LIGHT INDIA INTERNATIONAL
an official magazine of indian society of lighting engineers
Jan - Feb 2019

EMERGENCY GUIDANCE SYSTEMS

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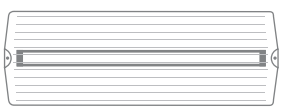

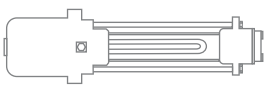

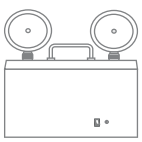

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From the President's desk

WISH YOU ALL A HAPPY NEW YEAR 2019.

You are aware that we have missed to bring out last two issues of the Lii Magazine for various reasons and it is regretted. Our dream and all out efforts to make this magazine a self supported one is yet to become a reality. If all our members in the State/Local centres can make a serious and concerted effort, to obtain long term renewable contracts for advertisements, the magazine can be made a top class professional release for the benefit our lighting fraternity. Let us hope for the best in the new year 2019.

Recently we have observed that the interest amongst the young graduates of various engineering institutions has grown considerably in the area of lighting and photometric. Formation of new student chapters in Pune, Chennai, Karnataka and Rajasthan is a welcome feature. Unless we induct youngsters and train them for leadership, we cannot grow and sustain. Day in day out, changes are happening and unless we adopt to the emerging trends, we will be out.

LED has almost replaced all other conventional lighting sources and even the rural public are now conscious of the advantages of using the LED lights. Coupled with the scaled up demand and governments initiative through EESL, the prices are also competitive. It is a welcoming trend for further development in this area. Seminars on smart lighting and OLED applications are the thrust areas for the present

In fact, Kolkata State Centre is planning for a major international conference on the trends in lighting during the coming year with international speakers and sponsorship from institutions like CIE. We also have plans to conduct the next Lii Exhibition in 2019.

I would like to wish again a Happy and prosperous new year 2019 to all our ISLE members and the lighting fraternity.

Dilip Kumbhat
President, ISLE

STUDY OF DAY LIGHTING UTILITY AND AVAILABLITY IN INDUSTRIAL BUILDINGS

Ar. Sanjana Mishra
College of Architecture, Sustainable Architecture, Bharati Vidyapeeth Deemed to be University, Pune

Abstract :
Proper use of day lighting not only improves the visual comfort in indoor environment, but also reduces building energy consumption effectively. Abundant, easily available continuous and free source of day light has a potential to reduce the consumption by 40% of lighting load in an industrial sector. Studies on this subject have mostly been carried out for office buildings, but were limited for industrial buildings, where lighting is one of a major electricity consumer. This paper presents a study of day lighting performance in a large space industrial building (Pune, India) by both field measurements and simulations , where it shows that total substitution of artificial lighting can be done by incorporating daylight in the building. The day lighting illuminance distribution was measured with zones according to zonal cavity method on a cloudy day. The average day lighting illuminance in the work shop during the day in case I i.e. TATA MOTORS ranged from 300 lux to 500 lux, 500 lux to 750 lux and above 750 lux according to the zones and similarly for case II i.e. ZF steering and gears pvt.ltd. ranged from 119 lux to 300 lux, 300 lux to 500 lux, 500 lux to 750 lux and above 750 lux according to the placement of the work station and the fenestrations. The day lighting illuminance simulations done by Ecotect simulation program was applied for comparison with the field measurements. It was found that through proper daylight harvesting complete eradication of artificial light usage in the day time can be achieved.

Aim :
To study and analyze day lighting in an industrial building.

Objective :

- Evaluate the day lighting environment quality of the industrial building according to the standards.
- Validate the accuracy of experimental method (on site measurements) and procedure that was used in the day lighting environment evaluation.
- Evaluate availability of the day light in the work space.

Scope :

- Daylight levels would only be considered for daylight hence the study will be conducted only during day lit hours.
- The study will be limited to industries using techniques to enhance day light penetration in the building.

The scope of study is limited to only single storied industrial sheds in Pune.

Limitation :
This study is carried out in one climate for one season only. In order to come up with general conclusions, a number of case studies in several climates for all the seasons should be carried out.

Methodology :
DETAILED METHODOLOGY :
This study was conducted in two single floor automobile industrial building in Pune, India, (18° 31′ N, 73° 51′ E). The floor areas of cases are as mentioned:

1.) CASE I i.e. TATA MOTORS is 220 (long) ×100 (wide) m2 and the ceiling height is 14.5m.

2.) CASE II i.e. ZF steering gears is 64 (long) × 36.5 (wide) m2 and the ceiling height is 12m.

Fig. shows the factory building model and its fenestration. Both the cases have a hackle-shape roof and five spans (the width is 10.0m for one span). Three kinds of daylighting fenestration were designed: the side windows on the walls, the top daylighting panels and top vertical skylights on the roof for both the cases. The window to wall ratio (WWR) and skylight to roof ratio (SRR) are showed in Table 2 and Table 3.

FIELD MEASUREMENT :

The illuminance was measured by illuminance meters. LX 13306 (Range 0 – 2,00,000 lux, accuracy ±4.0%+10) was used for the measurement of indoor daylighting illuminance. The field measurement was conducted on Sep 24, 2017, which was a overcast day. To separate the daylighting with artificial lighting, all the lamps were turned off during the measurement. To obtain the daylighting illuminance distribution in the whole indoor space accurately, the measurement grid size was set to be 10m×10m for both the cases. As some areas of the factory were off limits or blocked by machines, totally 70-80% of planned points were measured. To reduce the impact of the changing solar angle during the measurement period, the measurement needs to be finished in a short period time. The measurement at each position lasted for 10s to get a stable illuminance reading and one complete measurement of the whole factory need to take about 2 hours. All the measurements were conducted in the horizontal plane at a height of 0.85m above the floor.

Case study :

SELECTION CRITERIA :

The following criterions were considered for selection of cases to be studied:

- The building should be an automotive industry.
- It should be of single storey design.
- Scale of the building should be similar.
- Work performed in the building should also be of similar kind.

Site location of ZF steering gear

Site plan TATA motors

- The height of the building should be similar with the similar kind of technology or method used for daylight penetration.

LOCATION :

All the cases selected for the research are situated in Pune, Maharashtra. The cases are as follows:

1) CASE 1-TATA MOTORS PUNE located in Bhosari Road, Pune, Maharashtra

2) CASE 2-ZF INDUSTRIES LTD located in gal.no. 1242/44, village VaduBk, Tal. Shirur, Pune 412216

Case Study :

CASE STUDY I :

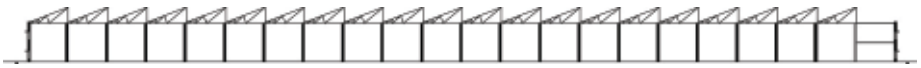
CASE STUDY I is of TATA motors located in Bhosari Road, Pune, Maharashtra.

COMPANY PROFILE:- Spread of Plant - 568 acres. Production Level - 178696 Eq.Veh Total connected load - 172 Mw.

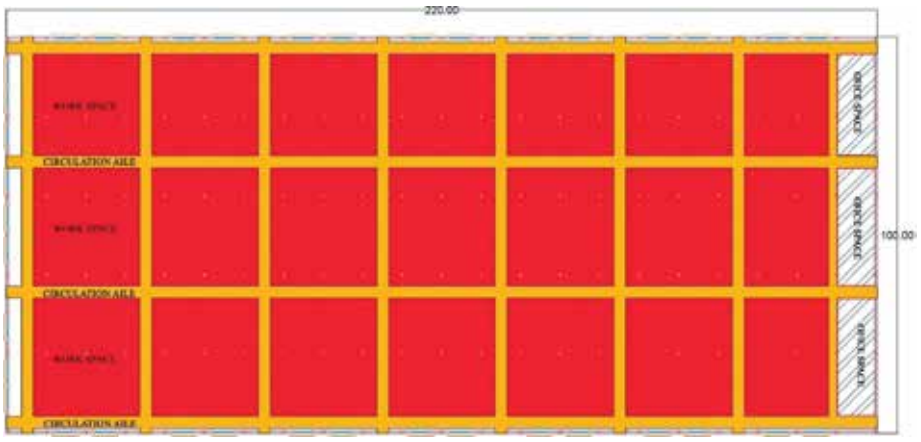
(SOURCE: OFFICIAL TATA MOTORS WEBSITE)

FOR THE PURPOSE OF STUDY C - BLOCK OF THE PLANT WAS CONSIDERED AS IT WAS RETROFITTED RECENTLY IN YEAR 2015-2016.

The floor area is 220 (long) ×100 (wide) m2 and the ceiling height is of 10 m. Fig. shows the factory building model and its fenestration. The factory has north light



Schematic section of TATA motor shed



Plan of work shed

trusses and 22 spans (the width is 10 m for one span, overall 22 north light trusses installed). Three kinds of day lighting fenestration were designed: the side windows on the walls, the top day lighting panels and top vertical skylights on the roof. The window to wall ratio (WWR) and skylight to roof ratio (SRR) are 12.2% and 24% .

CASE STUDY II :

CASE STUDY II is of ZF steering gear pvt.ltd. located in gal.no. 1242/44, village VaduBk, Tal. Shirur.

COMPANY PROFILE

Spread of Plant - 85,000 square meters (21 acres). Production Level - 15000spares

Total connected load - 109 Mw. (SOURCE: OFFICIAL ZF STEERING GEAR PVT.LTD. WEBSITE)

FOR THE PURPOSE OF STUDY ONLY THE INDUSTRIAL SHED NO 1. HAS BEEN CONSIDERED.

The floor area is 64 (long) ×36.5 (wide) m2 and the ceiling height is of 12 m. Fig. shows the factory building model and its fenestration. The factory has north light trusses and 9 spans (the width is 6 m for one span, overall 9 north light trusses installed). Three kinds of day lighting fenestration were designed: the side windows on the walls, the top day lighting panels and top vertical skylights on the roof. The window to wall ratio (WWR) and skylight to roof ratio (SRR) are 13% and 38.89%.

Schematic section of the work shed

Field measurement::

CASE STUDY I: TATA MOTORS

DAYLIGHT AUTONOMY1:

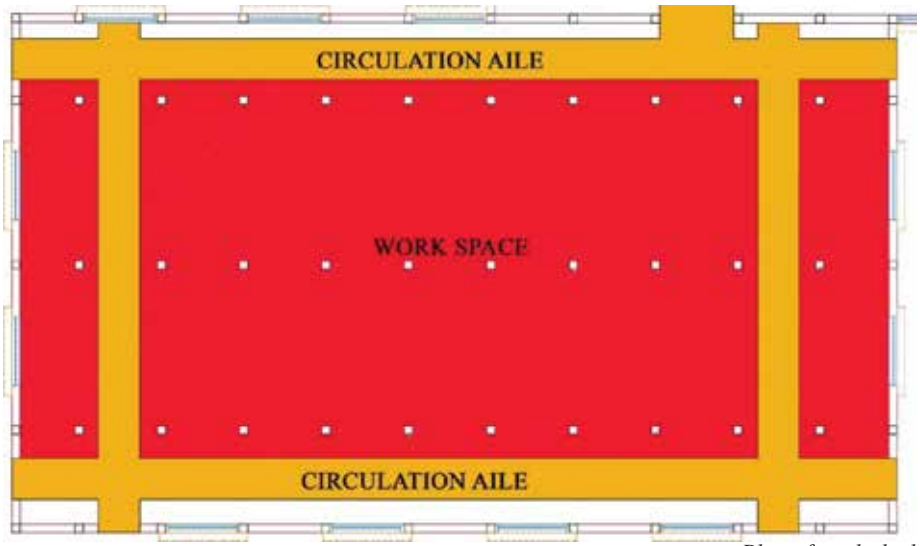
The shop floor is divided into three zones on the basis of placement of fenestrations:

1. Peripheral zone i.e. 7 m from the windows. 2.Transition zone i.e. 15 m from the windows. 3.Middle zone i.e. the core zone of the shop floor.

It is seen that the lux levels varied accordingly, it was also seen that lux levels in the zones also depended on the placements of roof lighting above the zones.

Model of ZF INDUSTRIES

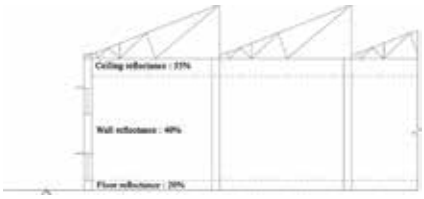
Site plan



Plan of work shed

Table 1: Daylight autonomy case I

Dimension	L/B Ratio	WWR	SRR	Surrounding	Finishes	Reflectances
64m x 36.5m	2:01	13.00%	39%	Trees at a distance of 6M	1. Ceiling: Aluminum sheets 2.Walls: Brick wall with white paint (old) 3.floor: concrete flooring	1. Ceiling: 55% 2. Walls: 40% 3. Floor: 20%

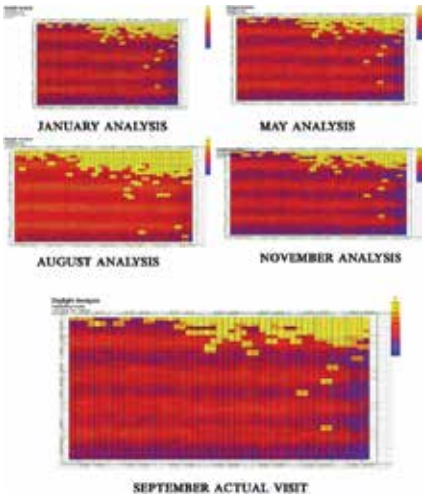


Reflectance on site

Daylight inside the shop floor also depends on the material reflectance in the interiors.

1Daylight autonomy: is the percentage of area which meets or is above the standard levels.
The lighting levels achieved in the interiors of the shop floor can be explained through the following figures.

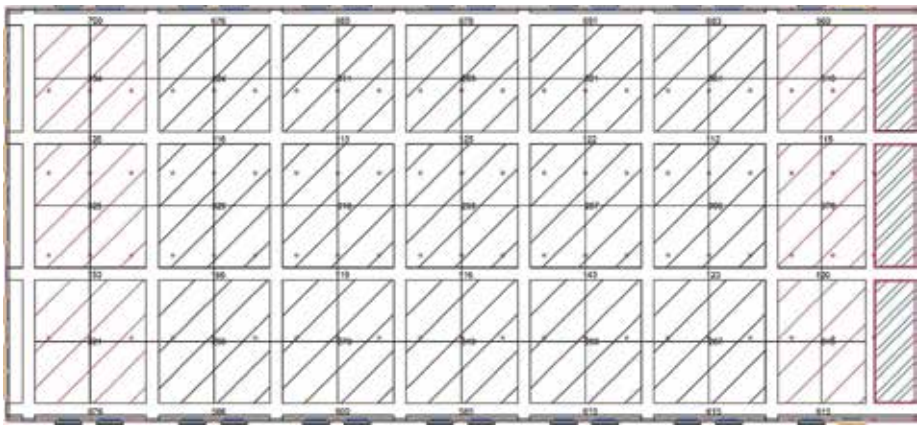
It is evident from the simulation results that optimum amount of lux levels are achieved inside of the shop floor all around the year. This amount can easily replace the need of artificial lighting required in the day lit hours.



Simulation result

CASE STUDY II:
ZF STEERING GEAR PVT.LTD.
DAYLIGHT AUTONOMY2:
The shop floor is divided into three zones on the basis of placement of fenestrations:

Peripheral zone i.e. 7 m from the windows
Transition zone i.e. 15 m from the windows
Middle zone i.e. the core zone of the shop floor It is seen that the lux levels varied accordingly, it was also seen that lux levels in the zones also depended on the placements of roof lighting above the zones.



Grid with lux levels for the work shed

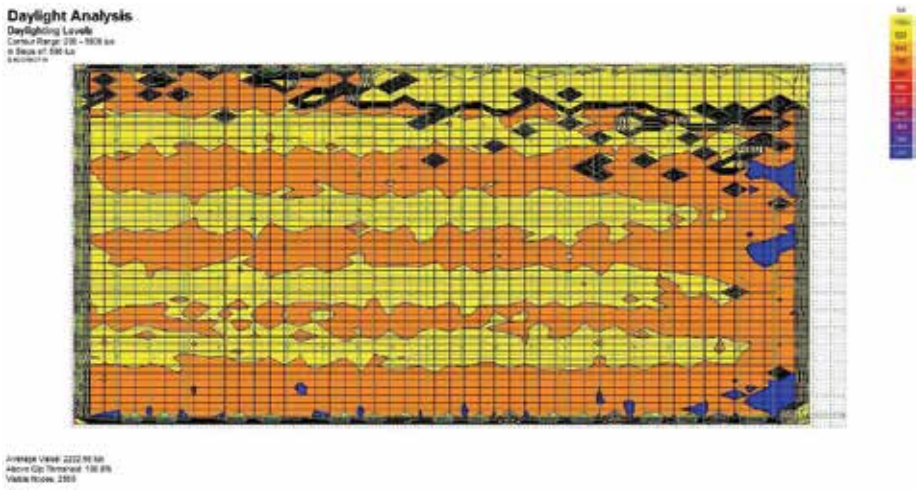
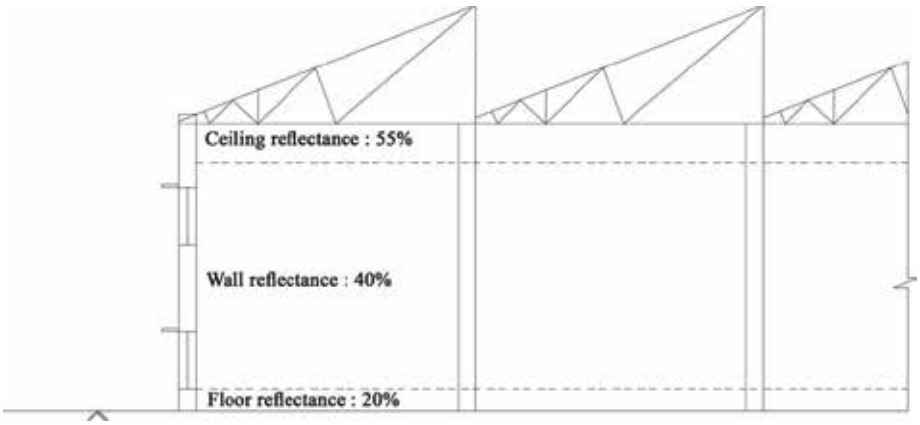


Table 1: Daylight autonomy case I

Dimension	L/B Ratio	WWR	SRR	Surrounding	Finishes	Reflectances
64m x 36.5m	2:01	13.00%	39%	Trees at a distance of 6M	Wall Paints	1. Ceiling: 55% 2. Walls: 40% 3. Floor: 20%

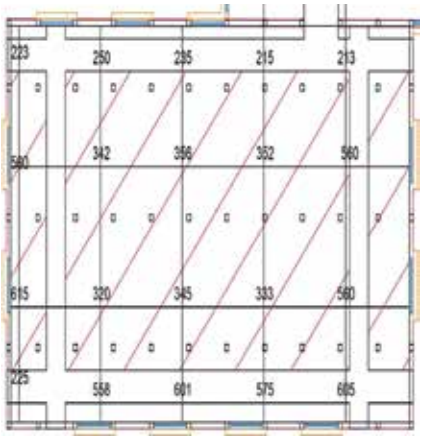


Reflectance

Daylight inside the shop floor also depends on the material reflectance in the interiors.

The lighting levels achieved in the interiors of the shop floor can be explained through the following figures.

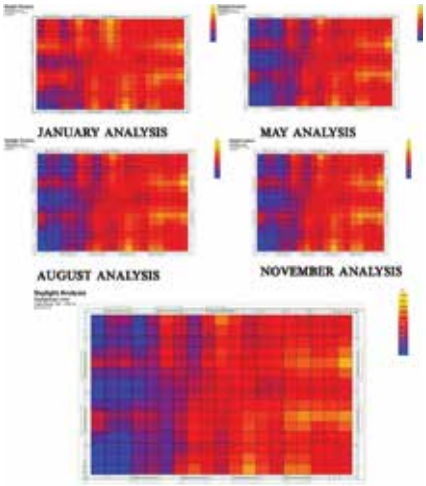
It is evident from the simulation results that optimum amount of lux levels are achieved inside of the shop floor all around the year. This amount can easily replace the need of artificial lighting required in the day lit hours.



