lighting design lab

ldl wins an iida.

In 2004 the Lighting Design Lab completed a major remodel of our space. The renovation was done using principles of sustainability, incorporated highly efficient lighting technology, and applied the latest in research on daylighting. This year, we submitted the redesign to the Illuminating Engineering Society of North America's International Illumination Design Awards (IIDA) and received a Section Award in recognition of our achievement. The project was also forwarded along for consideration for Regional, and International judging.

Previously, the LDL was primarily modeled on conventional office space of the 1980's. The ceilings were around 9 feet high using a T-bar system and acoustic tiles. Most of the offices were small, enclosed and away from the windows. The lighting demonstrations were in the daylit areas. The remodel changed all that. Ceilings were opened up, people were moved into the daylight, and new lighting technologies applied. Existing materials were reused where practical or recycled instead of landfilled. New materials were chosen based on environmental impact. While the LDL remained in the same location it had been in for 14 years, the look and feel of the place completely changed.

The lighting at the LDL is highly efficient, as you should expect. How efficient? The installed watts per square foot (W/ft^2), excluding the teaching displays, is $0.69W/ft^2$ ($0.84W/ft^2$ with task lighting) beating the Seattle Energy Code and ASHRAE 90.1-2004 lighting power densities by 31%. Integration with daylight is everywhere.

The IIDA is a program for recognizing excellence in lighting design instituted by the IESNA. The award process begins at the IESNA Section, where local projects are submitted and evaluated on a points basis. Projects receiving sufficient scores are given Section Awards. The highest scoring projects are then forwarded on for Regional judging. The Lighting Design Lab is gratified to have been honored with this award from the Puget Sound Section.

Above: The remodel moved staff offices into the daylighted areas to maximize the effect of daylight on our new workplace.

in this issue.

News

This quarter we are offering some exciting new events:

- Based on a new guide published by ASHRAE, we are teaching a class on how to design quality office lighting at a connected load 30% lower than allowed under the ASHRAE 90.1-1999 standard.
- An alumnus of the LDL, Denise Fong IALD LC is presenting a seminar on sustainable lighting. She is incorporating inspiring information from her recent visits to sustainable showcases in Denmark, Berlin and Hong Kong. Denise writes the Green Ideas column in the IESNA's LD+A Magazine.
- A Product Knowledge Day based on lighting using Light Emitting Diodes (LED). Eric Strandberg pulls together manufacturers and their products with a focus on the new generation of LEDs producing white light.

Inside this issue you will find details on our new lamp and ballast evaluation program, an internet teleconference seminar, and other local IIDA award winners. Enjoy!

big savings — great lighting!

by Eric Strandberg LC

A few months ago, Stephanie Seyk. Snohomish County Facilities Project Lead and Scott Gibson of PUD Energy Services, approached the LDL to help with a retrofit for their South County Local Office in Lynnwood, WA. They wanted to accomplish three things with the retrofit; lower the lighting loads in the facility, improve the lighting quality, and, related to the first two, demonstrate to their customers the good energy efficient lighting practices that they promote.

The bulk of the existing lighting for their open and closed offices was rather typical for a building of that period (1967); 112 prismatic, lensed, 2'x4' troffer fixtures (4 T-12 lamps with 2 magnetic ballasts in each). This resulted in overlighted work areas (60 to 100 footcandles) and a power density of over 5 W/ft^2.

Toward meeting their goals, a T-5HO indirect pendant system was installed. The system uses 1/8th of the power (from over 68,000 kWh to 8,044 kWh), while delivering a more appropriate light level (35 to 40 footcandles). Additionally the lighting quality was improved in a number of ways. The indirect lighting provides more uniformity of light levels and less glare. The T-5 lamps have better Color Rendering (CRI) than the old T-12 lamps they replaced (from about 62 CRI to about 85). The high frequency electronic ballasts in the new fixtures, while saving energy also deliver flicker free illumination.

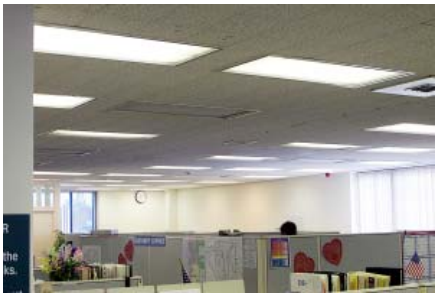
There were a few concerns about the new system that needed to be addressed as well. One, was that the ceiling height was only 9' and for an indirect system to perform well it should be at least about 1-½' from the ceiling, putting the fixtures only 7'6" above the floor. If they were to be installed in say, a middle school, an industrial space or a high activity area, this might have been too low. For an office space, filled with desks and partitions, and populated by adults, this mounting height should not be a problem.

