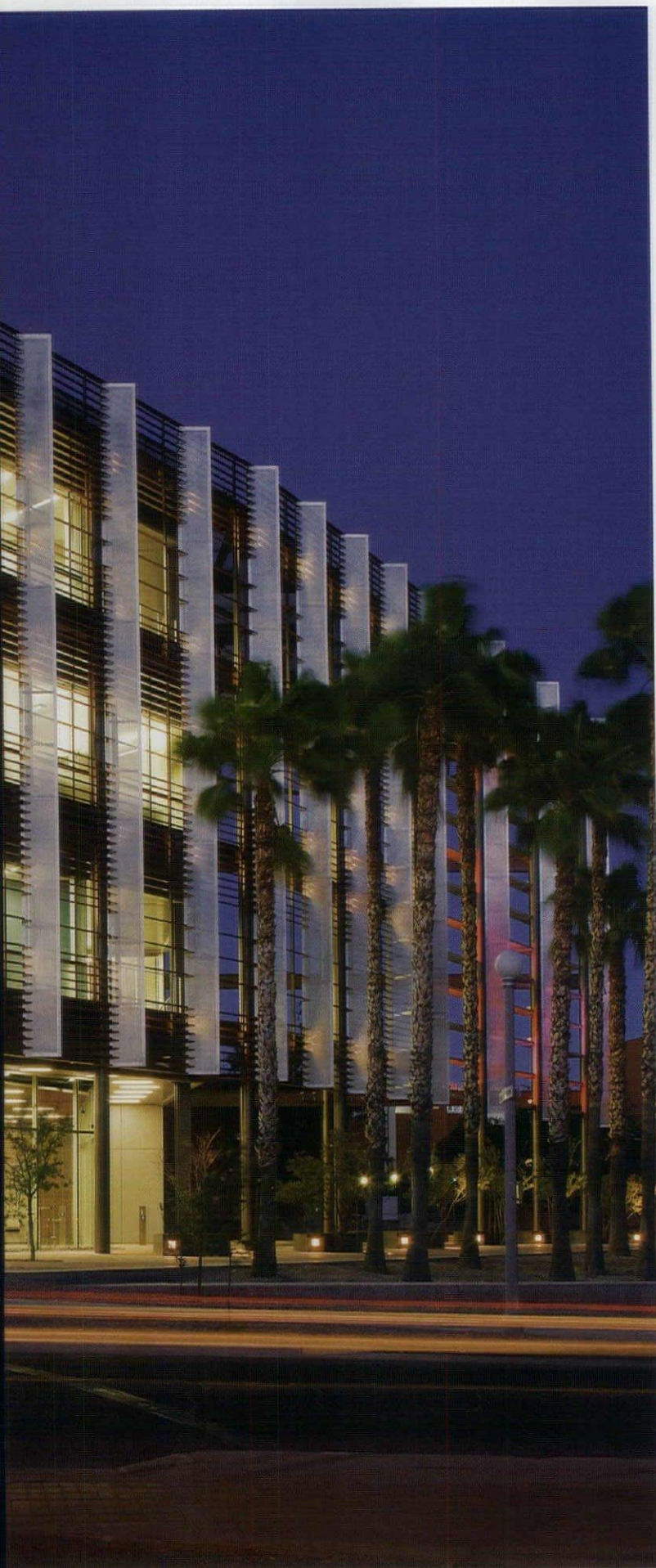
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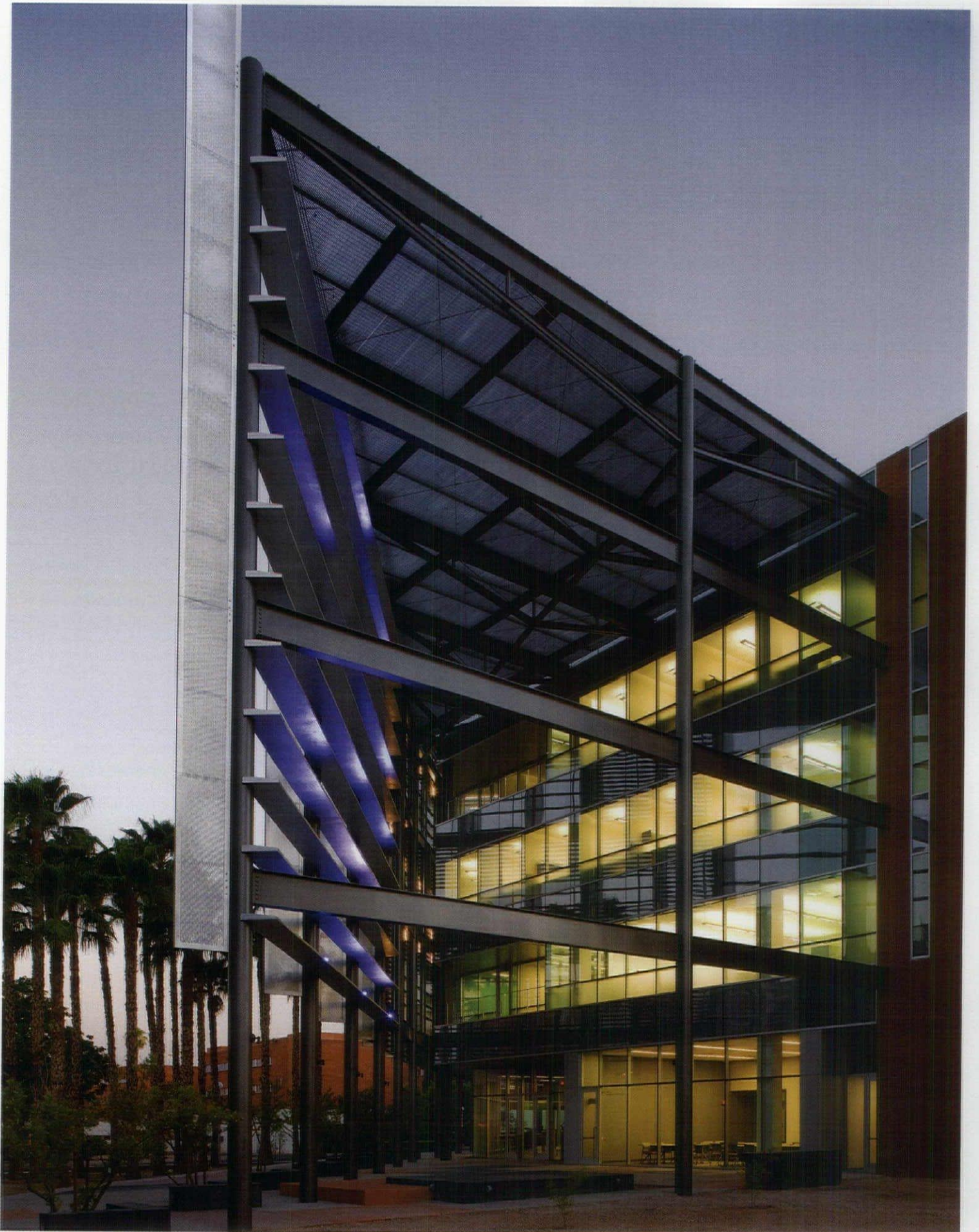
The University of Arizona's Norton School of Family and Consumer Sciences embraces the concept of family and is designed to bring students and faculty together