Inference of the study :

From the above case studies it can be analyzed that daylight can totally substitute artificial lighting systems in the day time. Design of proper roof lighting and window design by regulating permissible WWR and SRR ratios can replace general lighting in the day time, for the intricate work that is carried out in the shop floor can be provided with task lighting if needed otherwise appropriate lux levels can be achieved by simple implementation of sky lights, roof lights, windows and other innovative methods and techniques to harvest day lighting. The study also shows that acceptance of skylight harvesting solutions is gaining popularity day by day.

Use of various models of skylight harvesting has been successfully implemented for industrial lighting and thus the usage of artificial lights has been reduced considerably. New awareness of the advantages of day lighting, combined with the development of new design techniques and products, has improved the design of daylight in industrial buildings.



SEPTEMBER ACTUAL VISIT

The researcher believe that for the predictable future, daylight and daylight/artificial integrated systems will remain the preferred strategies for industrial facilities, offering superior efficiency, dependable, high-quality illumination. As these technologies continue to be advanced and improved upon, we will see more examples of integration of daylight with artificial lighting. Modern day lighting has established to be the best light source. It is also the most promising strategy for conserving energy and reducing building operation costs.

Conclusion :

In the conclusion of the study, it is quite evident from the above figure that through proper daylight penetration via skylights helps in replacing the need to use artificial lighting in the day time even in long span industrial building. It was concluded that desired amount of lighting levels where achieved inside the work shed so as to carry on the work uninterrupted. Daylight is dependable and uninterrupted throughout the year which can easily be harvested inside the building through various methods like skylights, light pipes, north light truss etc.

By utilizing daylight inside the building can enhance workability of the people working in the building it not only increases working potential of people but also helps in reducing fatigue in the occupants which otherwise happens with artificial lighting. Apart from these advantages an ample amount of reduction in power consumption and thereby reducing the overall billing in electricity is also one of the major point on why it is important to incorporate daylight inside the building. With the decrease in the electricity usage, the dependency on fossil fuels for its generation also reduces hence conserving resources.

References :

● "Day lighting application and effectiveness in Industrial Facilities"; by Brian McCowan and Daniel Birleanu; Energy and Resource solutions, Inc. Haverhill, MA referred for literature study.

● "Sky-lighting- a solution to reducing energy consumption in apparel sector"; by Pavan Godiawala, Noopur Anand, Jayantilal Mathurbhai Patel; National Institute of Fashion Technology Gandhi Nagar, published in National Journal of Scientific and Research Publications, volume 4, issue 4, 2014 April referred for literature study on an Indian context.

● "Integrated Lighting Efficiency Analysis in Large Industrial Buildings to Enhance Indoor Environmental Quality"; by Dušan Katunský, Erika Dolníková and Saeed Doroudiani; Department of Architecture and Building Structures, Institute of Architectural Engineering, Faculty of Civil Engineering, Technical University of Kosice, Kosice 04200, Slovak Republic; Department of Building Physics, Institute of Architectural Engineering, Faculty of Civil Engineering; Technical University of Kosice, Kosice 04200, Slovak Republic; North York, Ontario M2J 1Z4, Canada.

● Mechanical and electrical equipment for building; WALTER T. GRONDZIK,ALISON G. KWOK

Extract from Electrical & Power Review (EPR) November 2018.

LEDs for lighting up the power sector

Dilip Kumbhat, President, Indian Society of Lighting Engineers and CEO, K-Lite Industries

"Government should impose restrictions so that except the LED chips from reputed manufacturers, other imports are curtailed"

Dilip Kumbhat, President Indian Society of Lighting Engineers and CEO, K-Lite Industries, discusses how the government initiatives for energy saving measures for the lighting industry has proved to be a game changer for the Indian power sector.

Lighting contribution

One of the critical components of infrastructure that affects India's economic growth is the Indian power sector. Under the power sector, the contribution due to lighting power is significant and is considered to be around 17 to 18 per cent of the total energy.

Meeting the demand of industries

Electrification of energy demand in all regions and sectors and its impact on economic growth of the country has to be looked upon in two broad and distinct categories, i.e. meeting the demand of industries and catering to the lighting. It is obvious that the economic growth impact will be much higher with the industrial expansion as compared to lighting. In fact, most of the states have achieved total electrification of their villages by extending electric supply to those in need. The industries get established around the industrial hubs and places, which are already electrified.

A game-changing initiative to lower power consumptions of lightning industry

The initiatives by the Government of India for energy saving measures applicable to the lighting industry has definitely proved to be a game changer and these programs are implemented by:

- Establishing a separate non-conventional and renewable energy sources department for a focused approach in energy saving measures at the national level

- Developing domestic manufacturing capability for LED chips and encouraging entrepreneurs with more than 25 per cent investment cost reimbursement through the Department of Electronics and Information Technology (Deity) under the Modified Special Incentive Package Scheme (M-SIPS)

- Incentivising the establishment of R&D facilities, testing laboratories etc., for the lighting components

- By establishing a separate company known as EESL, and directly procuring and distributing millions of LED lamps, government has made a turn around to bring down the prices considerably.

Lighting market in India

Favorable government initiatives, growing environmental concerns and awareness and the declining prices of LED components due to scaled up demand are the factors to be considered for the growth rate of the lighting market in the years to come. According to TechSci Research report, the LED lighting market in India is projected to register a CAGR of over 30 per cent, during 2016-2021, on account of rising personal disposable income, growing government initiatives encouraging use of LED lights and increasing focus on smart city projects. Rising urban population of the country is expected to further drive demand for LED lighting in India during next five years.

The need to boost the lighting industry

Free and cheap imports, particularly from China, are really killing the development of domestic manufacturing of lighting components. Such imports have brought down the quality to very low levels. Government should impose restrictions so that except the LED chips from reputed manufacturers, other imports are curtailed.

There is a need to create more public awareness programs to choose energy efficient lighting and make the usage of LED lamps/fixtures in all government departments/ projects mandatory. A uniform standard for the LED chips in line with the emerging technologies should be implemented.

DAYLIGHT AUTONOMY AND ITS APPLICATION IN INDIAN CLIMATE

Ar. Tanmayee Panse

A sustainable architect with major interest in Lighting design, she has a love using Energy Efficiency as well as Energy Conservation in Lighting. Her major interest lie in aesthetics of Daylight Designing. Presently an Assistant Professor in Sinhgad College of Architecture, Pune, she pursues her interest in Lighting Design through her blogs on relevantlighting.wordpress.com

Introduction

Just using daylight for habitable spaces and affirming the building to be green is not enough in today's competitive world. The concept of usable daylight is very important. Hence the concept of daylight autonomy was evolved. Spatial Daylight Autonomy and Annual Sunlight Exposure allow designers to quantify and compare the success of daylit spaces. (Kevin Van Den Wymelenberg, 2016) It basically acts as a judge to the qualitative daylight performance of the building.

This concept has been devised by IESNA and applied for design of many buildings in the USA, where the amount of available daylight is low compared to the tropical climates. However this concepts needs to be emphasized in tropical climates since the available exterior illumination is high. The actual usable daylight times in India are pretty short, since most of the time the daylight is too harsh. Therefore, there is a need for correlation of daylight autonomy with Indian climatic context.

Aim :

To understand the concept and application of daylight autonomy in the context of daylight abundant climate of India through existing literature

Objectives :

- To understand the concept of daylight autonomy through exiting literature
- To understand the available exterior illumination in the tropical climate of India
- To underline the application of daylight autonomy in Indian context
- To specify the softwares used to calculate daylight autonomy

Methodology :

- Data collection and comprehensive analysis about the concept of daylight autonomy
- Comprehensive analysis of exterior illumination available in Indian climate
- Understanding application of daylight autonomy for architectural designing

Limitation :

This paper will not deal with annual sun exposure, a term commonly associated with daylight autonomy in cold countries.

Key findings

Daylight autonomy forms a more dynamic measure for usable daylight in built forms than any static measure like daylight factor and available illumination. It is more applicable in tropical climate with higher available illumination. Daysim along with Ecotect can be used to measure daylight autonomy and usable daylight.

DAYLIGHT AUTONOMY

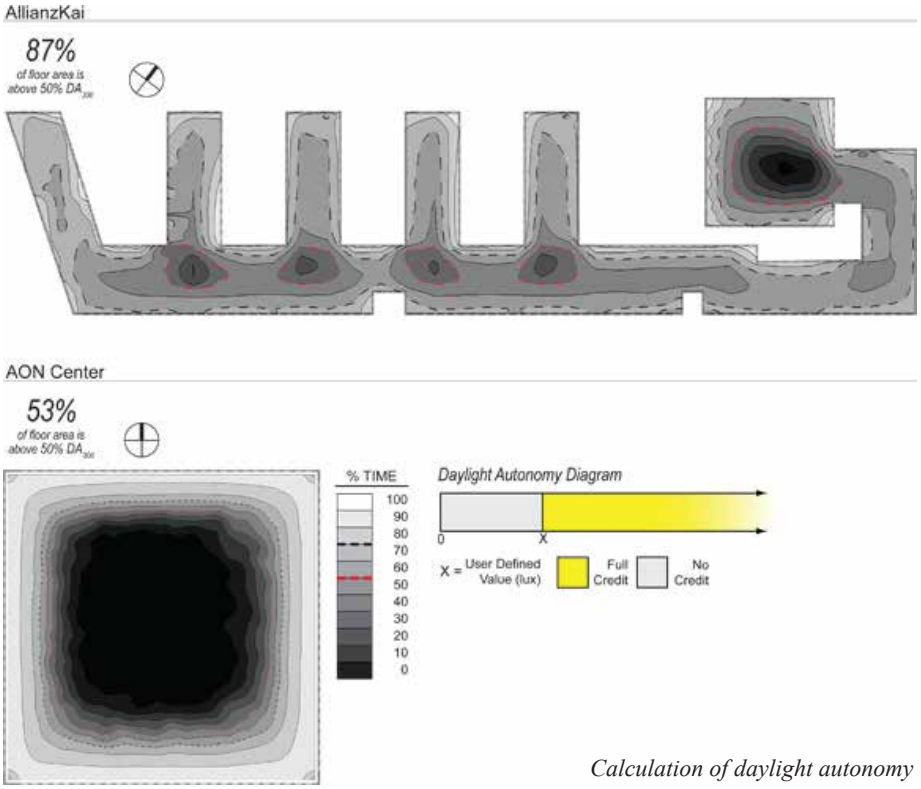
Background

The Egyptians used daylight controls to temper the heat of their extreme climate, introducing lattice and screens with different size openings to allow for daylight penetration into a space. In Rome, buildings were designed around courtyards surrounded by living space to maximize available daylight. European Renaissance masters revered light as both a practical and aesthetic design tool. Baroque style used indirect light to create mystery and intrigue in buildings, but as electric lighting sources and technologies improved; daylight took a back seat in lighting design.

Today, encouraged by updated building codes, new energy regulations, and a renewed emphasis on sustainability,

architects, building owners, and lighting designers are once again embracing daylight as a practical, aesthetic, and symbolic element of good building design. This is known as designing for daylight autonomy.

Daylighting is an important aspect of achieving energy efficiency in built form. Significant contradiction arises in buildings in the hot climate regions when relating window sizes and shadings to achieve both reduced energy consumption (requiring minimum opening ratios and more shading) and sufficient daylighting (requiring maximum opening ratios and less shading). (Mohamed Amer Hegazy, 2013) Natural lighting has two noticeable effects, Light and Heat. In hot climates, large windows can provide more daylight but higher cooling loads, while small windows can decrease energy consumption but do not offer sufficient daylight. Hence, hot climate is considered one of the most challenging climates when it comes to daylighting (A., 2012)



Calculation of daylight autonomy

Definitions

What is Daylight?

The entire natural light available from the sun and reflecting sky. It is an important feature to be considered for designing an energy efficient building, as it reduces the load on electric lighting during daylit hours.

What does Autonomy mean?

It means independence or freedom.

Daylight autonomy essentially means the autonomy in natural light, meaning that a space does not require artificial light to perform activities, which happens to be the core of sustainable lighting design. It means to maximize the amount of useful daylight, thereby minimizing or eliminating the need for supplemental electric light.

What is useful daylight, and how is it defined ?

Useful daylight illuminance (UDI) is a modification of daylight autonomy which places illuminance between 100 – 2000 lux. The range 0-100 lux is termed as under-illuminated and insufficient for functioning, whereas above 2000 lux is termed as over illuminated causing glare. There is little research to support the selection of 2,000 lux as an absolute upper threshold. Basically UDI guarantees visual comfort.

Useful daylight is independent of daylight factor. Daylight factor calculates the percentage of interior illumination with respect to exterior illumination. Exterior illumination differs with latitude and sky conditions. Hence DF cannot be termed as an ultimate measure of interior illumination.

Calculation

Daylight autonomy is calculated as the percentage of time when the architectural project is autonomous with daylighting in functional hours. Illumination on each point throughout the daylit hours of the year will be measured. The percentage of time at which the daylight on that particular point falls between 100-2000 lux (UDI) will be calculated. This is presented as the daylight autonomy if the point. For a successful design it should at least be 50%. It is a major innovation since it considers geographic location specific weather information on an annual basis.

In case the basic requirement for the function is 300 lux, the user is free to set the threshold above which Daylight Autonomy is calculated. For the graphs above, we selected a Daylight Autonomy threshold of 300 lux (DA300). The graphical percent values represent the percentage of the floor area that exceeds 300 lux for at least 50% of the time.

Importance

All the criteria in ECBC, IGBC, LEED, GRIHA, etc define the lower threshold of illumination through daylight. Most of the activities have minimum lux levels defined, like 300 lux for office working, 50 lux for circulation, etc. However, knowing the dynamic nature of daylight, buildings and daylight apertures designed for overcast sky conditions, will provide illumination much more than required. Lux levels as high as 3000-4000 lux will be achieved. This can easily cause glare for the occupants and hamper functioning. In such conditions it is observed that the occupant will close the daylight aperture and will rely on the more adjustable artificial lighting. This will defy the whole purpose of sustainable lighting. Hence there is a need to define the upper

threshold of illuminance through daylighting.

Daylight autonomy defines the lower as well as upper level of illumination. This range is termed as usable daylight illumination. Furthermore it defines the percentage of time in the whole year where a particular point will receive daylight within the usable range. This can define the annual daylight performance of the building. Since most of the buildings when designed for daylight are designed only for overcast sky conditions, the annual performance is ignored. This results in actually higher usage of artificial illumination in highly daylight hours. Thus daylight autonomy can form a better measuring unit for the annual daylight performance of the building.

Available exterior illumination in tropical climate of India

India is a tropical climate lying between latitudes 8 degrees to 32 degrees north. With respect to solar position and available exterior illumination this is a wide range. The available exterior illuminations for different latitude are given the following table.

Table XIX Illumination from a design sky

Latitude (N or S)	Design sky illumination
0°	17000 lux
10°	15000 lux
20°	13000 lux
30°	9000 lux
40°	6000 lux
50°	5000 lux

(Littlefield, 2012)

The skies are mostly clear except for the months of July and August, resulting in abundant daylight available from 8 am to 4 pm, the primary daylit hours.

Correlation between Daylight Autonomy and Indian climate

Daylight is the visible part of solar radiation and daylight at these latitudes can also mean thermal gain. In addition, bright sky, reflected light from the ground, and direct solar radiation can be causes of glare. To avoid overheating, daylight is normally blocked by shading devices or highly reflective glazing. To manage glare, most traditional diffuser materials and glare management systems reduce the usable output lumens as direct light is blocked and spreading increased. As a result, interior spaces can be dark and many buildings depend entirely on artificial lighting for illumination, even when external illuminance levels are very high.

Significance of daylight autonomy in higher exterior illuminance of India

Daylight autonomy gives a measure of total illumination on the work plane available throughout the year in daylit hours. It considers the lower as well as upper threshold. The lower threshold can be modified according to the function and activity requirements. Daylight is dynamic, thus there is no one common solution for all scenarios. It is more critical in tropical climate where the sky is predominantly intermediate; with inconsistent clouds formations which will influence the presence of direct sunlight and daylight availability. Daylight autonomy is a dynamic measure of daylight illumination. Therefore it is proposed that instead of any static measures like daylight factor or illumination in overcast conditions, daylight autonomy or continuous daylight autonomy with the help of useful daylight illumination will form a better evaluation method in Indian climate.

Softwares used to calculate daylight autonomy

Daylight modeling is an effective way of predicting the daylight performance of the building. Ecotect provides as an excellent tool for the same. The modeling can be done in Ecotect while lighting analysis can be carried out in radiance or daysim. Radiance can provide a time by time calculation of daylight, whereas daysim provides an annual matrix in the form of daylight autonomy. The upper and lower levels of illumination can be set in daysim for usable daylight.

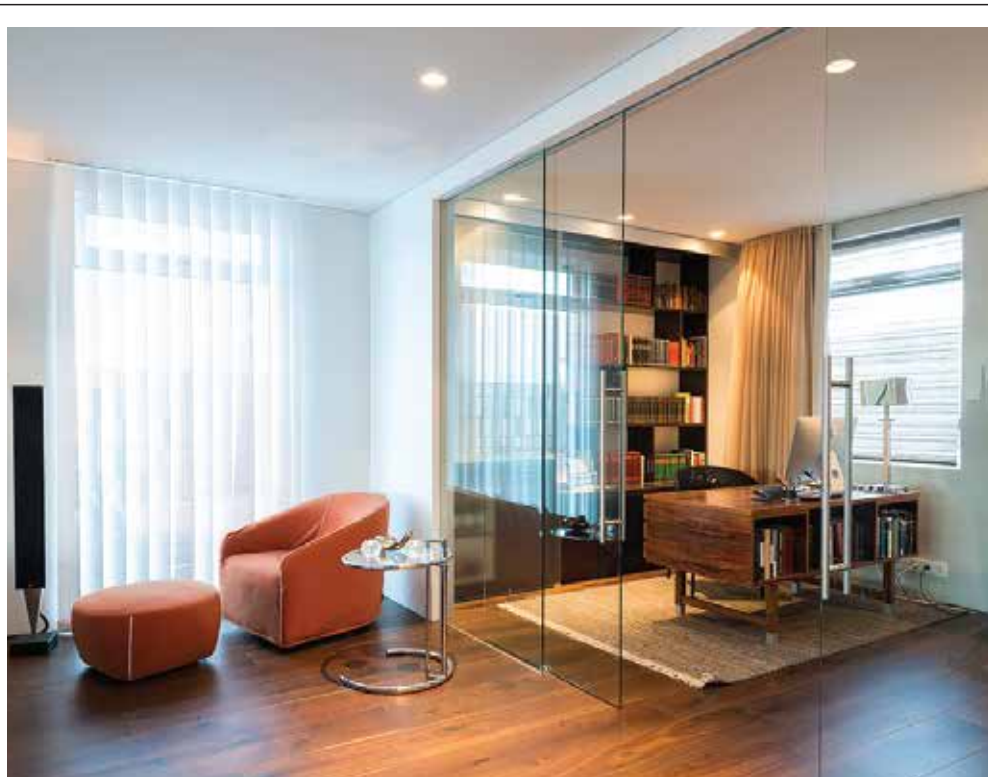
Bibliography

A., M. B. (2012). Natural daylighting in Iranian Hot and Arid Reions. IJTPE 4 , 191-196.

Kevin Van Den Wymelenberg, A. M. (2016, April 12). Annual Daylighting Performance Metrics, Explained. Retrieved December 22, 2017, from Architectural Lighting: http://www.archlighting.com/technology/annual-daylighting-performance-metrics-explained_o

Littlefield, D. (2012). Metric handbook Planning and Designing Data. Oxon: Architectural press.

Mohamed Amer Hegazy, S. A. (2013). PARAMETRIC ANALYSIS FOR DAYLIGHT AUTONOMY AND ENERGY CONSUMPTION IN HOT CLIMATES. 13th Conference of International Building Performance Simulation Association, , (pp. 2232-2232). Chambéry.