Don Holdridge, manager of the South County offices said, "along with the improved efficiency in lighting the office; the modernization adds to the appearance of the space. The task lighting is available for those that need it and provides a good alternative to the global high intensity lighting we replaced. The lighting is softer and effective, the effort was worth it."

Another concern was the predicted reduction in light level (about half) and whether it would be enough. When light is uniformly distributed in a space, contrast is low, and the eye adapts more easily to light levels recommended for general office tasks. After a short adjustment period most of the staff felt that the light levels were an improvement. Fluorescent task lighting was made available for staff performing more demanding visual tasks.

A third concern for them was "pay back" or how long would it take for the retrofit to save enough energy to pay for the equipment and labor. In this case the payback was a little over 3 years, while this may seem like a long time, consider that the existing system was in place for almost 40 years. All of the above made for a very successful project. Excellent quality lighting was provided for about 0.65W/ft^2.

Before: Before the retrofit. For nearly 40 years, 4-lamp recessed troffers using T-12 lamps and magnetic ballasts lighting these Snohomish PUD offices. Light levels in the offices ranged from 60 to 100 footcandles with a connected load of 5 W/ft^2



After: After the retrofit. Indirect T5HO pendant luminaires provide much more uniform illumination at a light level around 30 - 40 footcandles. Energy usage is reduced to 1/8 the previous level. Color quality is greatly improved and flicker from the magnetic ballasts is eliminated.

ldl evaluates new systems.

by Michael Lane LC

Once upon a time, giving advice for improving most lighting was the easiest thing in the world: "Change your T12 lamps and magnetic ballasts to T8 lamps and electronic ballasts." While this is still good advice, today there are so many choices for T8 lamps and electronic ballasts that the answer is no longer so straightforward.

Formerly, four foot T8's came in one wattage—32W. Today they might be 32W, 30W, 28W, and even 25W. This introduces a variety of lamp choices in which both the light output and wattage are variable.

• Ballasts

The T8 lamp is a rapid start lamp, and in the beginning of the history of this lamp, all the ballasts were rapid start. Then, someone discovered that if you use an instant start ballast on the T8 lamp, you could save some extra energy. Today, the majority of the electronic ballasts for T8s are instant start. But now there are programmed start ballasts, too. And not all of the new lamps are completely compatible with all of the ballast types.

• Ya Wanna Super-ize that?

A few years ago, along came combinations of lamp and ballast systems that came to be referred to as "super" or "high performance". At that point what had been so completely simple began to unravel, and even the most experienced people in lighting got confused about what the new systems all meant. Including us at the LDL.

• Enter "The Equalizer"

Contrary to what our name may suggest, the Lighting Design Lab is not a testing lab. We do not have the very expensive and highly technical testing equipment that an Independent Test Lab has. So we can not perform that level of product testing. But we do have the expertise to carefully evaluate combinations of lamps and ballasts under fairly controlled conditions in order to form our own opinions. So we built one — the equalizer — sort of an "integrated cylinder."

It is a large tube with closed ends and an interior with a reflective surface. It has a hole for a light meter's remote sensor, and a fan to keep the temperature fairly consistent. With this chamber, we can measure the performance and power quality of the new combinations of lamps and ballasts.

Our samples will be small and our opinions informal. But we will be able to compare different lamp and ballast systems under repeatable and controlled conditions. This won't be for published testing purposes, but we can do this to develop better informed opinions.

live! from the lrc: outdoor lighting seminar.

An internet teleconference of an Advanced Seminar on Outdoor Lighting, will be hosted May 18 from 10:00 - 11:30 am PDT at the Lighting Design Lab. Building on the information provided in the LRC seminar "the Truth about Outdoor Lighting" in March 2004, LRC researchers Dr. John Van Derlofske and Dr. Michele McColgan will present a more advanced seminar on outdoor lighting. The internet seminar will include information on recent research on nighttime vision; outdoor lighting fixtures; the interaction of human vision, perception and various types of lighting at low light levels; effective outdoor lighting design and application; and the measurement and mitigation of light pollution. The web-base seminar will include information from recent LRC research on metrics to measure and predict light pollution from planned lighting installations, as well as research being done to help develop a new and better classification system for outdoor lighting fixtures.