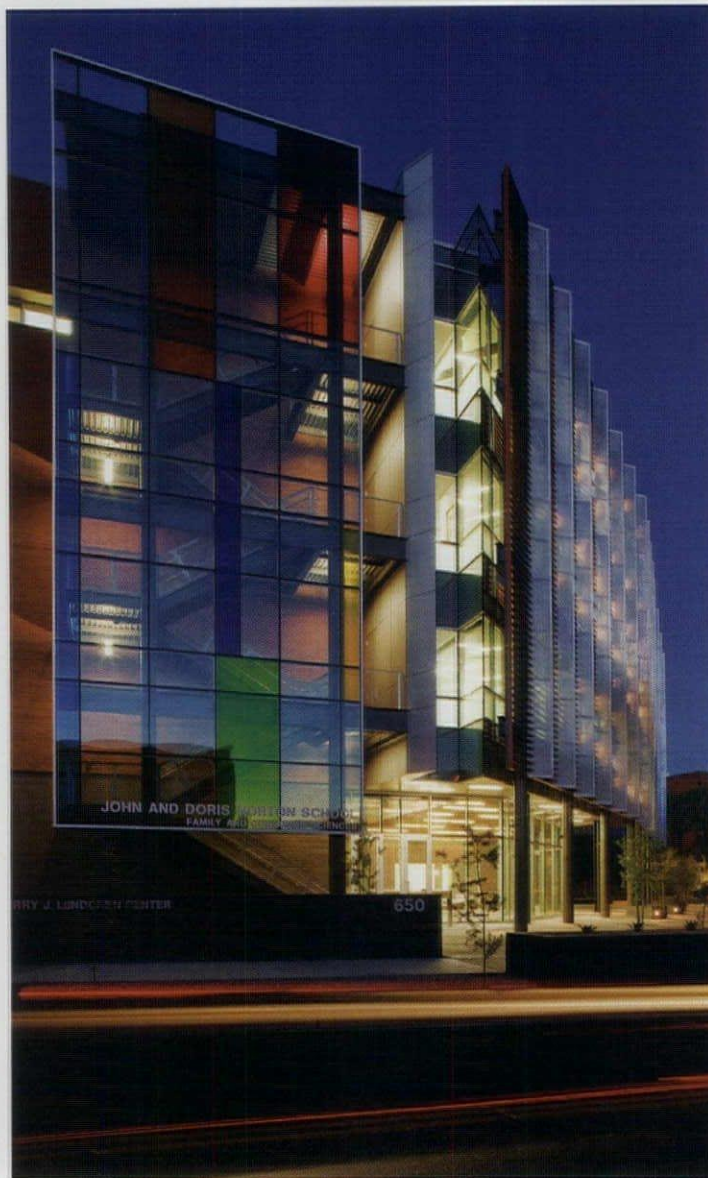
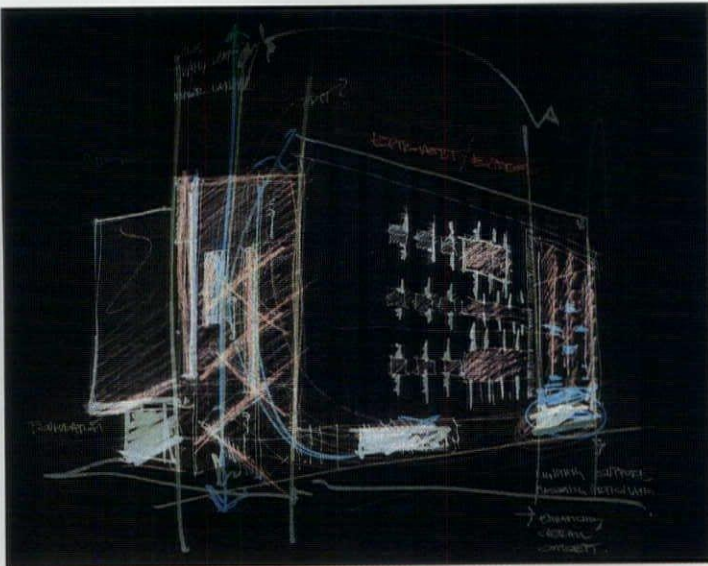
A recent addition to the family at the University of Arizona (UA) is neither a boy nor a girl, rather, it's a 72,000-square-foot facility called McClelland Park. The four-story building, completed in spring 2008, houses classrooms, research space, and administrative and faculty offices for the UA Norton School of Family and Consumer Sciences. Seen as the cornerstone of a new extension to the Tucson, Ariz., campus, McClelland Park represents a step forward for UA with its engaging yet practical exterior façade, which includes sun-shading devices and is illuminated with LED technology.