LED Expo Thailand

27-29 June 2019

IMPACT Exhibition Center, Pak Kret, Thailand

Timings
10:00 AM - 6:00 PM
(Business)

Participants
Visitors :15000 (Estimated)
Exhibitors : 300 (Estimated)

Organizer
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- THAILAND LED SUMMIT : A conference on LED Lighting product & technology.
- LED SIGNAGE : A platform to facilitate the display of innovative.
- PCB ZONE : A specific zone highlighting high performance PCB.

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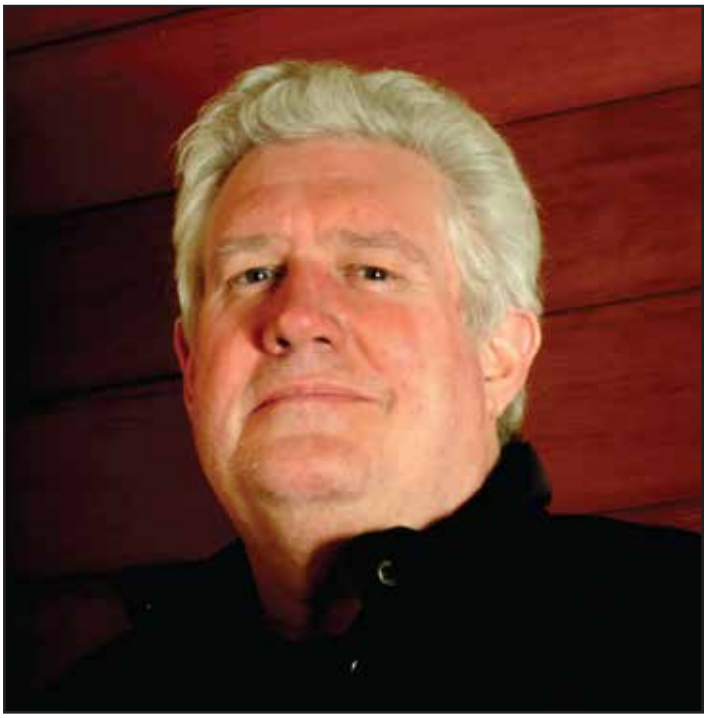


MELBOURNE CRICKET GROUND
SMART STADIUM PROJECT

Mr. Steve Brown
Melbourne Australia

The iconic Melbourne Cricket Ground (MCG) in Australia received a new facade lighting treatment in time for the ICC Cricket World Cup in 2015

HISTORY

The Melbourne Cricket Club was founded in November 1838, and played matches at various unsatisfactory venues around Melbourne for about fifteen years. In 1853, Governor LaTrobe offered the club three choices for a permanent site on the edge of town. The club chose Government Paddock, part of a 200 acre reserve for horse agistment and public recreation. The first inter-colonial match was played on a dusty, tree-ringed hexagon in March 1856. The first member's grandstand, constructed from wood, was built in 1854, and the first public grandstand in 1861. A famous reversible grandstand, which allowed people to watch cricket on the south side and football on the north, was built in 1876, just in time for the first ever Test Match against James Lilywhite's English team in 1877.

Two epochal football games took place within Yarra Park in July and August 1858; the first between Church of England

Grammar and St Kilda Grammar; the second between Scotch College and Melbourne Grammar. Neither game had any umpires, nor was played to any particular rules, and had about 40 players per side. One match was played over three weekends between 7 August and 4 September 1858. The game was declared a tie after both teams had scored the grand sum of one goal apiece. The first official Australia Rules football match (under defined rules) was played in 1879, and the first Victorian Football League match was played on 15 May 1897, when Melbourne defeated Geelong.

The 1879 match was played under extraordinary conditions. As far as we know, it was the world's first floodlit sports event, illuminated by the magic of Professor Pepper's new electric light! Allegedly some 14,000 people turned up to watch this game, at a time when football attendances in most parts of the world rarely exceeded 5,000.

The Melbourne Cricket Ground continued to grow in the early part of the 20th Century, nestled in its unique setting, even as late as 1930 still surrounded by orchards and paddocks. During World War Two, it was used successively by the US Army Air Force, the RAAF, and the US Marine Corps as temporary accommodation. Some 200,000 troops were stationed at the ground between 1942 and 1945.

On 28 April 1949, Melbourne beat out Buenos Aires, Los Angeles and Detroit as the venue for the 16th Summer Olympics to be held in November 1956. These were to be the first Olympics held in the southern hemisphere. Despite games boycotts by China, Egypt, Iraq, Lebanon, Netherlands, Spain and Switzerland, and the fact that the equestrian events had been held five months earlier in Stockholm due to Australia's tough quarantine laws, some 103,000 people attended the opening ceremony at the MCG.

TECHNOLOGY

The MCG acquired Australia's first colour video scoreboard in 1982, to replace two old bike-chain mechanism operated scoreboards from 1895 and 1907. Six 85 metre tall light towers were added in 1984, with a sportslighting system from Philips. They were first used to illuminate a day/night game in front of 82,000 fans in February 1985.

In 1988, it was discovered that the southern stand – which had been built in 1937 – had concrete cancer. It was decided to demolish the old stand and build anew, which led to the creation of the southern stand, soon christened the Great Southern Stand, completed in time for the 1992 Cricket World Cup. The new northern stand was built between 2003 and 2006, to replace various existing stands which had been built between 1928 and 1956. New works were opened progressively and the project came to fruition in time for the 18th Commonwealth Games in March 2006, and allows the seated capacity of the ground to exceed 95,000, with an additional 5,000 standing room places.

Some notable facts about the MCG include;

- The largest AFL crowd was 121,696 to see Carlton play Collingwood in 1970
- The largest reported crow was 130,000 to see evangelist Billy Graham in 1959
- The largest Test Match crowd was 91,092 to see the Ashes test last Boxing Day 2013 – a world record
- The largest one day international crowd was 87,182 to see Paksitan beat England at the 1992 World Cup

● The largest soccer crowd was 107,000 at the 1956 Olympic final – USSR versus Yugoslavia

● Also the venue for the first ever Test Match, and the first ever One Day International.

In terms of technology firsts, the MCG can boast of the following;

● First all-colour cricket scoreboard with instant replay

● First electronic sight-screens

● First scrolling signage on an oval ground

● World's highest sportslighting towers

● The grass is cut daily in summer (to 11mm in length) and twice weekly in winter (to 27mm in length), and uses HPS grow lights during winter to encourage growth.

THE DESIGN PROCESS

The 2015 Smart Stadium project was the latest phase in the ground's development. It involved a combination of architectural, technology and lighting enhancements, most working together in harmony to improve the patron experience. One of the first elements to be implemented, were two new electronic scoreboards, the largest in Australia at 332 square metres each, which were first used at the Boxing Day Test in 2013.

One of the aims of the Smart Stadium project was to look at how lighting, vision and sound could aid in wayfinding, motivating the public's approach to the stadium. One of the driving forces for the lighting project was to create a memorable long-range view of the MCG – often referred to as the helicopter shot, the Postcard shot or the Glory shot – by which the ground may be instantly recognisable on non-game nights.

We reviewed how we could tackle the main structure. We started by looking at benchmarks of stadia projects around the world, to understand the context into which any new design must be placed.
Examples included;

● BC Place, Vancouver

● Bunyodka Stadium, Uzbekistan

● Peru National Stadium

● Tampa Bay Stadium

● Amsterdam Area

This part of the project process was actually a lot of fun. We actually clambered over most of the building facades, roofs and balconies looking for possible mounting locations for equipment. The existing structure of the building naturally suggested certain approaches. The sloped seating plats present themselves to the outside more or less all the way around – except at entry gates – and we found it was possible to lit them in a relatively consistent manner for the full 360 degrees.

In order to convince the owners (the Melbourne Cricket Club) of the suitability of the design, we produced a fly-around model created by our in-house modelling division, Luminova.

The final design approach focused on two things. Firstly, distant views of the stadia required a continuous 360 degree uplighting of the stadium bowl via carefully placed LED uplights, with various head configurations and optics. And secondly, the pedestrian level view required direct view and indirect lighting of architectural elements at the seven stadium gates. These gates act as funnelling points for crowds from external concourse. Linked lighting systems were introduced into 6 metre high wayfinding totems that aligned to the gates, to enhance the visual guidance of the lighting scheme.

In terms of lighting control, there is a central lighting control management system located within a server room with an interface to the Match Day Control room, where a dedicated PC allows remote programming and show selection for the facade theming lighting. This control system is interconnected via the building Optic Fibre network to the entire lighting infrastructure to ensure full control of the system.

The final outcome from an operational point of view is a system that allows the operator to manage the depicted 'shows' and tailor them to an event of team. All current AFL teams and resident Cricket teams are pre-programmed as well as customisable scenes developed to suit sponsors or specific events.

The following lighting scenes were commissioned:

● White

● Pink (Breast Cancer week)

● Blue

● Red

● Green

● Yellow

● All AFL team colours (16 teams)

● Yellow & Green (Australian national colours)

● Red, White & Blue (Melbourne Cricket Club colors)

The new facade lighting was used for the first time the evening of the Grand Final of the ICC World Cup on 29 March 2015, and has been extensively used for the 2016 and 2017 Australian Rules Football seasons. The Melbourne Cricket stated to the press "We can now add to that true home team feeling at the MCG."

2018 AL Design Awards

The Constellation, The Founder's Memorial, Abu Dhabi, UAE

DPA Lighting Consultants

Barry Hannaford, David McNeil, Lee Sweetman

"The Constellation" is a monumental public artwork that functions as the centerpiece of The Founder's Memorial in Abu Dhabi, a permanent national tribute to the UAE's founding father, the late Sheikh Zayed bin Sultan Al Nahyan. The lighting team at dpa Lighting Consultants was invited to illuminate the artwork that was conceptualized and designed by Boston area artist Ralph Helmick, whose work explores human perception through optical discovery.

The lighting designers teamed with the artist for a series of mock-ups, in Boston and on site, to determine how the lighting could reveal the artwork from multiple viewing angles, while retaining the nuanced depth of field of the sculpture, which is composed of more than 1,300 convex polyhedrons (of different sizes) suspended from more than 1,000 tensioned cables. To achieve the three-dimensional rendering of the Sheikh's profile embedded within the artwork, 753 downlights and 1,203 uplights–all custom-designed and using 3.5W warm-white LEDs and integral DMX control–were used to light the sculpture. The celestial-like quality of the individual elements and the artwork as whole and fully illuminated evokes a sense of timelessness as it honors Sheikh Zayed and his vision for the UAE.

ARTIST
Ralph Helmick, Newton, Mass

LIGHTING DESIGNER
DPA Lighting Consultants, Dubai, UAE

PHOTOGRAPHERS
Alex Jeffries Photography Group

HYATT PLACE RAMESHWARAM

Dr. Amardeep M.Dugar
IALD, MIES, MSLL
Founder & Principal
Lighting Research & Design

Hyatt Place Rameshwaram - highlighting traditional ethics with modern ethos

Hyatt Place Rameshwaram is a new generation of hotels that offers casual hospitality in a smartly designed, high-tech and modern environment. However, designing and building an upscale select-service brand hotel like the Hyatt Place – differentiated by its modern product design, smart features, relaxed service model and fresh aesthetic – in a city like Rameshwaram presented its own challenges. Nestled on a beautiful island on the lower side of India and separated from Sri Lanka by the small Pamban channel, Rameshwaram is considered one of the holiest places in India. This religious city has a unique historical backdrop, as this is where Lord Rama from the Hindu mythology created a bridge across the sea to Sri Lanka. Renowned for its pilgrimage centres and great religious value, it attracts visitors from all over India and abroad. Having witnessed many dynasties, its medieval Dravidian architecture is a visual treat for artists and designers. The tranquil beauty of its temple architecture apparently provides great peace of mind. It is also famous for its various local markets.

The client JKR Enterprise intended to achieve a rate premium based on its superior product and service offering in addition to Hyatt's strong brand recognition. Hundreds of hours of research with the architects, designers and

consultants helped create an exciting hotel design with a competitive cost-per-key rate in the upscale select-service category. It features over 100 guestrooms, a teen club, function rooms, ballrooms, a business centre, day spa, extensive restaurants and a resort-style pool retreat. This resort experience includes direct interaction with the Rameshwaram climate due to its open-air food and beverage outlets and public areas. The lighting brief given to Lighting Research & Design was to be very mindful of operational expenses apart from capital expenses. Considering all the constraints, going the 100% LED way seemed like the best option.

The exterior and façade lighting treatment highlighting the unique architectural and design features of the property create a dramatic tonal contrast between the natural materials and the incredible Rameshwaram night sky. However, care has been taken to integrate these lighting treatments into the architectural features so as to reduce light pollution as well as the light sources' visual

presence. 36W LED Linear grazers highlight the vertical façade elements formed by the recesses between the guestrooms windows and roof overhangs while preventing light trespass and light spill. Similarly, 2x18W LED up-downlights highlight the vertical elements between the upper ground floor lounge windows with the roof overhangs preventing sky glow. Even the landscape lighting treatment uses full cut-off angle bollards and post-top luminaires for pollution-free soft illumination. A 3000K warm colour temperature is maintained in all the guest access areas, while service areas are illuminated with a mixture of 4000K and 6500K cooler temperatures.

At every given opportunity the lighting is married to the architecture and interiors with numerous custom designed luminaires and incredible attention to detail, revealing textures, highlighting forms and reinforcing a sense of luxury and sophistication. LED strips provide an eclipse-glow to the stone facings on the entry ramp stonewall, guiding guests into the billowing reception canopy. The canopy's graceful gabled form is gently illuminated with beam-integrated coves, offering a warm and inviting welcome experience. 14W/m LED strips tucked into the beams provide an ambient glow while custom-designed Fish-shaped pendants reminiscent of the local Rameshwaram culture contributes a

textured luminous sparkle.

The entire interior is entrenched in culture and history in the form of paintings and photographs of Dravidian art and architecture. Guests are greeted with a giant photograph of the Ramanathaswamy temple highlighted with 10W LED adjustable spotlights upon entering the double-height airlock and security check area. Similar 10W spotlights integrated in the pelmet uplight the adjacent textured wall thereby framing the photograph. A similar toned corner photograph of the Rameshwaram beach backlit with LED strips greets the guests in the reception lobby area. A sense of similarity is maintained with miniature 5W LED downlights integrated within rectangular cut-outs in the dark-wood ceiling providing general illumination in the air-lock, reception lobby and lounge areas.

The lounge areas consist of casual seating with custom decorative floor lamps. The concept of artwork photograph is taken to the ceiling in the Internet kiosk section of the lounge area. The LED strips within ceiling coves provide the dual purpose of highlighting the photograph as well as provide soft diffuse illumination sans veiling reflections for guests working on computer. Similar LED strips are integrated with the cabinets highlighting the artefacts placed within these cabinets. The reception counter itself is the centre-point of attention with LED strips integrated within the counter to graze the tiled surface as well as backlighting the fritted glass partitions above the counter.

The restaurant within the property caters for cosy as well as intimate dining. The lighting system follows traditional approaches such as selective use of downlighting, decorative pendants over the food displays and specific use of artwork light. The miniature 5W downlights create the impression of having dinner under a starry-night sky. Pre-set controlled light settings subtly shift the guest experience, seamlessly transitioning spaces from day to night. The upper-ground floor recreation deck adjacent to the restaurant is an elevated oasis comprising swimming and reflection pools, private gardens and quiet spaces. While the lighting of various water-features, selected structures, planting and built elements present 'each-as-a-part-of-the-whole', the hierarchy of light planning ensured that the pools were the more dominant elements at night.

The innovative design and guest experience of Hyatt Place Rameshwaram sets a new benchmark for the select-service industry. It welcomed its first guests on March 2017, bringing bespoke luxury to the historic city of Rameshwaram. With extremely strict budget and energy constraints, the entire project was completed for a budget less than 0.5 US$/ft2 with an energy consumption of less than 0.5W/ft2 for all luminaires and controls.

PHOTOGRAPHY

Gowtham Raj
Amardeep M. Dugar

PROJECT TEAM

Client – JKR Enterprise
Architecture – Centre for Design Excellence
Interior design – ASC Interiors
Landscape Architecture – ONE Landscape Design + Design Accord
Lighting design – Lighting Research & Design
Luminaire supply – Gojis Lifestyle + Unilites India
Fish pendants – Soto Decor

PRODUCTS APPLIED

Bollards – K-LITE Disc 16W + K-LITE Vera 16W
Controls – LEGRAND Universal dimmer + PHILIPS DYNALITE Multi-master
Decorative pendants & wall brackets – Custom
Downlights – ABBY Bling 5W + ABBY Snow 8W
Spotlights – ABBY Xyla 10W
Inground uplights – K-LITE ID 1W
Linear grazers – LEDS-C4 Convert 36W
Post-top luminaires – K-LITE Dixon 50W
Spike projectors – K-LITE Trioscape 7W
Underwater luminaires – ASTRAL Lumiplus S-Lim 24W + LEDS-C4 Aqua 18W
Up-downlights – ABBY Wallop 2x5W + K-LITE Wall-cylin 2x18W

Hunke Jewellers and Opticians, Ludwigsburg

Lighting concept

Hunke jewellers and opticians is a family business with a long and rich tradition in the town of Ludwigsburg, Germany. Situated in the centre of one of Europe's most renowned baroque cities, the owners planned to fuse the historical, traditional townhouse which hosted their established store with a newly built, neighbouring corner house.

In consequence, the interior design concept was meant to be a one-of-a-kind fusion of past and future elements, using premium materials. The aim of the lighting concept was, to underline and sharpen this approach - and present all products in perfect light.

The ambient lighting in the jeweller's part oft the store is generated by large fields of illuminated ceilings, integrated in an accurately shaped drywall ceiling structure. Random arranged spheres of diffuse glass complete the ambiance and serve as illumination for the facial area. The bright and brilliant product lighting is generated by recessed, adjustable downlights with reflectors made of dichroic glass, again integrated in a custom made drywall ceiling construction.

The showcases are illuminated by a combination of two lighting principles: the back wall is brightened up from top to bottom by a diffuse linear LED-strip, and the products are highlighted by directional

miniaturized spotlights with different beam angles and colour temperatures. An elaborate filter layer behind the shop windows generates a fascinating link between exterior and interior: a glass pane, printed with a gradient and supported by floor-integrated linear lighting, generates transparency as well as privacy.

The very centre of the store is the two-storey lounge area, situated in the oldest part of the building. It is dominated by a golden ceiling setback with a bundle of 40 custom made glass pendants in a random arrangement.

In the opticians store, an accurately arranged system of thin black ceiling lines with integrated track lighting provides an optimal flexibility for the different requirements of the illumination. A combination of glare reduced downlights (circulation areas), wallwashers (showcase walls) and powerful linear lighting (consultant tables), accompanied by directional spotlights (shelves and tables) create a well balanced, glare reduced lighting atmosphere.

Pfarré Lighting Design

pfarré lighting design creates daylight- and electrical lighting projects for architecture, land- and cityscape. As a company with world wide orientation, working independently from manufacturers, we are in a position to carry out public, commercial, cultural and private projects on almost any scale. With a holistic approach our work is characterized by individual responses on the particular project, environment and culture.

Our lighting designers are experienced with all phases of the HOAI (RIBA), and familiar with the conception of state-of-the art lighting controls. For special requirements we offer customized solutions, and designing light objects in the specific context of the architecture and the task concerned. In our projects, both aesthetical and technical longevity is as crucial as our focus on energy efficiency. Good lighting design enhances architecture and promotes its acceptance.

Gerd Pfarré FIALD
Managing / Design Director

Gerd Pfarré FIALD, born 1960. Since 1992 lighting designer. 1998 founding of Pfarré Lighting Design, an independent lighting design practice in Munich.

1978-81 apprenticeship in carpentry and cabinet-making, apprenticeship diploma; free wood carving, first designs of luminaires and furniture. 1982-85 product- and exhibition design in the team of Ingo Maurer. 1987-89 freelance designer in Milan and Berlin. 1989-98 lighting design for Ingo Maurer.