• About the Presenter(s)

John Van Derlofske, Ph.D. - Dr. Van Derlofske is the head of transportation lighting for the LRC and an adjunct assistant professor teaching in the LRC's MS in Lighting program.

• Michele McColgan, Ph.D. - Dr. McColgan is a lighting scientist at the LRC and an adjunct assistant professor teaching in the LRC's Master of Science in Lighting program.

This internet teleconference is available at the Lighting Design Lab at no charge, courtesy of the Northwest Energy Efficiency Alliance's sponsorship of the Lighting Design Lab, and partnership with the Lighting Research Center. Registration details are available on pages 4-6 or online at *www.lightingdesignlab.com*

spring 2005 events.

Registration on Page 6

did you know?

Members of professional design organizations (AIA, NCQLP/LC, ALA, BOC, and others) may be able to receive continuing education credits for attending events offered by the LDL.

To self-certify your credits (sometimes called learning units) make sure you keep the Certificate of Completion that we distribute at each event.

Learning unit credits are almost always issued at a rate equal to the contact hours. So a 3 hour class would be worth 3 credits.

For information about how your organization works with continuing education credits visit their website at:

AIA
aia.org

ALA
americanlightingassoc.com

ASID
asid.org

BOC
neec.net/boc.htm

BOMA
boma.org

IFMA
ifma.org

IIDA
iida.com

NCQLP
ncqlp.org

BETTERBRICKS

All Registration **must be in advance**. All fees must be **paid in advance**. No registrations or fees will be accepted at the door. On-line registration is available at ***http://www.lightingdesignlab.com/classes***

1 • Lighting for Office Buildings at 30% Below ASHRAE 90.1—1999. $30

Eugene:	Tuesday, May 10	• 2:00pm - 5:00pm
Portland:	Wednesday, May 11	• 2:00pm - 5:00pm
Boise:	Wednesday, May 18	• 2:00pm - 5:00pm
Billings:	Monday, May 23	• 1:00pm - 4:00pm
Missoula:	Thursday, May 26	• 1:00pm - 4:00pm
Seattle:	Wednesday, June 8	• 2:00pm - 5:00pm
Spokane:	Thursday, June 23	• 2:00pm - 5:00pm

This class is based on the *ASHRAE Advanced Energy Design Guide for Small Office Buildings*. The Guide was designed to provide recommendations for achieving 30% energy savings over the minimum code requirements of Standard 90.1-1999. It focuses on small office buildings up to 20,000 ft^2, which is the bulk of office space in the U.S. Michael Lane, senior lighting specialist at the LDL, has developed this class. Although the new efficiency standards are much stricter than in the past, they are not the last word in efficient lighting. Using easily obtained lighting technologies and commonly accepted design techniques, achieving additional savings of 30% is a realistic proposition. Students will leave with an understanding of the requirements of the Standard and the array of techniques available to reduce connected lighting loads below the published levels.
(3 CEU contact hours)

• Project Design Reviews. no charge by appointment.

The lighting specialist is available to provide schematic design review of proposed lighting strategies on your commercial and industrial lighting projects. Please contact the specialist for your territory to directly set up an appointment in your office.

2 • LIVE! from the LRC — Advanced Seminar on Outdoor Lighting. no charge.

Seattle: Wednesday, May 18 10:00am – 11:30am PDT

Internet Teleconference: John Van Derlofske, Ph.D.; Michele McColgan, Ph.D.
Building on the information provided in the Live! from the LRC seminar, "The Truth about Outdoor Lighting" presented in March 2004, LRC researchers Dr. John Van Derlofske and Dr. Michele McColgan will present a more advanced seminar on outdoor lighting. The seminar will include information on recent research on nighttime vision; outdoor lighting fixtures; the interaction of human vision, perception and various types of lighting at low light levels; effective outdoor lighting design and application; and the measurement and mitigation of light pollution. The seminar will include information from recent LRC research on metrics to measure and predict light pollution from planned lighting installations, as well as research being done to help develop a new and better classification system for outdoor lighting fixtures.
(1 CEU contact hours)

= basic = intermediate = expert

3 • Sustainable Lighting. Denise Fong IALD, LC, LEED™. no charge.

Seattle: Wednesday, June 22 • 4:00pm - 5:00pm

Sustainability takes many forms and touches all aspects of our lives. For an overview of perspectives in sustainability from Denmark, Sweden, Germany and China come join us for photos and thoughts of a broader world view. We'll look at attitudes toward lighting but also touch on electrical generation, waste management, water issues and other green strategies.