"What we really take pride in is the ability to understand the context and look at the character of a building," explains Rodrigo Manriquez, principal and senior lighting designer at SmithGroup's Detroit office, which provides lighting design services to all the SmithGroup offices. "This project was for the School of Family and Consumer Sciences—we needed to understand what the building is used for and how the students relate to it." He adds that the theme of family was prevalent in this project, and by identifying with the building and the people who use it, the lighting design evolved. A tight budget, maintenance concerns, and dark sky ordinances forced the SmithGroup team to be meticulous in the execution of the lighting scheme. "More constraints actually made the design stronger," Manriquez notes. "The biggest challenge was trying to maintain a connection to that concept of 'family' with all the other challenges. We had to make sure we were able to embody the essence of the school."

From the get-go, McClelland Park was intended to reflect the school's diverse and multicultural identity. Manriquez says the building took on two different "personalities": the side facing the existing UA campus with its somber brick façade became the "introvert" part of the building, and the side oriented toward the new area of campus was dubbed the "extrovert" because of its welcoming and bold use of a color-changing LED lighting scheme, and access to the open plaza area. "The idea of an ever-changing family dynamic, we really grabbed onto that," Manriquez explains. "The plaza was seen as a family living room where students and faculty could gather, and it truly has become that."

The exterior features various layers thanks to the shading devices: terra cotta-finish scrim serves as the base layer, and horizontally arranged louvers and vertical blades subdivide and mask the façade. Preliminary day-lighting analyses looked at the effectiveness of the shading devices in the abundant Arizona sun. "The direct sun coming through these blades is an ever-changing condition," Manriquez says. During the day, the shading





The building façade features color-changing LED technology, which also illuminates the open plaza area that originally was conceived to be the building's "civic living room" for students and faculty (opposite page). A preliminary sketch (this page, top) shows the "extrovert" side of the building, which includes the open-air staircase featuring a screen of colored glass panes (this page, above).

Project McClelland Park, John and Doris Norton School of Family and Consumer Sciences, Tucson, Ariz. **Client** University of Arizona, Tucson, Ariz. **Architect** SmithGroup, Phoenix **Lighting Designer** SmithGroup, Detroit **Project Size** 6,300 square feet (illuminated façade); 72,000 square feet (building) **Watts per Square Foot** 0.17 **Images** Courtesy of SmithGroup **Manufacturers** B-K Lighting, Color Kinetics, iO Lighting, WE-EF Lighting

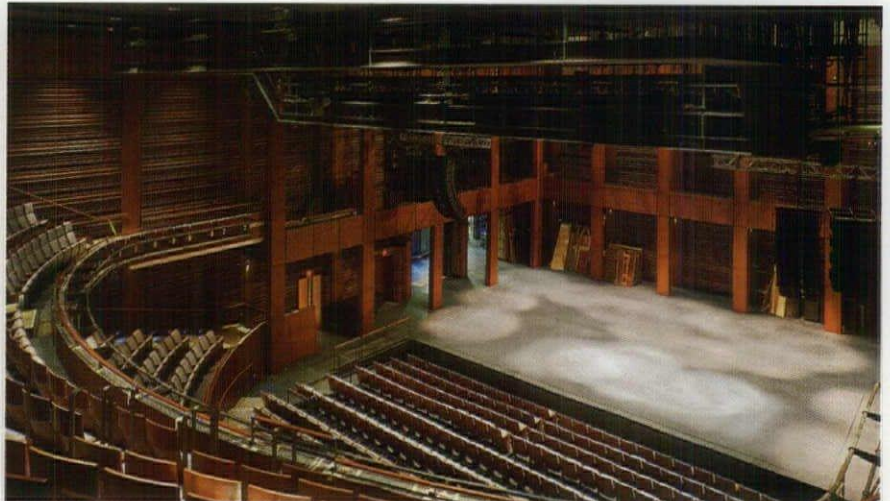
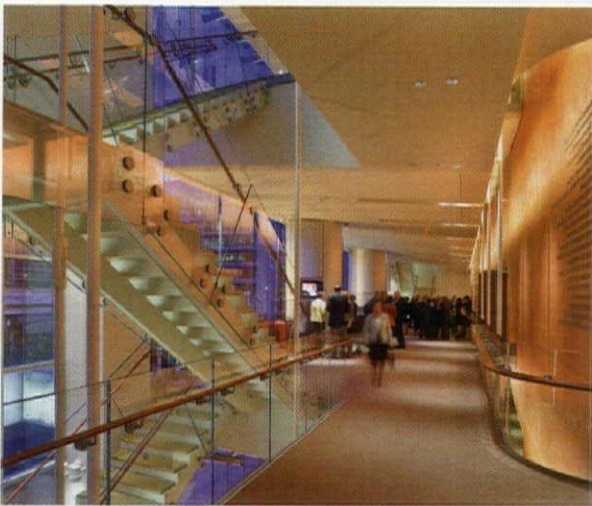
devices mask the building behind them, and at night the scrim is lit like a lantern, washing the building with light. White 3000K LEDs and RGB LEDs on a 6-inch-by-6-inch panel delineate the plaza and illuminate the scrim, and a multiple highlight effect is achieved because the fixtures—concealed by the shading panels—are mounted vertically. Manriquez notes that the project afforded them a "great opportunity to use a color-changing system," but adds that they were careful in their use of color and used it only to enhance their lighting concept. With hard-to-reach fixture placement and strict dark sky ordinances in place, LEDs were selected instead of fluorescent lamps because of their size, long life span, and fine beam pattern—in this case, a 5-degree beam. "It's a narrow blade 6 inches wide that we're lighting," says Chris Coulter, lighting designer and associate at SmithGroup. "To be able to control the light to be only at these blades, we needed the fixture to be controlled precisely. LEDs really allowed us to focus that light where we needed it and not lose it out in the sky."