Author and juror in the field of lighting design, frequent lecturer at universities and conferences around the world. Professional member of the IALD International Association of Lighting Designers, Chicago since 1998. Member of the IALD Board of Directors 2002-05. Induction to the IALD College of Fellows in 2012. Co-editor of the print edition ILLUMINATOR.

Recipient of numerous national and international design awards. The projects of Pfarré Lighting Design have been featured in more than 300 publications.

ENHANCEMENT OF DAY LIGHTING FOR DEEPER SPACES IN COLONIAL LIBRARY BUILDINGS

Ar. Diksha Patil, Ar. Gauri Shinde
College of Architecture, Sustainable Architecture, Bharati Vidyapeeth Deemed to be University, Pune

Abstract :
The British Colonial era lasted in India for over three centuries and had not only left an imprint of legacy and culture but also on magnificent buildings and infrastructures. The main aim of report is analysing day lighting levels in colonial library buildings to understand the availability of daylight in the existing scenario .This examines whether colonial building fulfil the desired lux levels required for reading according to NBC standards. The illuminance readings were documented for clear sky and overcast sky condition. All the selected buildings are Institutional Buildings which are designed and built in the post-independence era and even today they are serving the same purpose. The paper examines issues in day lighting for colonial buildings and suggests generic recommendations for the same.

Introduction :
Daylight creates an ambiance that has visual comfort and provides people with a connection to the natural environment. Utilization of daylight in libraries is not only serves purpose for aesthetics, but also saves energy and cost. Available daylight is free and provides the opportunity to reduce these negative impacts which are created by the over-dependence on artificial lighting sources. The daylight is not only a good source of light but the most efficient. The number of lumens per watt (efficacy) of daylight is twice that of a fluorescent lamp and ten times that of an incandescent lamp. Lighting in libraries is important for several reasons. Library users obviously need sufficient lighting for reading books or text on a computer screen. Design considerations must include avoidance of excessive contrasts which may cause visual fatigue. The amount of light as it changes over the course of a day and through the changing seasons must also be considered in an attempt to keep the levels of light as consistent as possible. Some of the challenges of natural lighting design include glare on computer screens and control of amount of daylight penetration. The intent of this article is to present factors affecting day lighting and recommendation the same as a guide to colonial library building design, with some illustrations that suggest the possibilities within that framework. (Dean, 2002).

Light Quantity :
The Illuminating Engineering Society (IES) is an independent organization of professionals. That sets light level guidelines which serve as the recognized standards for light in building spaces. The following table provides the illumination levels recommended for library spaces.

Space	Minimum Lux Levels	Average Lux Levels
Active(Occupied) Book stacks	80	100
Inactive book stacks	54	80
Book Repair and binding	215	323
Cataloguing	215	323
Circulation Desk and Reference Desk	215	323
Computer Areas	215	323
Audio - Visual Areas	215	323
Audio - Listening Area	215	323
Reading (Newsprint, Magazines, Key-Board)	215	323
Reading (Fine detail items, small prints)	540	805

Table 1 IES Recommended Light Levels

Daylight Factor :
The way in which natural light penetrates a building, it is useful to examine the distribution of indoor illuminance as a function of external luminous conditions. This is known as daylight factor distribution and is typically carried out with reference to an overcast sky.

Components of daylight are:-

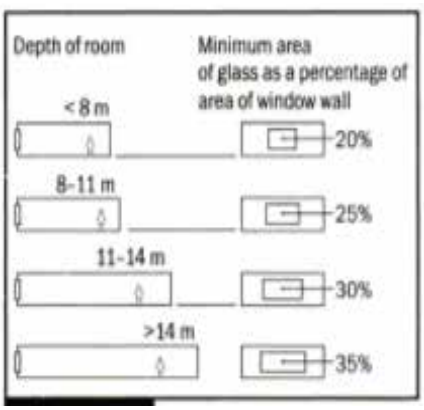
- Indoor illuminance - Required on reference plane
- Outdoor illuminance - Outside available illumination & depends on cloud cover.

Factors affecting daylight factor distribution :
1. Room depth
2. Height of the window head
3. Shading devices
4. Glazing type

Room depth
Deeper rooms have a poorer uniformity ratio, the ratio of the daylight factor at the back of the room to that at the front shows how the uniformity ratio varies as a room of a given cross-section gets deeper.

The minimum area of glass as a percentage area of window wall with different room depth is shown in Figure.

Limiting depth rule of room will be lighter at the back if its depth is not much greater than its width, and its depth is a little more than twice the height of the window head. The surfaces at the back of the room should be kept light. (TERI, January 30, 2009)



Recommended percentage of openings with varying room depth (TERI, January 30, 2009)

Height of window head
The higher the window head, the deeper will be the penetration of day lighting. This aspect is easily adaptive and a good distribution can be achieved in the space while maintaining the visual connection with the outside. (TERI, January 30, 2009)

Shading devices
Overheating and discomfort may occur if the annual penetration of sunlight exceeds one-third of probable sunlight hours. Direct sunlight can also cause glare. Controls are therefore necessary, particularly in workspaces. There are three main ways of controlling sunlight: (1) external shading, (2) internal shading, and (3) solar control glazing. (TERI, January 30, 2009)

Glazing Type
The choice of glazing affects the daylight, solar heat gain, and heat loss through a window. These are measured by the visible transmittance, the total solar transmittance, and the U value.

- Single glazing gives the best daylight.
- Double glazing gives about 20% less daylight than single glazing.
- In low-E (low-emissivity) double-glazing, the reduction in the day lighting factor is by another 10% with respect to double- glazing.
- Tinted double-glazing has low visibility, thus cutting out daylight. (TERI, January 30, 2009)

Methodology :
Research approach for this study is quantitative. The two buildings were selected on the basis of same era, having same architectural characters and same orientation. Research is done to measure illumination available on horizontal plane due to daylight. Measurement were recorded in overcast sky condition and clear sky condition at 11am and 2pm respectively. The LUX METER was used for measuring the day light. First of all, the seating layout of the library was drawn and according to the window height, the relevant measurements were taken at a particular distance. Room was divided in multiples of window height and at the intersection lux were measured.

Equipment used:-
Lux meter
Lux is a unit of measurement of brightness, or more. The illumination is how level of luminous flux is falling on a surface area. A lux meter is a device for measuring brightness. It specifically measures the intensity with which the brightness appears to the human eye.

Incident Lux Meter

List of Colonial Institutional Buildings in Pune
1. Gokhale Institute.
2. Deccan College.
3. F.C. College.
4. Agriculture College.
5. Wadia College.
6. SNDT College
7. SP College
8. COEP Library.Etc…….

Names of library buildings used for live Case Study,
1. Bai Jerbai Wadia Library, Fergusson College, Pune.
2. Dhananjayarao Gadgil Library, Gokhale Institute, Pune

Case Study 1 - Bai Jerbai Wadia Library, Fergusson College, Pune

Introduction
The building of the Bai Jerbai Wadia Library, comprising of two floors, was completed in May 1929 with a munificent donation from the Wadia brothers. The library was named after their mother Bai Jerbai Wadia Library. It is one of the three main buildings of the college. (BAI JERBAI WADIA LIBRARY, n.d.; BAI JERBAI WADIA LIBRARY, n.d.)
The entire first floor of the Library serves as a Reading Hall for students and is spacious enough to comfortably accommodate around 400 students at a time. This is

perhaps one of the largest Reading Rooms of any Library in the State of Maharashtra. The Main Library on ground floor more than 3,00,000 books and many research journals. Many research scholars and book-lovers have, over the years, donated a large number of their own personal collections; the Library has become fabulously rich in its collection.

The library is blessed with a remarkable collection of statues and posters, dedicated to outstanding national leaders and educationalists. In the course of time, with an increasing number of students, the Library felt the need to acquire more space by extending the building. This was first done in 1955, with government grants and then in 1982 with UGC grants.

Site Location

The Fergusson College is situated in the heart of the city and has a beautiful scenic campus of 65 acres with numerous imposing buildings of gothic architecture.

Google earth image (www.google.com, n.d.)

General Information

- Establishment : 15th May 1929
- Total Area: 15,900 sq. ft.
- Reading Hall : 6,500 sq.ft / 400 students
- Total Collection : 2,29,763
- Library Staff : 18
- Library Time – 9 am to 6 pm on all working days
- Orientation –East – West elongation
- Building Size – 36m x 16m
- Window size – 1.2 m X 2.1 m
- Wall Thickness – (Stone) 350mm

Library Photos

South Side elevation & Entrance of building

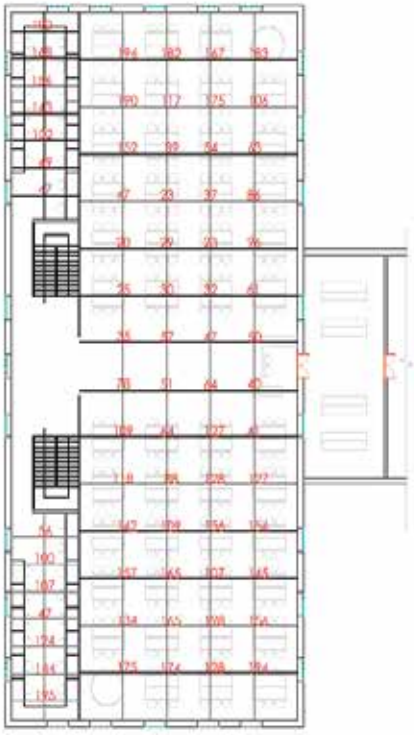
Reading hall on upper floor

West side elevation

Clerestory admitting light and fresh air

Stacks placed against windows on G.F.

Cubicles not getting sufficient daylight



Summary

1. Building is oriented E-W elongated which caters to availability of daylight throughout the day for upper floor which is the reading hall.
2. Number of windows on North – South and East - West are nine and six respectively.
3. Recessed windows are present on all four sides with size 1.2 X 2.1 m with clear glass glazing which gives direct light.
4. Total height of the building is 20 m. Height of Ground floor is 8 m including mezzanine floor. Height of First floor is 12 m including Gable and Ridge.
5. Clerestory has been provided to illuminate central portion of the library through daylight and which also admits fresh air.
6. Ground Floor of library has stacks and cubicles for different department and one central conference table.
7. Reading hall on first floor is divided into two zones for girls and boys on east and west respectively. Computer lab and digital library are located at south with lower height partition wall in between.
8. Internal finishes of buildings are light coloured, the furniture and reading tables are wooden and painted dark.

Issues

1. The Ground floor is totally dependent on the artificial lighting and does not have enough natural light penetration. As building has been extended on north so the only source of daylight is from east and west.
2. Book stacking area on ground floor is very densely arranged and very dark.
3. As windows are recessed lux levels recorded immediately near windows are lower.
4. Though windows were having clear glass and MS grill, daylight penetration reduced due to maintenance and collection of dust particles.
5. First floor of library has windows from all four sides but the reading desks on south didn't get enough illuminations due to partition wall.
6. Internal finishes of buildings are light coloured which reflects light but the furniture and reading tables are wooden and painted dark which absorbs light hence reducing the overall illumination.
7. Flanges provided for privacy on reading desk casted shadow in opposite direction thus drastically reducing illumination levels.
8. As readings were recorded in both overcast sky condition and clear sky condition major difference was found in lux readings.
9. Overcast sky condition enabled users to depend on artificial lighting even in reading hall on upper floor.

Case Study 2 - Dhananjayarao Gadgil Library, Gokhale Institute, Pune

Introduction

Dhananjayarao Gadgil Library established in 1905 as a Public Library under the aegis of Servants of India Society with late Gopal Krishna Gokhale as one of its founding members. Since 1930, it serves as the Library of Gokhale Institute of Politics and Economics (GIPE). It extends membership to public also and thereby performs the dual function of academic and public library as well. It has one of the largest and most important collections of social science documents in India catering to the needs of scholars, academicians, policy makers and other users working in social science subjects in India and abroad. The campus consists of an academic block, faculty block, administration block, seminar hall and the Dhananjaya Rao Gadgil Library. Presently the Library is housed in a four-storey building, which has a rare combination of colonial and modern architecture. There is a conference hall, known as Kale Memorial Hall, on the top floor of the Library which is used by the Institute and also let out to others on rent. (Gokhale Institute of Politics & Economics , n.d.)

Site Location

The Institute has a serene and beautiful campus of 5.25 acres (21,200 m2) and is located in the urban setting of Pune in Deccan Gymkhana area.

General Information

Establishment : 6 June 1930
Total Area : 34,444 sq.ft
Reading Hall : 2421 sq.ft /60 students
Total Collection : 2.8 lakhs of books
Library Staff : 12
Orientation –East – West elongation
Building Size – 55 m x 15m
Library reading hall size – 15m x 15m
Window Size – 0.6 x 1.8m
Wall Thickness – (Stone) 350mm

Library Photos

North Side elevation & Entrance of building

Façade of building

Central aisle with stacks on North and reading desk on South.

Summary

1. Building is E-W elongated with windows placed on North and South facade.
2. Library is located at Ground floor.
3. Height of the reading hall is 4 m.
4. North and South has nine windows on each façade.
5. Recessed windows of size 0.6 X 1.8 m have milky glass glazing which gives diffused light.
6. Reading desks are located on South and stacks are located on North and West.
7. Internal finishes of buildings are light coloured, the furniture and reading tables are wooden and painted dark.

Issues:

1. The window size is not sufficient and didn't suffice the required lux level (200-300-500). (Bureau of Indian Standards, 2015)
2. Reading desks are oriented along south direction but the flanges of desk are such that it casts shadow on working plane hence dependency on daylight is very less.
3. Desk immediate to window on south created discomfort glare due to direct sun penetration.
4. Internal finishes where light in colour but furniture has dark colour which does not reflects light. So the reflection of the wall and ceiling are not contributing to the illumination of building interiors.
5. Stacks are placed very densely & against the windows on north hence reducing the diffused light available from north.
6. The field measurement of the stacking and reading area are the levels for the overcast sky condition and clear sky condition which gives an idea that there is a drastic difference in the LUX level near window and the interior due to ageing of structure, improper arrangement of the stacks and reading areas.

Conclusion

Adequate day lighting will penetrate into a room depends upon window location, and interior surfaces. There is a direct relationship between the height of the window head and the depth of daylight penetration. Typically adequate daylight will penetrate one and one half times the height of the window head, although it may penetrate a distance of twice the height under direct sunshine. (Robertson).

No Cost Recommendations:-

- Improper arrangement of reading desk and stacking has affected the day lighting so proper arrangement of furniture can be suggested.
- Avoid stacking near windows and should be placed were illumination levels are lower.
- Achieve maximum daylight from North by removing obstructions.
- Regular maintenance and cleanliness of windows will help in good amount of daylight penetration.
- Dark surfaces impede daylight penetration and cause glare when seen beside bright surfaces. For good distribution throughout the room, it is especially important that the wall facing the window be light-coloured.
- Furniture like reading desk should be placed perpendicular to window to avoid shadow on horizontal plane.
- Reading desk should not be placed immediately near window to avoid direct glare.

Low Cost Recommendations:-

- Changes in Interior can be done for better daylighting condition by using light coloured surfaces which gives higher reflectance. This can be incorporated by changing colours of wall, ceiling, floor and furniture.
- Choose matte over shiny surface finishes. Matte finishes are better than specular surfaces for good distribution of daylight because they reduce reflected glare.
- Aim for recommended surface reflectance's. Desirable reflectance's : ceilings >80 percent; walls 50-70 percent (higher if wall contains a window); floors 20-40 percent; furniture 25-45 percent. (IESNA, 2000)
- Glazing can be changed by using high VLT (Visible Light Transmission) and lower SHGC (Solar Heat Gain Coefficient) to reduce heat gain.
- Daylight penetration into a space can be increased by using light shelves. This is a horizontal element with a high reflectance upper surface that reflects light onto the ceiling and deeper into a space.
- Direct glare can be avoided by integrating shading devices.
- Maximise W.W.R (wall to window ratio) on ground floor to achieve desired lux levels through day lighting.
- Building having deeper plans has very less illumination in central space and depends highly on artificial lighting. So properly sized light pipes can be effective at bringing daylight to interior spaces without the associated heat gain and glare problems.
- Replacement of existing electric lighting with star rated and energy efficient fixtures to control variability of daylight.

References

BAI JERBAI WADIA LIBRARY. (n.d.). Retrieved from http://www.fergusson.edu.

(2015). Bureau of Indian Standards.

Dean, E. M. (2002). Daylighting Design in Libraries. U.S.: AIA .

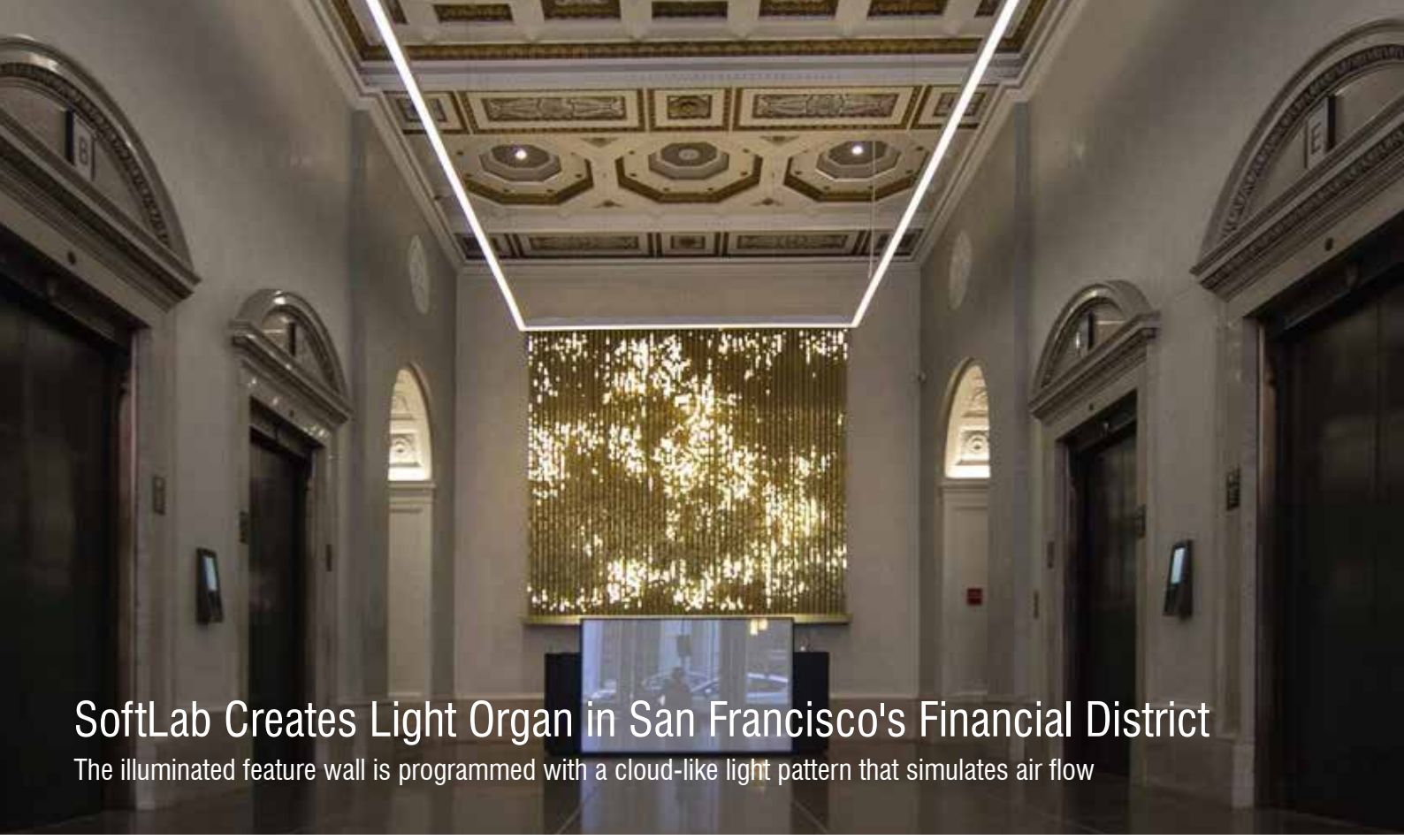
Gokhale Institute of Politics & Economics. (n.d.). Retrieved from http://www.gipe.ac.in.