Denise Fong is Senior Principal at Candela Architectural Lighting Design in Seattle, WA. She writes a regular column on sustainability issues for *LD+A Magazine.* She has been honored with design awards for her innovative and creative lighting applications for projects such as the ACT Theatre and Pacific Science Center's IMAX Theater addition. She is a former Lighting Specialist at the Lighting Design Lab.

(1 CEU contact hours)

4 • Product Knowledge Day - Using LED Lighting. no charge.

Seattle: Thursday, July 14 • 3:00pm - 5:00pm

Light Emitting Diodes, or LEDs promise to revolutionize the way we light our architecture. The question is when. This Product Knowledge Day will look at the state of the art today and how existing products perform. The focus will be on systems that deliver "white" light. Primarily used for close in task, exterior pathway or architectural accent lights. Configured in clusters or strips, LEDs are well suited for many unique and conventional luminaire designs. This event will give you the opportunity look at working samples of some of these products and meet the local manufacturers representatives to help answer any questions you may have.

• Lighting Fundamentals Tour - Explore the Lighting Design Lab. no charge by appointment.

In addition to being a work and meeting place, the Lighting Design Lab is designed to be a large walking classroom for teaching the fundamentals of lighting. All the pieces of lighting are on display: light sources; luminaires, controls; and daylighting. Touring the LDL is the perfect way to attend this class and get hands-on exposure to new technology. A Fundamentals Tour lasts about and hour and a half—more if there are lots of questions. If your tour group has a particular interest such as glare, power quality issues, or controls, the tour can be tailored to your interests. A comprehensive tour of the LDL addresses energy effective lighting, integrating daylight and electric light using controls, color characteristics of light, lamps and ballasts, luminaires and more. In addition, the tour provides more details into LDL services.

To schedule a Lighting Fundamentals Tour you may:
- call 800-354-3864 (206-325-9711) ext 29 and set it up with Randy
- email at randy@lightingdesignlab.com or info@lightingdesignlab.com
- fax your request to 206-329-9532

We will need to know what date(s) you would like for the tour, and possible times. It would work best if the tours start no later than 2:00 PM. Please limit your tour group size to 20. Let us know if you have a specific area of interest.

ldl class locations:

Billings: Prudential Floberg Realtors
1550 Poly Drive
Billings MT

Boise: Idaho Power
Conference Room 6-East
1221 W Idaho St
Boise ID

Eugene: EWEB Community Room
500 E 4th Ave
Eugene OR

Missoula: Northwestern Energy
Auditorium
1801 S Russell St
Missoula MT

Portland: Earth Advantage National Center
Rhododendrom Room
16280 SW Upper Boones Ferry Rd
Portland OR

Seattle: Lighting Design Lab
400 E Pine St
Suite 100
Seattle WA

Spokane: WSU Spokane
Phase I Classroom Bldg, Rm 147
668 N Riverpoint Blvd
Spokane WA

registration form.

Spring 2005 Classes

PAYMENT POLICY: Fees Must Be Paid In Advance before attending class. Purchase Orders, checks, and credit cards are accepted. Complete and fax this form to 206-329-9532. Class fees are waived for university students and employees of sponsoring electric Utilities. **No Payment or Registration Will Be Accepted At The Door.**

Secure On-line registration is available at *http://www.lightingdesignlab.com/classes*

registration fee paid by. (circle one)
credit card · enclosed check · purchase order · Utility employee fee waiver · university student fee waiver

registration information.

Name ·

Company ·

Profession ·

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billing information. (must be complete to process card transactions)

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E-Mail ·

Address ·

City, State, Zip ·

Credit Card Number (VISA & MasterCard ONLY) · Please include your CVV Code - last 3 digits of the number on the back of your card near your signature

Expiration Date ·

please check the circles of the class(es) and event(s) you wish to attend (on-line registration available).
event locations on page 5.