An open-air staircase with a screen of colored glass panes along one side is an architectural design element that the lighting designers embraced to allow the building to read more vertically. It provides a counterpoint to the open plaza located at the opposite end of the structure. A walkway around the building is illuminated by 70W metal halide T6 lamps, and 35W metal halide T6 downlights are mounted to the columns in the plaza to provide lighting along the perimeter. In addition to the downlights, 35W T6 metal halide steplights also are used in the plaza. "The whole point was that we were trying to consolidate the number of lamps that needed to be stocked for maintenance concerns," Manriquez points out.

The LEDs illuminating the façade run through a handful of scenes, and various hues help reinforce the differences between the scrim, which features warm colors, and the family plaza, which uses cooler tones. "We wanted quality color lighting, but we didn't want it to be in-your-face," Coulter explains. "Since this is the first building with exterior lighting like this [on the UA campus], there was some hesitancy by the client to do anything too flashy. But they love the outcome." The lighting design team at SmithGroup also is pleased with the end result of the facility's lighting concept, regardless of whether passers-by pick up on the overarching theme of family. "Philosophically, maybe one person will get it. I want to talk to that person," Manriquez says. "But regardless of whether you see the connection to [our intended] concept, the lighting scheme still works. Ideally you do see it, and if not, we'll wait for the person who does." **JENNIFER LASH**

STREET THEATER

Expanding its space in downtown Washington, D.C., the Shakespeare Theatre Co. not only entertains patrons of its two theaters, but it also draws attention from passers-by via the three-story glass façade



The lobby areas at the Harman Center for the Arts (above, left) are visible to passers-by through the three-level glass façade (opposite page), which engages nonpatrons in the events occurring at the theater. Sidney Harman Hall, featuring dark cherry wood panels for sound diffusion, offers numerous stage configurations and a suspended catwalk for the stage lighting (above, right).

A theater might be an unexpected occupant of five and a half floors of an 11-story office building, but Washington, D.C.'s Shakespeare Theatre Co. (STC) couldn't pass up the opportunity to expand its performance space. STC's existing home—the 451-seat Lansburgh Theatre, located just 100 yards from the expansion site—is now joined by the 774-seat Sidney Harman Hall, which opened Oct. 1, 2007. Collectively, they are known as the Harman Center for the Arts.

The Harman Center is hard to miss, with its three-level glass façade curtain wall that "emphasizes a jewel-like transparency," says Shaili Patel, senior associate at Mulvey and Banani International, the electrical engineering firm responsible for the project's lighting design. "The façade directly links the activity within the lobby areas with the surrounding urban environment." General illumination in the lobbies comes from 75W halogen MR16 downlights. During the day, the electric lighting in the lobby is dimmed because of the natural light afforded by the façade,

but at night Patel says it "creates an inviting ambience."