IESNA, D. L. (2000). Illuminating Engineering Society Of North America.

Robertson, K. (n.d.). Daylighting Guide for Buildings. CMHC Daylighting Gu.

TERI. (January 30, 2009). Sustainable Building - Design Manual: Sustainable Building Design Practices. The Energy and Resources Institute (TERI) ISBN-10: 817993053X.

www.google.com. (n.d.).



SoftLab Creates Light Organ in San Francisco's Financial District

The illuminated feature wall is programmed with a cloud-like light pattern that simulates air flow

New York–based design studio SoftLab has recently completed a permanent lighting installation for the renovated lobby of 315 Montgomery, an historic 16-story office tower in San Francisco's Financial District. Titled Stratus, the installation is comprised of two layers of staggered brass tubes, each of which is lined with translucent polyester resin and punctuated with laser-cut holes. Measuring 126" tall by 120" wide by 8" deep, the installation incorporates 60 custom LEDs with frosted acrylic diffusers, set into an aluminum channel. The work is custom-programmed with a "generative noise pattern" that according to SoftLab, "simulates air flow" and resembles clouds. TouchDesigner—a node-based visual programming language developed by Toronto-based Derivative—sends the pattern to the LEDs, which are controlled by two control boards.

During the day, SoftLab notes that the installation resembles a light organ, while at night, it blends into its backdrop and "the cloud-like LEDs appear to flow through the back wall of the lobby." The installation was commissioned by New York–based Vornado Realty Trust and is on view from the street 24 hours a day.

ABOUT THE AUTHOR

Ayda Ayoubi

Ayda Ayoubi is an assistant editor of products and technology for ARCHITECT. She holds master degrees in urban ecological planning from Norwegian University of Science and Technology and in world heritage studies from Brandenburg University of Technology. In the past, she interned with UN-Habitat's New York liaison office and the International Centre for the Study of the Preservation and Restoration of Cultural Property in Rome.

CITATION FOR CEILING FEATURE

George S. and Dolores Dore Eccles Theater, Salt Lake City, UT

Cline Bettridge Bernstein Lighting Design

Francesca Bettridge
Michael Hennes
Nira Wattanachote
and Glenn Fujimura

Pelli Clarke Pelli's Eccles Theater — Salt Lake City's premier performing arts venue — celebrates the city's architecture and the landscapes and starry skies of Utah. The lighting becomes a unifying element, imparting a welcoming street presence and articulating the building's design themes. The 2,500-seat performance hall's lighting recalls the dramatic landscape surrounding the city, with its evenly washed perimeter walls evoking the striated mountains. The theater's showpiece is the re-creation of the starry sky that blankets the city at night.

The design of the ceiling had to dramatically evoke the feeling of the night sky, while accommodating the functional demands of the theater itself. LED strings are stretched across frames and arranged in layers two-deep. Within each ceiling section, the strings are separated into nine different dimmable zones, allowing for random control and cross-fading. Using differently sized LEDs with varying on-center spacings, and then offsetting the panels at unequal distances from each other, creates a three-dimensional sense of depth. Tilting the frames at an angle enhances this effect and helps to avoid nearby theatrical equipment.

The architecture sets the stage, and the lighting completes the picture: a grand amphitheater under a clear, starry night sky, nestled among the mountains.

"The project team would not have been able to execute the 'starry sky' without Francesca and her team.

The process was challenging and memorable, from drawing inspiration from Utah's canyons, designing the stars' random pattern, to the final installation. I feel lucky to have been part of the team!"

—Gina Narracci, Apicella + Bunton Architects (formerly of Pelli Clarke Pelli Architects)

ARCHITECT
Pelli Clarke Pelli Architects
HKS Architects, Inc.

OWNERS
Salt Lake City
Salt Lake County

PHOTOGRAPHERS
Jeff Goldberg / Esto

PERCEPTION AND QUALITATIVE ANALYSIS OF LIGHT ON USERS IN AN OFFICE SPACE

Ar. Shruti Gade
College of Architecture, Sustainable Architecture, Bharati Vidyapeeth Deemed to be University, Pune

Abstract :
Light In All Manners Is A Requisite Phenomenon Which Helps Humans To See The Objects, Space And Colour As Well As It Puts Light On Sensory Aspects Of The Subject. Visual Perception Is A Basic And Inseparable Subject In Different Light-related Study Areas. Every Object Or Space One Sees Is Based On Individual Approach And Perceptible Area Of Focus. This Paper Encompasses Fields Of The Recordings Of Direct Visual Observations Of Effects Of Light, Colour, And Space On People Working For Several Hours In That Office Space. With The Advent Of The Need To Analyse The Study Area Of Visual Observations With Appropriate Method, The Paper Has Case-studies Of Direct Observations Through Verbal Descriptions Obtained By Questionnaire.
With Reference To The Subject, Lighting And Colour Are Inseparable Factors In Architectural Spaces. The Paper Also Talks About Various Quantitative Data Analysis Comparing It With The Actual Verbal Data Observations To Carry The Conclusion.

Introduction :
Light And Colour Have Always Been Critical Aspects Of Any Architectural Space And They Have Been Used Extensively To Create A Specific Visual Experience While Invoking Certain Emotions. A Lot Of Effort Has Been Put Into Perfecting Workplaces Which Enhance Productivity And Provide A Comfortable Working Environment. The Major Focus Has Been On Finding The Right Balance Of Lighting And Colour. The Appropriate Use Of Light And Colour Is Quintessential In Modern Workplaces Where The Average Employee Spends At Least 9 Hours In A Controlled Environment With Minimum Interaction With Natural Elements. When Working For Extended Hours Artificial/man-made Lighting Comes With Its Set Of Side-effects Such As Fatigue, Strain On Eyes And Disruption Of Biological Clock.

Knowing The Exact Effect Of Light And Colour On Employees In An Office Setting Can Help Us In Choosing The Appropriate Lighting Design To Minimize These Side-effects And Provide A Relaxed Working Environment. This Study Evaluates The Impact Of Artificial Lighting, Colour And The Light Intensity On Employees In An Office Building Using Qualitative Data Obtained Through A Verbal-semantic Questionnaire And Comparing It With Quantitative Data.

Why is good lighting important at work?
Modern Workplaces Give Utmost Importance To Health And Safety At Work. Lighting Is A Very Important Aspect Of Health And Safety Since A Properly Lit Environment Means Quicker And Easier Hazard Detection. Poor Lighting Can Not Only Lead To Accidents But Also Affect The Health Of People At Work Causing Symptoms Such As Eyestrain, Headaches, Nausea And Migraines. It Can Also Cause The Sick Building Syndrome In New And Refurbished Buildings; Symptoms Of Which Include Headaches, Lethargy, Irritation And Poor Concentration.

For Businesses, Poor Lighting Has A Monetary Impact In The Form Of:

1. Time Off Work Because Of Accidents And Injuries;
2. Increased Absenteeism;
3. Reduced Staff Efficiency And Productivity.

Color and space :
Perception is defined as the immediate mapping of objects into the brain while cognition refers to subsequent processes of semantic and verbal classification of perception (Cognitive Color, 2005). Perception in interior architecture depends on the visual cues of the physical space, in other words, the characteristics of the visual environment, such as size, shape, texture, colour, position of the object to the viewer

(Sanoff, 1991).

All the elements in the space not only form a setting but also create the experience of being in that environment/setting. For example, our perception of temperature is affected by light and colour. It can cause the space to appear warm/hot or the opposite cool. Similarly, the colour scheme together with lighting can make a space appear distracting, hazy, dull, less spacious, introverted or vice versa, bright, relaxing, spacious, extraverted. It can evoke or subdue visual comfort conditions.

Objective:

1. Study the effect of light intensity on people at work
2. Study the effect of light and surface color on people at work

Research methodology:

The research methodology is partially based on the PERCIFAL (Harald, Karin, Ulf, & Barbara, 2011) method; yet the tool which is used in PERCIFAL is taken for the study. This methodology has a qualitative approach. It uses direct visual observations and recording of these observations using a questionnaire. For office case-study Emerson Export Engineering Centre is chosen. As sample observers, the users of the space that is working people are requested to answer the questionnaire. The questionnaire is modified to gain a better insight into the effect of light and colour in an office space. The observers are briefed prior to filling up the questionnaire to be sure that they understand all the questions and terminologies used therein. This is crucial since the observers need to understand the questions correctly for them to respond accurately. The observers are then allowed to fill the questionnaire based on their experience of the space. Observers are asked to analyse their experience in their office space based on their time duration of working in that space for 6 months. The observers are people working in that office space for several hours and do not define any specialization or expertise in lighting field. To generalize the study area of light sources, the observers were not asked about detailed specifications of light source. The questionnaire tries to record responses based on short term as well as long term impression of the space. It restricts the impression to colour of the light source and colour of surfaces; inclusive of the causal relationship between colour of light and colour of surface. Most of the questions framed don't define the intrinsic quality of space as well as the detailed specifications of light source; they are moreover focused on visual experience. Observers are not restricted for any indicative factor about space; rather they are asked direct objective questions to frame their percept. The viewers' remarks are at last summed up and analysed qualitatively.

The questions are divided in two

Study Parameter	Method	Sample
1. Illumination of Light	Quantitative (Lux Meter)	Light Source
2. Perception of Light	Qualitative (Survey)	People
3. Perception of Light Color	Qualitative (Survey)	People
4. Perception of Surface Color	Qualitative (Survey)	People




methodological groups with their respective samples as a tool:

With help of the mentioned tool, visual analysis of light and colour in office space is carried out. In this methodology light analysis with simulations is not considered. It focuses on perceptive area of study.

Results and discussion:

Data Analysis:

The data shows that most people are comfortable with the current illumination.

The data shows that majority of the people are comfortable working for 9 or more hours in current illumination levels.

The data shows that many people prefer a warmer wall colour tone.

The data shows that all people from the sample have worked for 9 or more hours in a multi-coloured surface space.

Q8	Yes	No
Response	17	3

The data shows that most of the people prefer a space with multi-coloured surface.

The data shows that most of the people are comfortable working even if the current illumination is reduced by some percentage.

The data shows that the amount of illumination does not strain most of the peoples' eyes The data shows that people are affected by the light and colour at the workplace significantly.

The data shows that most of the people feel productive/energetic in the current illumination of light source.

Findings:

PERCIFAL is a way of collecting and systemizing analysable data from individual observations (Harald, Karin, Ulf, & Barbara, 2011). This paper uses the same perceptive analysis method from visual analysis of light and colour. The method is totally based on an observer's expressions towards the provided light illumination in work space. The methodology that consists of two methods, one that is quantitative analysis that provides the Lux levels of light sources in chosen office space, and the second one is data collected through survey of people working in that office space for nine or more hours.

The results obtained from both the methods provide again a perceptive analysis of supervisor's findings. After using the quantitative data, Lux levels measured of Light sources in the work space are 280 Lux, during daytime. Lux level in space near windows and glass façade is obtained as 260 Lux. As the glass used for openings and windows is tinted glass, only few amount of daylight factor enters the space.

As per NBC (National Building Codes India, 2016), the amount of Lux levels required in an office building is as follows:

Offices		
General offices	300-500-750	1
Deep plan general offices	500-750-1000	1
Computer work stations	300-500-750	1
Conference rooms, executive offices	300-500-750	1
Computer and data preparation rooms	300-500-750	1
Filing rooms	200-300-500	1
Drawing offices		

The amount of Lux levels obtained from the case-study office space is less than the Lux levels mentioned in NBC (National Building Codes India, 2016).

The qualitative method developed with questionnaires and survey helps to conclude that light and colour largely depends on an individual's perception and adaptation.

Users using that office space for nine or more than nine hours for at least six months, after answering the Survey questions, help us study the perceptual phenomenon in more detail. Parameters like, 'General impression of the space' has few questions. To each parameter the observer seems to focus more on psychological and physiological factor. People using space with less illumination level than the required levels given in NBC are comfortable in the space.

Even though the Lux levels show to be less and give a general idea about modification in overall lighting system, people working for several hours find the amount of illumination sufficient.

The sample office space has white colour for walls, light blue and white colour combination for cubicles and super white colour for lights. Under parameter like 'Space and Colour', observers state to find the colour of the surface areas soothing and comfortable; though there is no much attention of observers on the colour of light source. This study encompasses colour in a manner where the colour of the surface is affected by the colour of the light source. It doesn't provide deep knowledge about colours specifically.

In this method other factors (like the specifications of light source, age of eyes and other factors related to luminaire) are subtracted. The focus of the study is general perceptive analysis of effects of light and colour on the observers. The perception of observers is studied as a general phenomenon, which is an obvious impression of the space and light on the users.

Conclusion :

With all the answers from observers and analysis of the findings are, light and colour affect the users of the space. For few it affects in large perspective. Instant impression of any space is considered. With means to have to observe the space and to analyse the light and colour of that space, observers tend to adapt the perceptual analysis method. Observers in any office space experience various feelings. This leads to a conclusion that any office space, including lighting illumination, and colour of light source affect overall expression and state of being of the users.

References :

Cognitive Color. (2005). CIE.

National Building Codes India. (2016). Bureau of Indian Standards.

Harald, Karin, Ulf, & Barbara. (2011). PERCIFAL: Visual analysis of light, space, and color. AIC 2011 MIDTERM MEETING, ZURICH – INTERACTION OF COLOUR & LIGHT IN THE ARTS AND SCIENCES – PROCEEDINGS, 229-232.

Sanoff, H. (1991). Visual research methods in design.

ISLE Participation in Green Building Congress 2018, Hyderabad

Raised from the Haze of Time

Floating Exhibits in the German Ivory Museum Erbach

German Ivory Museum, Erbach

Through the passion for travelling and collection of Count Franz‘ I. zu Erbach-Erbach (1754-1823), the Odenwald town of Erbach became the center of German ivory carving and had exhibited its extensive collections at the Werner Borchers Halle for many years. The latter has been closed down towards the end of 2015. As of autumn 2016, a small but exquisite part of the ivory sculptures have found a new home in the Erbach Palace. The remarkable exhibition concept of Sichau & Walter Architects BDA frees itself from the building envelope and presents the collection in darkened rooms with spatial boundaries sprayed in anthracite. Leading across this visually dissolved space, is a pier that offsets the differences in level and interconnects the showcases with a proverbial red thread. Like luminous glass cubes, these display cases are lined up on the walkway.

Showcases of Partially Frosted Glass

The show case glass panes‘ lower third is frosted and fitted with edge light integrated in the base. The sanding dissolves smoothly into clear glass. By virtue of the edge light the frosting assumes a gentle brightness evocative of a haze that shrouds the object holders.

Furthermore, small profiles with miniature projectors are installed in the upper corners of the show cases. A test on site revealed that in this spatial context silver anodized profiles and luminaires are less visible than black anodized equipment.

The miniature projectors stage the exhibits in an accentuating and glare-free fashion. Larger display cases make use of an alternating layout of spot and medium optic luminaires. This creates the impression that luminous figurines emerge from a sort of haze. The converters for both, the frosted glass edge light and the miniature projectors are remote and stored in an accessible void in the show case‘s plinth.

A Pier as the Red Thread

The pier and its low balustrade are clad in red leather. The walking surface transforms into a seemingly suspended path in an intangible, almost imperceptible spatial envelope by virtue of concealed LED light ribbons in its balustrade. For this purpose, a groove has been milled into the upper part of the inward-facing balustrade flank. The

slanted apertures are aimed at the path and house LED light ribbons fitted with honeycomb louvers that shield the light sources even from longitudinal views. The upper part of the guard can be removed for installation and maintenance of the LED strips. Yet, the balustrade appears to be massive and carved from one piece. The LED converters are remote and hidden in a cavity underneath the raised pier.

Historical Closets

One of the spaces uses existing historical closets, now displaying a wealth of objects that have been fastened to the molleton fleece-clad rear wall. These are set in scene by linear light sources concealed inside the furniture. For this purpose, the continuous LED light strips have been installed horizontally in the overhead part and vertically in the flanks of the closets. The mounting locations have been chosen in such a fashion as to combine an optimum illumination with a minimum visibility of the light sources.

The Temporary Exhibition

The final space, dedicated to temporary exhibitions, sees the visitor off with a view of yet unprocessed elephant and mammoth tusks, thus revealing also the controversial side of the exhibit. Ceiling mounted miniature projectors underline the exhibit‘s drama. These luminaires originate from the same system as the display case lighting, but are more powerful. In order to better fit into the spatial envelope‘s colour, they are anodized in black. They form a frame to ensure that with changing contents exhibits in the periphery and in the center will be optimally set in scene.

The display case illumination, the glass edge lighting, the pier illumination and the orchestration of the existing closets can all be switched and dimmed individually by showcase and by room. The dimming values of each component are adjusted to meet dramaturgical and spatial criteria. Following the prevalent red hues of the showcase plinths and pier all lighting elements use warm white light. This further emphasizes the exhibits by virtue of colour perspective and helps to materialize them through focal glow.

Through the use of hidden, glare-free light sources, Licht Kunst Licht underscores the contrasting exhibition scenery and brilliantly orchestrates its treasures.

ARCHITECT
Sichau & Walter Architekten BDA, Fulda

LIGHTING DESIGN
Licht Kunst Licht AG, Bonn / Berlin

PHOTOGRAPHY
Sichau & Walter Architekten BDA

The remarkable exhibition concept of Sichau & Walter Architects BDA frees itself from the building envelope and presents the collection in darkened rooms

The show case glass panes‘ lower third is frosted and fitted with edge light integrated in the base.

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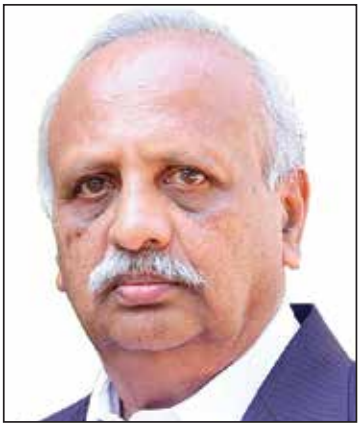
Karnataka Centre Activities



Mr. M.S.Narasimha Swamy
Chairman,
Karnataka State Centre / ISLE

ISLE-KSC conducted the following four programs in engineering colleges as a part of its mandate to disseminate information and knowledge related to illumination technology. All our programs were well attended (in excess of 100 members in each) and conducted professionally.

1) A half day Workshop at MVJ College of Engineering, Whitefield, Bengaluru on October 4, 2017

The inauguration of the workshop was done in presence of the Principal of the College Prof. Gunasekaran and the HOD of Electrical & Electronics Engineering Prof. Premalatha. Mr. Sathyendra highlighted the activities of ISLE to the audience. The following five lectures were presented on the occasion.

i) 'Basic Metrics for Modern Lighting' by Dr. B. K. Chandrasekhar
ii) 'Introduction & Importance of Standards in Engineering' by Mr. M. G. Sathyendra
iii) 'Street Lighting Controls for Smart Cities' by Mr. N. Ravi Rao
iv) 'Energy Conservation Opportunities in Buildings' by Mr. Pradeep Nettur
v) 'Interior Lighting' by Mr. Madan Rawal

2) Inauguration of Student Chapter at GSSS Institute of Engineering and Technology for Women, Mysuru on September 15, 2017

This was a special occasion wherein a student chapter of ISLE was inaugurated in a colorful function. The students had taken the initiative of making a large LED display of "ISLE" to commemorate the formation of the student chapter. The elegant inauguration of the program was presided by Mr. Bharath, CEO, GSSS. Dr. Shivakumar HOD of Electronics and Instrumentation, and Dr. Vagdevi, HOD of Electrical and Electronics Engineering were present on the occasion along with other faculty members.