1 • Offices 30% below ASHRAE. $30
- ❍ Eugene: Tues 5/10 · 2:00pm - 5:00pm
- ❍ Portland: Wed 5/11 · 2:00pm - 5:00pm
- ❍ Boise: Wed 5/18 · 2:00pm - 5:00pm
- ❍ Billings: Mon 5/23 · 1:00pm - 4:00pm
- ❍ Missoula: Thurs 5/26 · 1:00pm - 4:00pm
- ❍ Seattle: Wed 6/8 · 2:00pm - 5:00pm
- ❍ Spokane: Thurs 6/23 · 2:00pm - 5:00pm

2 • LIVE! from the LRC - Outdoor. no charge.
- ❍ Seattle: Wed 5/18 · 10:00am - 11:30am

3 • Sustainable Lighting. no charge
- ❍ Seattle: Wed 6/22 · 4:00pm - 5:00pm

4 • Product Knowledge Day - LED. no charge.
- ❍ Seattle: Thurs 7/14 · 3:00pm - 5:00pm

You can register instantly and securely on-line. Payment is accepted by credit card, check and purchase order.
www.lightingdesignlab.com/classes

lighting waste disposal.

by Randal Smith

Image courtesy the Pollution Prevention Resource Center: www.pprc.org

Northwest Fluorescent Lamp Recycling Project

On March 15, 2005, EPA issued the Clean Air Mercury Rule to permanently cap and reduce mercury emissions from coal-fired power plants for the first time ever. This rule makes the United States the first country in the world to regulate mercury emissions from utilities.

On March 10, 2005, in a separate but related action, EPA issued the Clean Air Interstate Rule (CAIR), a rule that will dramatically reduce air pollution that moves across state boundaries.

Together the Clean Air Mercury Rule and the Clean Air Interstate Rule create a multi-pollutant strategy to reduce emissions throughout the United States. It is expected that within the next year or so, no landfill in America will be accepting any product that contains any amount of mercury.

This means that American businesses must rethink and revamp how our mercury waste is handled. The solution is easy, already in place and not at a large cost. Also, the solution helps reduce paperwork, and legal liability for businesses.

What is the solution to the challenge of mercury in our lighting waste? ***Lamp recycling***.

The Pollution Prevention Resource Center is leading an effort to educate hospitals, lighting contractors and commercial property managers about proper disposal of spent fluorescent lamps. They also are working with large industrial suppliers to identify ways to have them provide information to customers and help facilitate the proper disposal of lamps.

The PPRC is a nonprofit organization that is the Northwest's leading source of high quality, unbiased pollution prevention (P2) information. PPRC works collaboratively to promote environmental protection through pollution prevention. PPRC believes that environmental and economic vitality go hand in hand, and that both are necessary to protect the high quality of life enjoyed in our region.

If you would like more information about lighting waste disposal resources, contact Randy Smith at the Lighting Design Lab (randy@lightingdesignlab.com). If you are interested in more information about the PPRC's mercury pollution reduction work, contact Christine Guiao at cguiao@pprc.org.

section iida awards.

by Randal Smith

Cutler Awards (Residential)

• Mercer Island Residence - Mercer Island, WA: Christopher Thompson - Studio Lux, James L Sultan - Studio Lux

Energy Efficient Design Awards (Commercial)

• Large Biotechnology Campus - Seattle Office: Shaun Patrick Darragh - NBBJ, Blythe Von Reckers - NBBJ, Jeffrey L. Miller - NBBJ, Earl Kemppainen- NBBJ

• Lighting Design Lab Renovation - Seattle, WA: Michael Lane - Lighting Design Lab, Shaun Patrick Darragh - Lighting Design Lab, Eric Strandberg - Lighting Design Lab

Guth Awards (Commercial Interior)

• Café Darclee: Trish Connor - Lumena Lighting Design, Vic Moreno - Lumena Lighting Design

• Large Biotechnology Campus - Seattle Office: Shaun Patrick Darragh - NBBJ, Blythe Von Reckers - NBBJ, Jeffrey L. Miller - NBBJ, Earl Kemppainen - NBBJ

• ILWU - Honolulu, HI: Carol DePelecyn-dePelecyn Studio

• SeaTac Airport - Step Concourse A: Melanie Taylor - NBBJ, Jeff Miller - NBBJ

Waterbury Awards (Commercial Exterior)

• Large Biotechnology Campus - Seattle Office: Shaun Patrick Darragh - NBBJ, Blythe Von Reckers - NBBJ, Jeffrey L. Miller - NBBJ

• Wilma Historic Building - Missoula, MT: Jason DeCunzo - DeCunzo Design Associates

Above: Photographer: Christian Richters A pedestrian bridge at a Biotechnology Campus in the Seattle, WA area. The design uses LEDs and T5HOs. This project received a Waterbury IIDA Award for Shaun Patrick Darragh/NBBJ, Blythe Von Reckers/NBBJ, Jeffrey L. Miller/NBBJ. Shaun Patrick Darragh is currently a lighting specialist at the Lighting Design Lab.

lighting design lab

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