In the lobby, asymmetrical reflector T5 fluorescent cove lights illuminate the theater wall and floor cutout that "separates" the performance area for acoustic isolation. Recessed 150W and 250W halogen PAR38 lamps provide ambient light over the seats in the hall, where the walls include African cherry wood panels in varying widths and depths for sound diffusion. Custom LED wall sconces highlight the wooden pilasters, while plug-in LED luminaires illuminate the stage area's removable pilasters because fixtures any deeper than 4 inches would have been damaged by the rigging lines. The stage lighting, accessed by the suspended catwalk, is flexible, and components can be plugged into connector strips controlled by a dimming system. With the addition of Sydney Harman Hall, the STC can host more theater-goers and performances while also being a performance itself, attracting onlookers as they pass by the eye-catching glass façade. **JENNIFER LASH**

Project Sidney Harman Hall, Harman Center for the Arts, Washington, D.C. **Client** Shakespeare Theatre Co., Washington, D.C. **Architect** Diamond and Schmitt Architects, Toronto
Electrical Engineer Mulvey and Banani International Inc., Toronto **Theater Architect** Fisher Dachs Associates, New York **Acoustic Design** Talaske, Oak Park, Ill. **Mechanical Engineer** Crossey Engineering Ltd., Toronto **Project Size** 85,000 square feet **Watts per Square Foot** 3 **Photographer** Tom Arban, Toronto **Manufacturers** Bruck, Cole Lighting, Design Plan, Elliptipar, ERCO, Indy Lighting, Juno Lighting, Leucos, Midwest, Paramount, Phoenix, Prescolite, RAB Lighting, RSA Lighting, Selux, Visioneering Corp., WE-EF, Zumtobel





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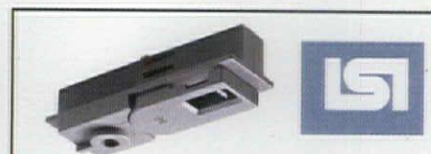
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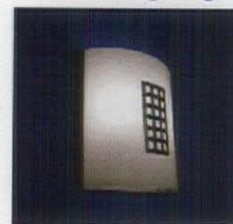
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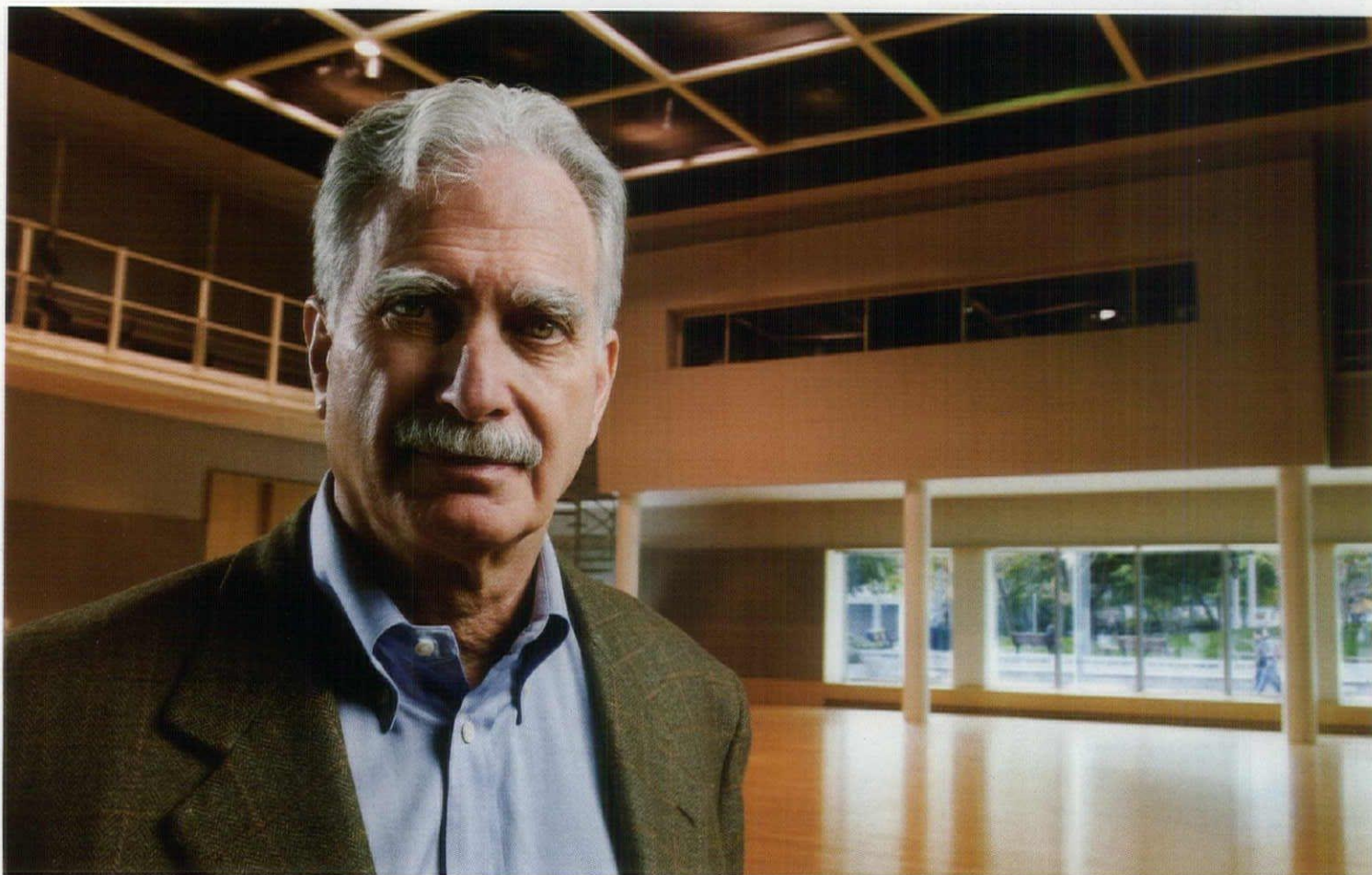