Mr. MSN Swamy, Chairman, ISLE-KSC addressed the students and explained the vision and mission of ISLE. The technical program that followed had the following four presentations.

i) 'Some Aspects of Light' by Dr. B. K. Chandrasekhar
ii) 'Introduction & Importance of Standards in Engineering' by Mr. M. G. Sathyendra
iii) 'Street Lighting Controls for Smart Cities' by Mr. N. Ravi Rao
iv) 'Selection and Application of Light Sources in Indoor Lighting' by Mr. Madan Rawal

The presentation by Mr. Ravi Rao included a short film on the practical application and savings accrued by Jamnagar City Corporation in street lighting using LEDs. The program was well appreciated and a press report appeared in the local tabloid.

3) Workshop on 'Design, Testing and Applications of Modern Lighting' at Global Academy of Technology (GAT), Bengaluru on November 7, 2017 jointly organized by ISLE Student Chapter at Global Academy of Technology and ISLE-KSC.

The workshop was organized by the student chapter to create awareness on different aspects of lighting. Shri. MSN Swamy, Chairman, ISLE-KSC and Dr. N. Ranapratap Reddy, Principal, GAT addressed the gathering during the inauguration. Over 100 students and some faculty members participated in the event. The following four technical talks were delivered in the workshop:

i) 'Rudimentary procedure in design and testing of drivers for light sources' by Mr. N. Ravi Rao
ii) 'Evaluation and testing of self ballasted LED lamps' by Mr. M. G. Sathyendra
iii) 'Right light in right space - A case study on boutique lighting' by Ms. Suma Khandige
iv) 'Light generation in semiconductors' by Dr. B. K. Chandrasekhar

4) Half day workshop on 'Aspects of Lighting in Architecture' jointly by BMS College of Architecture, Bengaluru and ISLE-KSC on February 8, 2018 in the BMS Library Auditorium, Bull Temple Road, Bengaluru.

The program began with an invocation followed by 'Lighting the Lamp Ceremony'. Shri. MSN Swamy, Chairman, ISLE-KSC, Prof. Mamatha P Raj, Director, BMS College of Architecture and noted Architect Prof. Jaisim of M/s. Jaisim-Fountainhead along with speakers participated in the lighting ceremony. Both Shri. MSN Swamy and Prof. Jaisim in their brief address emphasized the importance of lighting in architecture. The following three technical talks were given in the workshop:

i) 'Introduction to Daylighting' by Dr. B. K. Chandrasekhar
ii) 'Safety Compliances of Luminaires' by Shri. M. G. Sathyendra
iii) 'Lighting Controls' by Shri. N. Ravi Rao

The presentations were followed by a lively Q&A session which made the event interesting.

In addition to the above programs, the local Management Committee met four times on July 7, 2017, August 26, 2017, November 14, 2017 and January 16, 2018. The AGM of ISLE-KSC was held on August 26, 2017. In addition to the 200+ student members in Global Academy of Technology, we have 109 girl students from the GSSS Engineering College for Women. During the year, new additions as members to the chapter were

Fellow life: 1
Member life: 2
Student members: 109

Efforts are on to start the local chapters at Mangaluru and Mysuru.


Boston Consulting Group Offices,
Los Angeles, CA
PANORAMIC


PENTHOUSE

BCG'S NEW SPACE – SPANNING THE TOP TWO FLOORS OF ONE OF L.A.'S TALLEST OFFICE TOWERS – NEEDED TO CONVEY A 360° PERSPECTIVE AND SENSE OF "UNLIMITED POSSIBILITY"

by **Cindy Foster - Warhen**

When the international consulting firm Boston Consulting Group (BCG) opened its new West Coast headquarters in the heart of downtown Los Angeles, it was in good company. Directly across the street from the historic Los Angeles Public Library, the BCG office occupies the 51st and 52nd floors of the north tower of City National Plaza and offers stunning views of the Santa Monica and San Gabriel Mountains along with other landmarks, such as the famous Hollywood sign and Dodger Stadium.

With such notable neighbors, BCG wanted this office to express the company's shared purpose of expanding "the art of the possible," according to Shubin Donaldson, the Los Angeles – based design firm that led the project. Most importantly, the consulting firm wanted its space to evoke the 360° perspective and sense of "unlimited possibility" that is the hallmark of the firm's work and its culture. The design team determined that the aesthetic needed to resonate and reflect the many facets that influence business work conditions today.

In its research, the team at Shubin Donaldson discovered that most of the BCG consultants would occupy the 45,000 sq.ft penthouse headquarters only 25 percent of the time. They would typically spend the bulk of their work week meeting clients at their respective offices and coming together at the BCG offices for weekly updates.

For that reason, creating a series of large individual offices would be an inefficient use of the space. Instead, the team opted to create a variety of non-assigned custom workstations – a model called "hoteling" - where staff members could collaborate.

The Shubin Donaldson project team designed 210 workstations. 130 traditional and the other 70-80 as an alternative system. The plans allotted for 24 private offices and 30 meeting rooms clustered in the center portion,H leaving the permimeter open so that the expansive views of the city were accessible to all. The team then devised a variety of unique features including a 16' x 20' skylight, an outdoor terrace, and a Zen-inspired work area bordered by a delicately draped "hanging garden".

LIGHTING AN OPEN & ETHEREAL SPACE

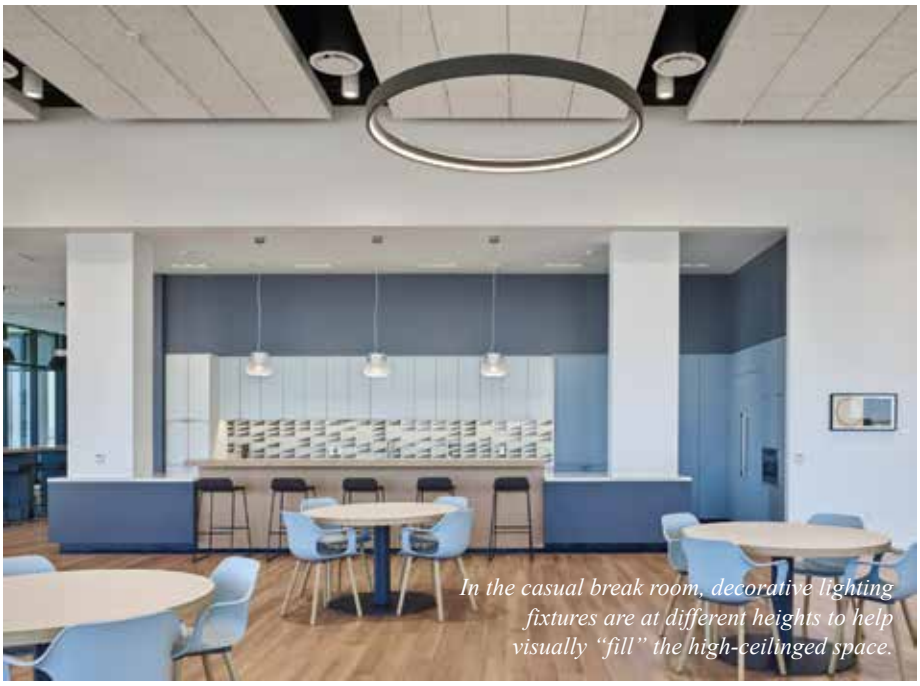
Handling the lighting design was Culver City-based Oculus Light Studio, under the guidance of Principals Scott Hatton and Archit Jain, and Senior Designer Carol Prendergast. Utilizing BCG's core beliefs of "partnership and transformation." the oculus team integrated the lighting into the architecture to transform it into a sustainable, enjoyable, and open environment. Their lighting plan featured the combination of a variety of architectural lighting elements in the form of recessed linear fixtures, downlights, and pendants with large decorative luminaires to support the scale of the space.

The lighting design was subtle, so as not to interfere with the uninterrupted 360° vista of the outdoors which underscored the company ethos of "unlimited possibilities" while also amplifying the expansiveness of the space.

Upon entering the offices, guests are visually drawn to the definitive contrast of light and dark throughout. Concealed LED strip lights and a variety of decorative pendants provide a striking contrast with the modern architectural elements, interior furnishings, plus white and dark finishes.

A stunning focal point is the RGB programmable skylight that draws the eye to the high ceilings and cloud like feeling on the Mezzanine level. The 16' x 20' skylight opening is accented around the perimeter with Dura Tape RGB LED strip lights that are set to correlate to the skyline. The programming can be manually changed by the receptionist to any color for special occasions with a DMX controller.

Approximately 200 feet of this same linear LED strip light in 3000K delivers a striking



In the casual break room, decorative lighting fixtures are at different heights to help visually "fill" the high-ceilinged space.

"WE KEPT THE CEILINGS AS CLEAN AS POSSIBLE BY USING A LOT OF DECORATIVE ELEMENTS STRATEGICALLY PLACED TO MAXIMIZE DISTRIBUTION PLUS WALL – MOUNTED LINEAR ELEMENTS FOR PERIMETER LIGHTING."

- Carol Prendegast, Senior Designer, Oculus Light Studio

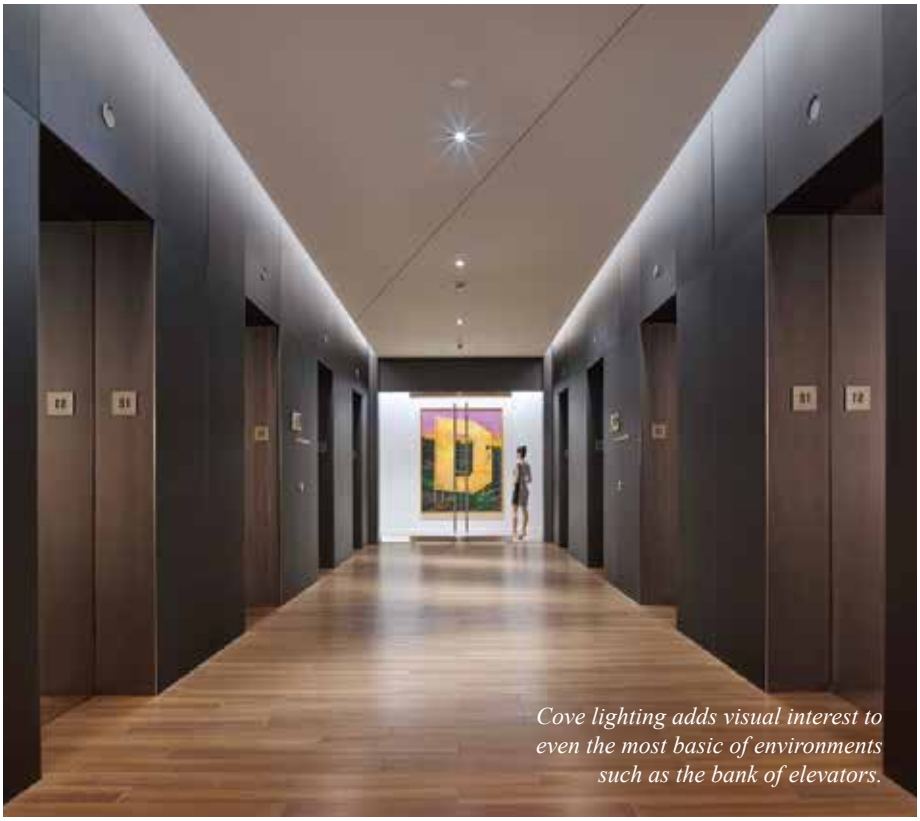
ethereal glow along the stairs, under counters, and in the coves of the elevator lobby. White accent lighting is used to visually guide occupants from the 51st floor atrium to the 52nd floor, where additional work stations are located. Multiple works of art on the walls are highlighted with surface-mounted wall washers concealed in the vertical linear perimeter slots along the hallway on the 51st floor.

"One of the intents for the project was to keep ceilings as clean as possible. Most of the light at offices, work stations, conference rooms and communal spaces comes from decorative elements with few recessed downlights at high spaces above corridors," Prendergast comments, "We also illuminated large vertical areas with linear perimeter slots to balance shadows coming in through the large surrounding windows during daytime. The main multi-purpose room needed a lot of flexibility as this would be used as a break room and video/meeting space. "To illuminate this area, the Oculus team employed cylinder fixtures concealed between ceiling panels for general illumination with a secondary layer of light provided by both large (72") and small (52") round pendants (Cycle) directly above communal work tables. The booths utilize glass niche modern pendants to minimize their impact on the view yet still provide ample light on the table.

The kitchen counter is distinguished by an organic glass pendant by Eureka, which serves a a decorative element. To deliver the ideal task lighting behind the kitchen, Targetti customized its CCT Mini Adjustable downlight fixture to deliver the high-output optics with a small aperture that the design team required.

CREATIVE PROBLEM - SOLVING

Working with a vast open space presented the Oculus team with a few design complications, such as the high ceilings, Wanting to keep the ceiling plane as clean as possible, the team illuminated the General Office areas with a variety of 4-,6-,8-, and 12-ft linear pendants by Pinnacle and approximately 300 feet of concealed linear wall-mounted uuplights and wall grazers for perimeter illumination form Bartco.



Cove lighting adds visual interest to even the most basic of environments such as the bank of elevators.

Most of the decorative pendants were standard except for the two customized 12' x 8' rectangular models by ALW that hang directly above the work stations on the Mezzanine level.

Decorative large Switch pendants by Eureka hang from the 52nd floor's high ceiling and can be seen from the Mezzanine level. Oculus worked with the manufacturer to create a custom stem for the application.

"Due to the height of the ceilings, we needed a custom stem to attach to the upper deck for support with a fake canopy at the suspended ceiling." Prendergast explains. "The stem needed to give the appearance that it was suspended from the lower ceiling, but also allowed us to lower those pendants directly above work stations where lighting was needed."

"We kept the ceilings as clean as possible by using a lot of decorative elements strategically placed to maximize distribution plus wall-mounted linear elements for perimeter lighting," she adds. "We had to study multiple sections of the space to ensure that the mounting heights of all decorative fixtures were comfortable as the user stood at all levels." A "hanging garden" composed of a thin, steel-rod lattice is one of the most memorable architectural spaces in the project. The structure supports a lush meditative Zen garden that rests 52 stories above the bustle of the street below. To maintain the airy feeling, the Oculus team specified the Wireflow single pendant by Vivia exclusively in the Garden Lounge as a decorative element with parallel linear pendants by ALW to provide direct lighting around the perimeter.

The skylight is highlighted by color-changing LED lighting.

SKYLIGHT VS.DAYLIGHT

The large surrounding windows made controls very intricate to comply with natural daylight, Title 24 code requirements, plus the functionality of the space. According to Prendergast, the management of the controls required the most coordination with the electrical engineers to ensure that the fixtures that landed on multiple zones were identified properly and controlled as needed. The lighting fixtures in multiple zones were placed on individual controls with special daylight sensors to coordinate with the daylighting from the skylight and the expansive windows.

Other lighting was placed by zones as much as possible. The control areas consisted of : Zone 1 being the closest to any window; Zone 2 provided a secondary layer of daylight controls; and Zone 3 controlled areas that were in relation to the other zones in the space. For example, the conference rooms had 15 ft. runs that wre perpendicular to the windows. The linear pendants landed in Zone 1, Zone 2, and Zone 3 so even though it visually looks like one continuous run, it is actually controlled in three different sections.

For its success in problem-solving and making complicated lighting schemes appear simple, the Boston Consulting Group project was awarded with both the 2017 Lumen West – Award of Excellence in Interior Design and the 2017 IES – Award of Merit in Interior Design.

The "hanging garden" installation brings the lushness of the outdoors into this daylight-filled space, bolstering employees'mood.

PROJECT
Boston Consulting Group West Coast Headquarters.

LOCATION
Los Angeles

LIGHTING DESIGN - Oculus Light Studio
Scott Hattron,Principal,
Archit Jain, Principal,
Carol Prendergast, Senior Designer.

ARCHITECT
Shubin & Donaldson

AWARDS / CERTIFICATIONS
2017 Lumen West,
Award of Excellence – Interior Design.
2017 IES, Award of Merit – Interior Design.

2018 AL Design Awards

ARCHITECT / ARTIST
Jenny Sabin Studio, Ithaca, New York

LIGHTING DESIGNER
Focus Lighting, New York

PHOTOGRAPHERS
Pablo Enriquez and JP Lira / Focus Lighting

Lumen at MoMA PS1, Long Island City, New York

The competition winning scheme designed by Jenny Sabin Studio for MoMA PS1's 2017 Young Architect's Program, featured two types of responsive textiles: solar activated and photoluminescent. To highlight the installation's day-to-night transformation, Focus Lighting designed a custom lighting program to provide visitors with a dynamic experience. Eighteen RGBAW and UV LED fixtures were strategically placed to illuminate the two large-scale canopies that spanned the MoMA PS1 courtyard. An eight-minute choreographed sequence played during the day, while, three 90-second scenes, starting at sundown, ran on a continuous loop, accenting the installation's architectural details. The interactive experience provided visitors with a spatial and luminous journey.

Report on PRESENT & FUTURE LIGHTING

Venue: Triguna Sen Memorial Hall, Jadavpur University, Kolkata

The conference was jointly organised by ISLE, Calcutta State Centre and Electrical Engineering Department of Jadavpur University and was sponsored by ESCI.

Members from ISLE, Calcutta State Centre, Institute of Engineers (India), Faculty members and students from Jadavpur University, Calcutta University, Asansol Engineering College, Guru Nanak Engineering College, other institutions and dignitaries attended the conference.
Total number of delegates: 214.

The conference was inaugurated by Prof. Suranjan Das, Vice Chancellor, Jadavpur University in presence of Mr Pradeep Ghosh, Pro VC, JU, Prof. Subrata Pal, HOD, E.E Department, J.U, Mr. Kamal Sethia, Mr Piyush Chakraborty, VP, ESSCI, Mr Varun Bhatia, GM, ESSCI and other dignitaries.

Mr. Kamal Sethia, Chairman, ISLE, Calcutta State Centre in his welcome address articulated the role of ISLE in imparting knowledge based programme among the students in the field of Illumination, Electrical, computer and other arena of modern technologies and Engineering. Prof Suranjan Das, Vice Chancellor, Jadavpur University, in his keynote address enumerated in details the role of Jadavpur University in the field of research and development work in science and technology with the installation of modern testing laboratories. He invited the Industries to come forward and invest more in R&D.

Prof. Subrata Pal, HOD, Electrical Engg, JU, highlighted the various research works

Mr. Tapan Kumar Ghosal
Hon'y Secretary,
Calcutta State Centre / ISLE

being undertaken by Jadavpur University. He also conveyed his thanks to ISLE for organising such conference jointly with the electrical Engg. Department of J.U..

Mr. H. Mukherjee, Vice president, Isle, briefly explained the role of ISLE in the field of educational programmes in various

universities and technical institutions.

Mr. Varun Bhatia, GM-Standards, in his Key note address enumerated the need of constant research and development activities in the field of illumination engineering and introduction of modern energy efficient luminaries for minimising the national power usage in illumination as a whole. He also stressed the necessity of Standards maintainable in lighting industries.Mr. Tapan Kumar Ghosal, Hon. Secretary, ISLE, Calcutta State Centre, delivered his vote of thanks.

Technical Session-I.
SESSION CHAIR: Mr Sisir Gangopadhyaya.

1. Ms. Sudeshna Mukhopadhaya delivered her presentation on **"Future of Light ….. looking beyond lighting"**. The presentation was regarding the chronological developments in the field of lighting engineering, energy efficient lighting devices etc. The also spoke about the various new Lighting technologies and controls, which will be part of our future lighting / smart cities.

2. Mr. Senthil Kumar Madasamy from CREE presented his paper on **"LED".** He explained in details the need of replacement of the conventional luminaries with the LED, for energy conservation and enhanced lighting effects.

1. Mr. Avijit Ash, from Philips India delivered his paper on **"Light….. beyond Illumination"**, enumerating the introduction of modern lighting fixtures in all segments. He explained in details how the luminaire manufactures are constantly coping up with introduction of the present need based lighting system including smart lighting.

Mr Sisir Gangopadhyaya, Session Chair thanked all the three speakers for their excellent presentations.

Student Session
Group Discussion on Present & Future Lighting by Students & Research Scholars of JU Students
SESSION CHAIR: Prof Biswanath Roy.

1. From Rubbing Stones to Speaking
This paper was prepared by Zeeshan Siraj, and presented by Rahul Manna and Aiswarya Dev Goswami in absence of the author. They gave a brief description of the evolution of lighting from rubbing stones to modern light sources like candles, oil lamps and electric lights including modern day controls, including voice control.

2. The Future of Lighting
This presentation was presented by Rahul Manna and Aiswarya Dev Goswami. They spoke about modern lighting technologies using environment friendly organic polymers, like, OLED (Organic Light Emitting Diodes) and FIPEL (Field Induced Polymer Electroluminescence Light). Keeping in mind the need for using renewable sources of energy, the presentation also included Gravity Lighting System and Biological Light Bulb, a source of daily lighting needs in the near future. Lastly, the presentation was on TM30, a standard which might replace CRI as the industry standard to measure color rendition of a light source.

3. Software Based Lighting Design of Indoor and Outdoor Areas
This was presented by Ritam Chakraborty. This sheds light on the methods of carrying out lighting design of indoor and outdoor areas using some popular software platforms. A short description of a light fixture's colour appearance and its ability to render the true colours of objects viewed under its light helps in choosing the CCT and CRI appropriate for any given task.

4. Light Communication
This was presented by Tishya Sarma Sarkar. This explained about Optical Wireless Communication (OWC), classified as Li-Fi (Light Fidelity) which is the Visible Light Communication (VLC) and Terrestrial OWC, i.e, Laser Communication. The current bandwidth in use and the possible bandwidth limits were mentioned along with achievable data transfer speeds, which can go up to 100 times the speed of Wi-Fi. Both LEDs and LASERs can be utilized to carry out this communication job.

Prof Biswanath Roy, Session Chair thanked all the speakers for their excellent presentations.

Technical Session-II.
SESSION CHAIR: Prof. Saswati Mazumdar.
1. Mr. S Bose, National Test House gave an overview of newly installed Testing facilities in the field of luminaries. He also presented a video showing the latest model of LTM make spectrometer and its testing facilities for entire range of luminaries' parameters.

2. Mr. Biswajit Sengupta of ISLE, presented his paper on the adverse effects of Blue LEDs especially street lighting.

3. Asst. Prof. Partha Sarathi Satbha of J.U presented his paper on "Smart outdoor lighting". This was about software based lighting control in street. A protocol of the same has been prepared by the Illumination Engineering department of JU.

4. Mr. Surajit Das of PREMIER WORLD presented 3D projection lighting, with slides show including façade lighting and various other lighting shows.

Prof Saswati Mazumdar, Session Chair thanked all the speakers for their presentations, which were highly thought-provoking and educative.

The conference concluded with presentation of certificates to all the participants.

SEMINAR ON ENERGY EFFICIENCY & ORIENTATION PROGRAM FOR ISLE-STUDENT CHAPTER

(Poornima University, Jaipur)

Dr.Prakash Barjatia
Director of MIT School of Energy & Lighting NABL Technical/Lead Assessor
Governing Body Member of ISLE
pbarjatia@gmail.com

Dr.Barjatia *presenting a copy of Lii Magazine to* ***Dr.K.K.S.Bhatia,*** *President-Poornima University*

Department of Electrical and Electronics Engineering conducted Orientation Program for ISLE-Student Chapter and Seminar on Energy Efficiency on Saturday, 21.04.2018. Dr. Prakash Barjatia, Adviser (Lighting & Energy) : MIT School of Technology Management (MITSOT), Pune and Governing Body Member of Indian Society of Lighting Engineers) was Chief Guest of the event. He delivered Keynote Address on Sustainability and Pollution Due to Lighting – Subject for which he was invited to make a presentation during 10th Asian Lighting Conference held on at Shanghai, China. He explained difference between Energy Efficiency and Energy Conservation. He discussed different types of pollutions related to lighting. Initiatives to curb pollution and wastage due to improper lighting were discussed with help of practical examples.

Sh. G.S. Charan (Assistant General Manager,Technology, EESL) was Guest of Honor. Mr. Mausam Saxena (Executive Engineer, EESL, Jaipur) and Mr. Prashant Bajpai (Rajasthan-Head, Gupta Power) were Special Guests of the function. Mr. Mausam Saxena explained about initiatives of energy saving and energy conservation implemented by EESL in collaboration with Government and private organizations. He also explained energy saving initiatives in campuses. Sh. G.S. Charan discussed Objective and Applications of ISLE (Indian Society of Lighting Engineers). He discussed importance of ISLE Student Chapter in University.

Dr. K.K.S.Bhatia, President, Poornima University discussed about Energy Scenario in India and World with respect to power generation technologies. He also emphasized on importance of energy audit for sustainable development. Dr. Manoj Gupta Pro-President (I/C) and Dr. B.K. Sharma (Dean, SET) discussed about energy conservation, social awareness and need of ISLE Chapters to encourage capacity building among students and society.

Participants & Faculty Members

Dr.K.K.S.Bhatia*, President-Poornima University presenting Memento to* ***Dr.Barjatia***

ANNUAL GENERAL MEETING

Chennai State Centre on 23rd Nov, 2018

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Report on ISLE meeting and Lectures at KIIT, Bhubaneswar

Mr. Tapan Kumar Ghosal
Hon'y Secretary,
Calcutta State Centre / ISLE

Mr. Tapan Kumar Ghosal, Hon. Secretary, ISLE, Calcutta State Centre(CSC), attended a meeting with the members of the ISLE Bhubaneswar State centre executive committee, on 27th September 2018. The following points were discussed and recorded :

1. The activities of ISLE Bhubaneswar State centre was briefly explained by Dr. C.K. Panigrahi for the financial year 2017-18.

2. The committee has been advised by the Hon. Secretary, ISLE, CSC, to conduct election for forming the new committee for the financial year 2018-19.

3. The schedule for conducting such election as per the By-laws of ISLE, has been clearly explained by the Hon. Secretary, ISLE, CSC.

4. Dr. C.K. Panigrahi requested ISLE, CSC to assist them to conduct more programmes on Lighting and Electrical Engineering.

Following lecture meetings were conducted by Mr. Tapan Kumar Ghosal, Hon. Secretary, ISLE, (CSC) on 27th and 28th September 2018, at the School of Electrical engineering, KIIT, Bhubaneswar.

27th September 2018
Lecture on Energy Management
26 participants including faculty members, PhD and Post Graduates student, Power point presentation on the subject was delivered.

28th September 2018.
Lecture on Energy Audit
Power point presentation followed by practicals at various laboratories was conducted.

Both the programmes were highly educative in nature and well appreciated by the participants.

indian society of lighting engineers

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CITATION FOR DESIGN PRESERVATION

The Grill at the Seagram Building New York, NY

L'Observatoire International

Hervé Descottes
Wei Jien
Jenny Ivansson

" It was important for us to honor and respect Richard Kelly's original lighting."
- Hervé Descottes

" Renovating this celebrated restaurant in a landmark interior was undoubtedly a daunting challenge, and the lighting design rose to the occasion. The subtle, almost invisible upgrade to Richard Kelly's design with new energy-efficient technology was beautifully accomplished."
- Lumen Judges

INTERIOR DESIGN
Georgis & Mirgorodsky
William T. Georgis

ARCHITECT OF RECORD
Richard H. Lewis Architect

OWNERS
Major Food Group
RFR Realty LLC

PHOTOGRAPHY
Scott Frances
courtesy of Major Food

The iconic Seagram Building is a mid-century landmark designed by renowned architects Mies van der Rohe and Philip Johnson. It was often called "The Tower of Light," acknowledging the groundbreaking work of Richard Kelly, the pioneering architectural lighting designer. L'Observatoire was engaged by owner Aby Rosen of RFR Realty in collaboration with leaseholder Major Food Group and designer William T. Georgis to develop a respectful lighting scheme for The Grill and The Pool, formerly The Four Seasons.

Kelly's original concept and mood are preserved and simultaneously refreshed with improved lighting technology, including the use of LEDs and a new, modern controls system. Added layers of light accent the space's historic architectural features. More control and precision are provided for settings between day and evening. Dynamic lighting for events and special occasions modernize Kelly's lighting design intent.

The lighting design enhances the intimacy of the dining experience by creating resonance between darker and brighter areas, highlighting tabletops, and playing with layers of light and shadow, all while keeping the original lighting theme. The lighting celebrates the dining experience of today while preserving the beauty of the space's legendary past.

AWARD OF EXCELLENCE

London Mithraeum
London, United Kingdom

Tillotson Design Associates

Suzan Tillotson
Mitul Parekh
Shan Jiang

Schreiber Studio

Matthew Schreiber

Meticulously controlled lighting reveals the ancient Roman city of Londinium and the mysterious Temple of Mithras, the bullslayer, "reinstated" in its original location within a new corporate headquarters. At street level, the climate-controlled display case could not incorporate lighting. Artifacts are displayed on pyramidal forms, revealing details with minimal shadows from track lighting. At the mezzanine, ghostly figures emerge among the exhibits. Concealed framing projectors illuminate resin replicas without interfering with visitors' ability to read the interactive displays.

At the lower level, "walls" of light rise over the foundation remnants of the temple. "Haze" – theatrical fog never before used in a permanent installation – gives the light beams their structural physicality. The light is aimed horizontally onto a series of concealed mirrors, and the resultant plane is interrupted by baffles to simulate portals. Technical challenges involved coordination with air systems and ceiling construction. The altar figure comprises layers of cut steel, cantilevered so that each silhouette is illuminated. Bespoke pendants, designed to be near-invisible, reveal the ruin from below eye level. The overall lighting design furnishes just enough light for visitors to examine the artifacts and ruins without distracting from the mystery and magic of the immersive experience.

PRIME ARCHITECT / MEDIA
Local Projects
Jake Barton

ARCHITECT / EXHIBITION DESIGN
Studio Joseph
Wendy Evans Joseph

ARCHITECT OF RECORD
Foster + Partners
Owe Schoof

ARCHAEOLOGY
Museum of London Archaeology
Sophie Jackson

CONTRACTOR
Sir Robert McAlpine
Mark Taylor

OWNER
Bloomberg L.P.
Michael Bloomberg

PHOTOGRAPHY
James Newton

Modernized Modernity

Integral artificial and daylight design for the State Parliament of Baden-Wuerttemberg

State Parliament of Baden Wuerttemberg

For the general renovation of the state parliament building in Stuttgart, the Staatliche Vermögens - und Hochbauverwaltung Baden -Wuerttemberg (State Administration for Property and Construction) had set two goals which seemed difficult to reconcile at first sight: On one hand, the historic registered properties of the building had to be preserved. On the other hand, the assembly hall – previously solely lit by artificial light sources – was to be opened up for daylight. In close collaboration with Staab Architects the lighting designers at Licht Kunst Licht have developed an elegant solution which does not alter the external appearance of the structure characterized by glass and bronze, yet brings daylight even into its very core. In the remaining areas of the parliament building, a consistently LED-based lighting concept celebrates the elegant approach of post-war modernism.

Bold opening of an enclosed space

The state parliament building of Baden-Wuerttemberg marks a new beginning in many respects. Among other things, it was one of the first new parliament buildings to be built in Europe after the Second World War. Also, the uncompromisingly innovative architectural language of the steel frame construction could be understood as a metaphor for the spirit of optimism and new self-understanding of politics at the beginning of the 1960's. The state parliament also showed courage in the innovation implemented in the newly renovated building.

In the best sense of the word this becomes obvious in the assembly hall, the heart of the building. The previously windowless and introverted space has moderately been opened at its rear. This intervention allows for views through the foyer into the rose garden. However, a noticeable influx of natural light and direct visual connection to the outside has only become possible by a partial opening of the roof. For this, 12 large circular skylights with a diameter of 2.60 meters and 36 smaller ones with a diameter of 0.80 meters were inserted flush with the flat roof. All small skylights are equipped with so called “smart glass technology”. With the help of electrochromic glazing a light and thermal energy reduction can be achieved in case of excessive light incidence.

Views into the sky above Stuttgart

The natural light is transported and directed by a unique and innovative daylighting system, then directed and subsequently brought into the space via a translucent and satinized ceiling made of plastic panels. For this, large plastic tubes are located directly underneath the skylights. At the small skylights, these tubes are shaped as short cylinders, while long truncated cones are installed at the large skylights. The small cylinders are clad with highly reflective film and end approximately 50cm underneath the skylights, transporting the light evenly into the ceiling cavity.

In contrast, the large, conical daylight openings reach down to the luminous ceiling where they are closed with clear panes; these circular panes are integrated as transparent discs in the otherwise frosted ceiling. The interior finish of the cones is a smooth and slightly mirrored, while the

outer surface has an opalized finish by use of a special coating technique, giving it a rough feel. This means that they transport some of the daylight down to the assembly hall, while the other portion is emitted over the surface of the cones. Thus luminous volumes are generated within the ceiling cavity, giving the ceiling a sense of vibrancy and depth.

As a result, the natural light arrives as a mixture of diffuse and direct components into the nine-sided plenary hall. The clear end-faces of the cones create prominent light zones, but also enrich the space by allowing direct views into the sky above Stuttgart. The highlight: Each seating position is guaranteed a direct and nearly unobstructed visual connection to the sky; the conical detail visually reduces the ceiling thickness, seemingly joining the sky with the edge of the luminous ceiling.

Natural and artificial light – a powerful duo

The daylighting system generates vital light atmospheres, with average illuminance levels reaching between 150 lux on cloudy days and more than 800 lux on clear, sunny days. According to the user’s needs, LED light with color temperatures tuneable between 2700K and 6500K, can supplement the daylight to be the sole light source in the evening hours. To achieve this, linear LED profiles were arranged radially around the daylight cones and tubes – similar to the blades of a turbine – and tilted towards their centre by 30 degrees. Through this structure and orientation, an optimal balance of cylinder, cone, and luminous ceiling illumination could be achieved. During normal usage, the average horizontal illuminance in the assembly hall is 500 to 600 lux; for television broadcasting the illuminance can be increased to over 1000 lux. All television recording lighting requirements, such as uniformity and flicker-free performance of the lighting systems, are fulfilled. Both the DALI controlled LED fixtures and the electrochromatic glass components are controlled centrally, where various preprogrammed lighting scenes can be retrieved via touch panel.

Technical updates for good ideas

With the exception of an added elevator in the access area of the building and the newly built “Citizen and Media Centre,” there have not been substantial changes to the space program and visitor circulation through the state parliament building. This was not only due to a requirement of the heritage protection, but simply not necessary, as the architecture’s free flowing spaces behind its transparent façade still look astoundingly contemporary – even

after 50 years of use. Similarly, the lighting designers at Licht Kunst Licht encountered several areas where the existing lighting solutions' atmospheric effect called for respectful updates rather than alterations. In the interests of energy efficiency and lighting quality, they brought the technology up to date in these cases, all the while retaining the charm of the existing solution.

A good example for such a situation is the foyer, which spans across the first and second floor. With its zoning and elegant simplicity, the existing lighting solution created so much charisma that it was retained in the new concept. Hence, the indirect lighting from the perimeter offices as well as the light cove tracing the outer wall of the assembly hall were maintained. However, all light sources were retrofitted with LED technology and the light levels were adapted to current standards.

Vertical surfaces and downlights in the foyer

As part of the redesign in the foyer, the strict grid of the ceiling fixtures was kept, but symmetrically aligned to the columns. The previously pronounced luminaires were replaced by recessed square shaped fixtures with prismatic covers. They quietly and unobtrusively blend in into the ceilings, yet cast a powerful and directed light. The light flooring finish reflects a percentage of the luminous flux back to the ceiling. With this pleasant side effect, the space appears wider and more open. In addition to the optimized general lighting, the two staircase blocks are orchestrated with LED light for a prominent appearance that can be perceived from both the interior and the exterior of the building. Yet another vertical surface is emphasized with light in the textured relief wall at the restaurant. Here, compact, adjustable LED projectors are used to highlight the embedded Jurassic period fossils with precisely aimed lighting.

Transparency and graphical grid

With such a consistently transparent building envelope, the interior lighting clearly defines the exterior perception of the building. Hence, its spatial dramaturgy is easy to read, even in the evening hours: the bronze cladding and tinted windows form the two upper floors into a powerful cube, which seems to float above the ground floor glazing below. The illuminated walls at both the ground floor staircases and the perimeter wall of the assembly hall's upper floors emphasize the glowing effect of the building.

Overlaying the illuminated core concept, the existing lighting solution had used a graphical light pattern on the building's structural elements. Located between the lintels directly behind the façade, linear light elements provided the general lighting for the room. As part of the renovation, the light profiles now serve only to create a representative effect at night. For this reason, the lighting elements were integrated behind the metal ceiling grid. This way, more light is cast on the reveals, while the fixtures are discretely kept in the background.

A cultural landmark has arrived to "Today"

Client demands, heritage protection requirements, and the integration of modern, efficient technologies – the expectations for the general renovation of the state parliament of Baden-Wuerttemberg were ambitious and they have been fulfilled at the highest level. The courageous implementation of the daylighting solution, the preservation of the original high-quality building structure, and an energy modernization enabling a 40% energy savings are rewarding results of the project, which was completed in line with both the estimated budget and schedule.

ARCHITECTS
Staab Architekten GmbH, Berlin
www.staab-architekten.com

LIGHTING DESIGN
Licht Kunst Licht AG, Bonn / Berlin
Project and team management : Benjamin Dorff, Maik Czarniak
Project team : Tanja Baum, Edwin Smida
www.lichtkunstlicht.com

PHOTOGRAPHY
Marcus Ebener, Berlin
Michael Tümmers, Stuttgart

Report on Seminar on "Need for Testing, Certification and Compliance"

The above Seminar was organised jointly with Isle, Calcutta State Centre and UL (Underwriter Laboratory), Bangalore, on 4th October 2018 at The Lalit, Kolkata.

The programme started with registration at 10.30. Am. The programme highlights are as under:

1. Mr. Kamal Sethia, Chairman, Calcutta state Centre, in his welcome address explained the need of such programmes for the awareness of the Lamp manufacturers in West Bengal and the Eastern region of the country. The certification of the products in the lighting industry is now become mandatory by enforcing acts issued by the BIS. He also enumerated the various programmes being conducted by Isle, Calcutta State Centre. He requested UL team to organise similar programmes for various PSUs and Private organisations.

2. Mr. H. Mukherjee, Vice president, Isle, GB, explained about Isle and its role in details in imparting knowledge to the various institutions, in the field of Illumination and Electrical Engineering.

3. Mr. Pranav Kumar Jha, Business Head-South Asia UL, in his power point presentation explained about UL and its role.

4. Mr. Rajat Mandal, Consultant explained about the seminar objective and reflection.

5. Mr. Puneet Randeo UL, explained about In-country Legislation requirement.

6. Mr. Satish Kumarand Mr. Avin Nanjappa of UL, highlighted the Role and Importance of testing and certification and UL infrastructural set-up and capabilities.

7. A panel discussion was conducted, moderated by Dr. Saswati Mazumdar, Chairperson, BIS, TC-ET 49.and the following participates took park in the discussion.

a) Mr. R.K.Bhandary, Sigma Lighting.
b) Mr.Durga Prasad,CPWD
c) Mr. Subhankar Das, Chief Engineer, PWD
d) Mr. Avisekh Toshniwal, Reshmi LED
e) Mr. Sunil Jagwani, Luminears
f) Mr. Parekh, Jt. DG, MES
g) Mr. Aniruddha Kajaria, Century LED
h) Mr. Pinaki Roy, Ex. Chief Engineer and ISLE Fellow member.