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Len Auerbach

ONE LIGHTING DESIGNER, TWO DISCIPLINES

With a career that has spanned more than 35 years, Len Auerbach is that rare lighting designer whose practice successfully bridges the worlds of theater and architecture. His two San Francisco-based firms—Auerbach Pollock Friedlander, which specializes in performing arts facilities, and Auerbach Glasow French, which concentrates on architectural lighting design—are responsible for a diverse project portfolio that includes the Yerba Buena Center for the Arts in San Francisco and the Cirque du Soleil spectacles “Kà” and “Love.” Auerbach caught the theater bug as a student working in summer stock productions, and his passion was reinforced during a stint at the Guthrie Theater in Minneapolis. Not one to conform to cookie-cutter approaches, Auerbach’s work offers compelling lighting solutions that defy categorization. Whether he’s working in theater or architecture, creating light in space has always been Auerbach’s focus. **ELIZABETH DONOFF**

How are architectural and theatrical lighting different?

In the theater you have the audience in a fixed viewing environment. In an architectural setting the audience moves through the space; they are the performers.

What first intrigued you about the theater?

I was fascinated with the intensity and the control of stage lighting,

and the separation between the performer’s view and the audience’s experience because of lighting’s ability to create mood, movement, color, and space.

How does available technology impact the design process?

New light sources continue to come out; however, few fixtures are designed to utilize them. We see this with LEDs. They are great for the right application, but there are still many designers who use them just for the sake of using the technology, even if it has nothing to do with the architecture. Designers need to understand architecture is not just a canvas for light. Light should give form to architectural space.

What are your most memorable projects?

My early work with Kenzo Tange at the Minneapolis Institute of Arts and Children’s Theatre Co. More recently our work with Santiago Calatrava for the new Atlanta Symphony Hall.

What do you try to impart to colleagues and young designers?

Ultimately nothing in design is new. We just have a lot more to work with today, and because we have so many more tools we have to be much more selective in our choices.

JAY BLAKESBERG