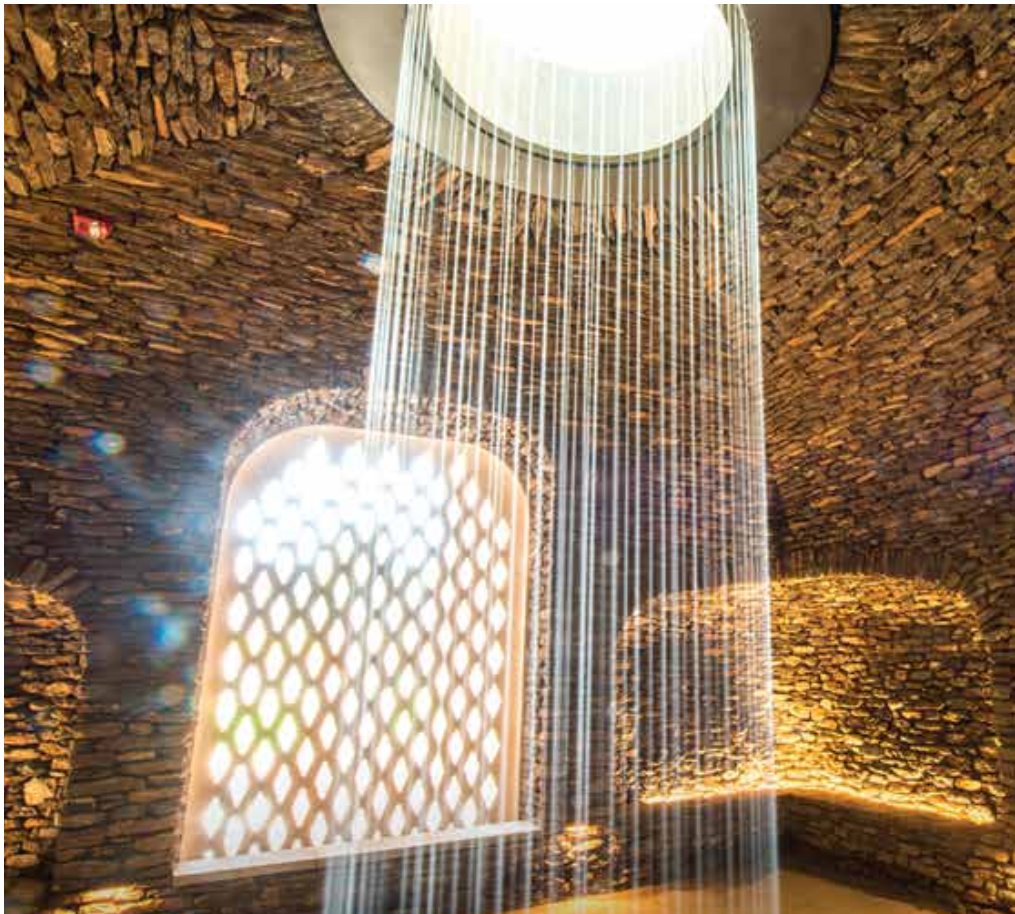
The seminar was attended by 65 participants from Isle Members, dignitaries from PWD,CPWD, Metro-Railway, Jadavpur University, Delegates from reputed lamp manufactures, viz, Sigma Lighting, Balin, Simoco, Reshmi Led, Binoy Opto, Guniya LED lighting EPCC
The seminar was concluded by a vote of thanks by Tapan Kumar Ghosal, Hon.Secretary, Isle, Calcutta State Centre.

AWARD OF MERIT

Longwood Gardens Renovation Kennett Square, PA

L'Observatoire International

Hervé Descottes
Jason Neches
Natalia Priwin



" I like to keep the mystery of the night. The night belongs to something magical. You need something at night you don't have during the day. It's in our bodies; it's physiological."

- Hervé Descottes

Longwood Gardens is one of the premier horticultural display gardens in the United States, comprising 1077 acres of gardens, woodlands, and meadows. The Main Fountain Garden combines classical landscape design with music, art, innovation, technology, and spectacular fountains. The architects designed a major rehabilitation for the 80 year–old complex, including restoration; mechanical, electrical, and plumbing upgrades; and entirely new features and enhancements. L'Observatoire's lighting concepts for the restoration and redesign subtly enhance and shape the visitor experience by concealing light fixtures and using small LED sources wherever possible.

The lighting enhances the garden architecture and dynamic fountains at night, leading the eye toward the spectacle of the grand fountains. Strategic spotlighting renders garden features without drawing attention to itself. Visitors marvel at the fantastical garden elements without explicitly noticing the light source.

The Main Fountain Garden is experienced from multiple vantage points. The varied lighting scheme gives an overview of the fountain garden as grand tableau, while simultaneously creating intimate spaces within the garden to reveal pathways, lawns, and fountain areas up close. The control system ties the garden to natural cycles, lunar and seasonal, so the lighting evolves in parallel with the seasons, offering a rich experience for visitors.

ARCHITECT
Beyer Blinder Belle

LANDSCAPE ARCHITECT
West 8

WATER FEATURE DESIGN AND ENGINEERING
Fluidity Design Consultants

OWNER
Longwood Gardens

PHOTOGRAPHY
Daniel Traub
FreshFly

Polygonal Exterior, Organic Interior

As a teaching and inspiration venue for 1,000 students, the building now unites formerly three schools.

Multilayered Light in the Vocational College of the Archbishopric Cologne

Inaugurated in summer 2016, the Vocational College of the Archbishopric Cologne is one of the most important educational facilities for social professions in North Rhine-Westphalia. As a teaching and inspiration venue for 1,000 students, the building now unites formerly three schools. Having won the competition as part of an architectural peer review process, the Cologne based architectural office 3pass Architekten assumed the part of the lead designer of the project in 2012. The design pivot was an organically shaped atrium that forms the project's heart, circulation area, meeting place, auditorium and light well.

Light Infused Heart

The atrium has also become the core element of the lighting concept. The space unfolds its many layers from all viewing directions and floor levels, while never cluttering the view with exposed light sources. In order to emphasize this multilayered characteristic, the atrium's rear walls have been illuminated with continuous concealed grazing light profiles. Only in areas with an extended spatial depth, such as passages or open study zones, low-glare downlights were introduced. By means of a milled recess in the richly textured Heradesign excelsior acoustic board ceiling they have been recessed in a flush detail.

Light Fillings

The balustrade edge forms a particular interface with the lighting concept. Organic recesses in the girders are filled with wood housings, dubbed „fillings". These wood volumes are fitted with round cutouts accommodating adjustable track-mounted spot lights. Through the fillings' apertures, they illuminate the sculptural stairs and the atrium expanding into an auditorium in a glare-free fashion, using carefully selected beam and aiming angles. For this purpose,

the track position in the volumes, as well as size and location of the apertures, have been coordinated with the required aiming angles.

As a result, the large open areas on the ground floor can be provided with an illuminance of 300 Lux, without having to attach light fittings to the sky light structure. This would have affected the ease of maintenance and above all the design of the lightweight, seemingly floating glass membrane.

Open learning zones create half-secluded niches in the atrium‘s galleries. These have been partly fitted with sophisticated multifunctional furniture that are skillfully engulfed by a layout of ceiling recessed luminaires.

Staggered Polygons

The class rooms accessed from this spirited atrium are all connected to the clearly structured, polygonal brick wall facade with its bay window ribbons. Continuous, slender light profiles follow the facade contours in three tracks, thus illuminating the class rooms in a uniform and glare-free fashion. The light trails follow each polygonal change of direction with carefully detailed miter joints, where each corner is seamlessly illuminated. As a result, the luminous lines can be perceived from the outside as staggered outlines. As in other areas, these luminaires form a clean, defined interface with the textured Heradesign ceiling. Moreover, their microprism covers ensure that they fulfill even elevated glare control requirements. Inside the class rooms, the luminaires are allocated to control channels according to their vicinity to the window, thus allowing them to be activated or deactivated according to the daylight availability as detected by a daylight-sensor. Due to a limited budget, dimming controls could not be realized. Yet, in spite of the technology‘s simplicity, palpable energy savings can be achieved.

Similarly, the training kitchens adjacent to the class rooms, are connected to the facade. Here, the linear lighting layout is continued, however in four tracks. Where required, these are interrupted by extraction hoods. Along the walls, miniature LED ribbons have been mounted underneath the wall units, in order to prevent users from casting their own shadow on the task.

The design pivot was an organically shaped atrium that forms the project‘s heart, circulation area, meeting place, auditorium and light well.

Even in the gym, the concept of the facade tracing luminous lines is continued. However, here the use of ballproof luminaires was mandatory. Since the space can be divided by means of a movable partition wall, the layout is interrupted at the center. The illumination performs at its optimum, whether the partition wall is closed or open.

The Cafeteria Forms a Space within a Space

The cafeteria on the ground floor is characterized by a rich, dark wood cladding, that forms a space within a space. The scaled ceiling panels are visually detached from each other by a hint of LED light. A bench alcove is emphasized by grazing light. The cafeteria tables are provided with concentrated, brilliant light from adjustable downlights that compensate the ceiling slope through their design. Near the windows, the wooden room cladding discontinues, and the space, now light in colour, expands towards the adjacent exterior. Here, the taller Heradesign ceiling is fitted with downlights with a flush trim ring again.

Adding Rhythm to the Space

In the library, the shelf lighting designed by the interior design office Keggenhoff occurs entirely from the furniture itself. An array of vertical light lines adds rhythm to the perception of space and illuminates all shelf compartments. The horizontal lighting elements allow sampling selected books. Only in the periphery, following the generous facade fenestration, the illumination of the reading desks is provided by downlights in the Heradesign ceiling. The reading stations are fitted with table luminaires that engender a zoned luminosity and provide the required illuminance levels.

Connective Light Lines in the Emergency Stair Case

The frugal emergency stair cases are illuminated by LED light profiles in exposed concrete recesses. Located on the stair flight‘s bottom side near the well hole, the light profiles represent a seamless, graphic, yet highly functional element. With their dark luminaire housing, the fittings are accurately recessed in these grooves. Their prismatic cover dissolves the dotted LED array into a continuous line. At the rear walls of the landings the profiles have been mounted in deeper recesses and generate grazing light on the walls that are partly adorned with modern artwork. The entrances are emphasized by directional illumination from downlight pairs in the vestibule ceilings. The increased light intensity extends an inviting gesture and connects the moderate outdoor lighting levels with the indoor environment‘s radiant visual briskness. The hierarchy of the three entrances is not only recognizable

in the architectural expression, but also reflected in the area‘s brightness, thus making the main entrance stand out.

Subservient Exterior Lighting

The goal of the exterior lighting concept was to give visual priority to the nocturnal building. Therefore, the few and strategically placed light steles keep their distance from the facade. With their rotational symmetric light distribution they illuminate the forecourt area. Their slender shape and cylindrical luminaire head appear sleek and restrained while offering a pleasant outdoor illumination.

Near the facade, the paths are illuminated by grazing light from linear fittings recessed in the base of the long outdoor benches. For this purpose, narrow-beam profiles have been mounted in deep recesses carefully shielding the light sources from the pedestrian‘s view.

Selected trees are gently enhanced by buried uplights in the planters. Glare-reducing accessories ensure that the light sources remain shielded.

Facing the adjacent road intersection and away from the forecourt, a bicycle parking facility has been added. A low parapet encloses the area and separates it from the sidewalk. Located on the interior face of this balustrade are asymmetrical recessed orientation lights illuminating the racks in a functional yet gentle fashion.

Light Promoting Concentration

For both, the indoor and outdoor illumination, the colour 4000K has been implemented. In the building‘s interior the neutral colour guarantees a balanced light atmosphere when blended with daylight while also promoting concentration and airiness through the slightly elevated blue sprectrum. Simultaneously, the colour is not so cool as to negatively impact the sleep-wake rhythm of the students in evening classes. In the outdoor environment the brisk light colour pleasantly differs from the adjacent orange high pressure sodium road illumination.

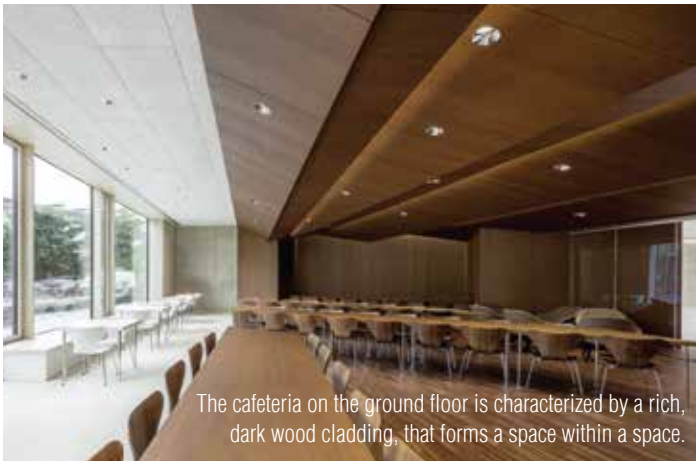
Generally, the lighting design contributes greatly to the visual mediation of the architecture, crisp and polygonal on the outside, soft and organic on the inside. It skillfully sculpts the spatial envelope and contributes to making the visual layers tangible.

Simultaneously, the interaction with incoming daylight, e.g. from the generous skylight in the atrium and the extended bay window ribbons in the class rooms plays an important part - ergonomically, scenographically and also energetically.

ARCHITECT
3pass Architekt/innen Stadtplaner/innen Kusch Mayerl BDA

LIGHTING DESIGN
Licht Kunst Licht AG, Bonn / Berlin
Project- and team leader: Stephanie Grosse-Brockhoff
Project team: Lisa Görke, Shine Jiang, Andreas Schulz

PHOTOGRAPHY
Constantin Meyer, Cologne



The cafeteria on the ground floor is characterized by a rich, dark wood cladding, that forms a space within a space.

Organic recesses in the girders are filled with wood housings, dubbed „fillings“. These wood volumes are fitted with round cutouts accommodating adjustable track-mounted spot lights.

Continuous, slender light profiles follow the facade contours in three tracks, thus illuminating the class rooms in a uniform and glare-free fashion.

In the library, the shelf lighting designed by the interior design office Keggenhoff occurs entirely from the furniture itself

EVENT CALENDAR

Mumbai, 9-11 May 2019,
Bombay Exhibition Centre

Hyderabad, 25-27 Jan 2019,
Hitex Exhibition Center

27-29 June 2019,
IMPACT Exhibition & Convention Center,
Bangkok, Thailand

Kochi, 14-15 Feb 2019
Bolgatty Palace, Convention Center

Goa, 6-8 Feb 2019,
Cidade de Goa,
Vainguinim Beach Goa

Coimbatore, 14-17 Feb 2019
Codissia Trade Fair Complex

DUBAI, 5-7 March 2019
Dubai World Trade Center,
Sheikh Zayed Road, Dubai,
United Arab Emirates

Mumbai, 25-27 April 2019,
Bombay Exhibition Centre

BRICKELL BEAUTY

THE LATEST SAKS FIFTH AVENUE IN THE EAST BOASTS AN INNOVATIVE LIGHTING DESIGN THAT MIRRORS THIS UNIQUE NEIGHBORHOOD IN GREATER DOWNTOWN MIAMI.
BY CINDY FOSTER – WARTHEN
PHOTOGRAPHY BY BILL WALDORF OF WALDORF PHOTOGRAHIC ART & BY VOKSLYTE.

Saks Fifth Avenue, Brickell, Miami

As one of the world's pre-eminent retailers, Saks Fifth Avenue is renowned for its superlative American and international designer collections, its expertly edited assortment of handbags, shoes, jewelry, cosmetics, gifts and first – rate fashion expertise. The luxury retailer recently opened its third Florida store in more than 30 years. In fact, the three-story Miami store is the company's largest and newest in the East.

Optimizing the international retail appeal of the Dade County area, Saks became the lead tenant in a recently opened $1.05-billion, mixed-use development in the Brickell financial district. Brickell City Centre spans 9.1 acres along South Miami Avenue (between Sixth and Eighth Streets) in downtown Miami. It is comprised of two residential towers, two mid-rise office buildings, plus the EAST, Miami Hotel. City Centre brings upscale urban living to the neighborhood and a whole new level of sophistication to the area.

MAPPING THE VISION

The New York City based architecture firm Jeffrey Hutchison & Associates – renowned for its exclusive focus on fashion retail architecture was hired to lead the design team for the formidable project. “Given the multiple points of entry to the 107,000 sq.ft. Store, particular care was given to the customer journey and establishing key focal points in each location to orient the customer and provide an exciting introduction to the store and each department,” notes Jeffrey Hutchison, the project's architect. Among those visual stand-outs, the decorative custom tile walls in the Beauty department are inspired by an abstract painting. “ The World of Women's department infuses Deco-inspired geometric crème – and walnut-coloured stone flooring,” Hutchinson states, adding that “ the world of men's section is highlighted with a gray-on-gray palette of Cubist-inspired forms.”

The creative collaboration between the architectural firm and the California -based lighting design team of Oculus Light Studio brought the vision to life by crafting a balance between the interior design and lighting quality while remaining cognizant of both schedules and budgets. Led by Archit Jain, Principal of Oculus and Lighting designer Joel Weston, the project was a work in progress for newly two years.

After reviewing the design concepts presented by Jeffrey Hutchinson & Associates, the Oculus team selected a versatile range of products that matched the aesthetics of the interior design and also met the needs of properly illuminating the merchandise.

GLOWING CURVES OF LIGHT

"From the start, the interior design called out for curving, glowing lines in the ceiling." Jain remarks. In order to create these particular curves of various lengths and radii, custom fixtures would be required. Fortunately, the design team was familiar with Maryland-based lighting manufacturer VoksLyte," which specializers in creating customizable lighting contours that are factory-made to almost any curvature or length.

This new Saks Fifth Avenue design required a variety of custom radii from 14.75 feet up to 30 feet in arc lengths. The discreet, 2' wide Tangent Series luminaires are designed to sturdily and seamlessly link together to form continuous shapes that provide phenomenal lighting performance. Each custom arc was recessed into the ceiling with a trimless mud flange to provide a seamless look that resonated well with the overall design. The Tangent Down custom luminaire was both sculptural and performance-driven to provide the curving, glowing lighting element required throughout the three floors of the store.

The lighting design process for the Saks project was highly involved, according to the Oculus team. Additional custom fixtures came from Amerlux, which provided a track head that could be recessed into a ceiling slot. This customization required a specially made arm to be installed in the track head slot to allow for a center beam of optics to be aimed and projected. To manage costs, the slot was architecturally created, with the track assembly installed inside.

Throughout the retail space, a vareity of field-adjustable accent lights by Juno, Reggiani, and Amerlux were installed to provide the proper amount of merchandise and general lighting. With the budget becoming a critical issue, the design team paired those field-adjustable accents with retrofit LED lamps that are consistenly used in other current Saks locations. For uniformity of illumination, all of the lighting fixtures on this project are 3000K, although the design team indicated that on a national brand basis, some Saks' departments – such as the jewelry and beauty sections – have a cooler 4000K colour temperature. Based on sight lines in this particular location, it was determined that the same colour temperature should be used across the board.

In addition to the accent fixtures and customized ceiling curves, speciality selections were made for other areas. The lighting design called for "random" accent lighting in the ceiling including recessed linear fixtures, which were provided by Axis lighting.

No mater where they are in the store, Saks shoppers are enveloped by unique lighting. Besides the coves, a variety of additional areas are outfitted with large LED backlit panels or LED strip accents. The backlit panels are illuminated by Luminii LED tape in 4000K and serve as focal points above and below the stairwells plus in certain areas that utilize the ceiling of white light to illuminate displays with track heads and field-adjustable downlights.

PROBLEM SOLVING

As with most projects with strict budgets and timeframes, the construction and implemenation can be tricky.

"The "random" accent light ceiling was a little difficult to design, as we wanted to make sure that there was a way to get it installed in the ceiling and to convey the locations to the contractors in the field," Jain explains, "We achieved this by creating a grid with typical locations, and then randomized that grid within the larger ceiling. The net effect was we got zero RFIs (Radio Frequency Interference) on the field location of these fixtures.

The novel design work did not go unnoticed in the architectural and retail communities. The project was awarded a prestigious Shop! Retail Enviroments 2017 Design Award – which recognizes the best new designs in retail environments and experiences – as well as the association of Retail Executives 2017 Silver Award.

ARCHITECT & DESIGN
Jeffrey Hutchison & Associates, New York City

LIGHTING DESIGN
Archit Jain, IALD,
ISLE, LEED AP, Principal & Partner and
Joel Weston of Oculus Light Studio,
Culver City, Calif

Wheel of Light

Exclusively for bicycles, a parking garage with impressive light was built on the Novartis Campus in Basel.

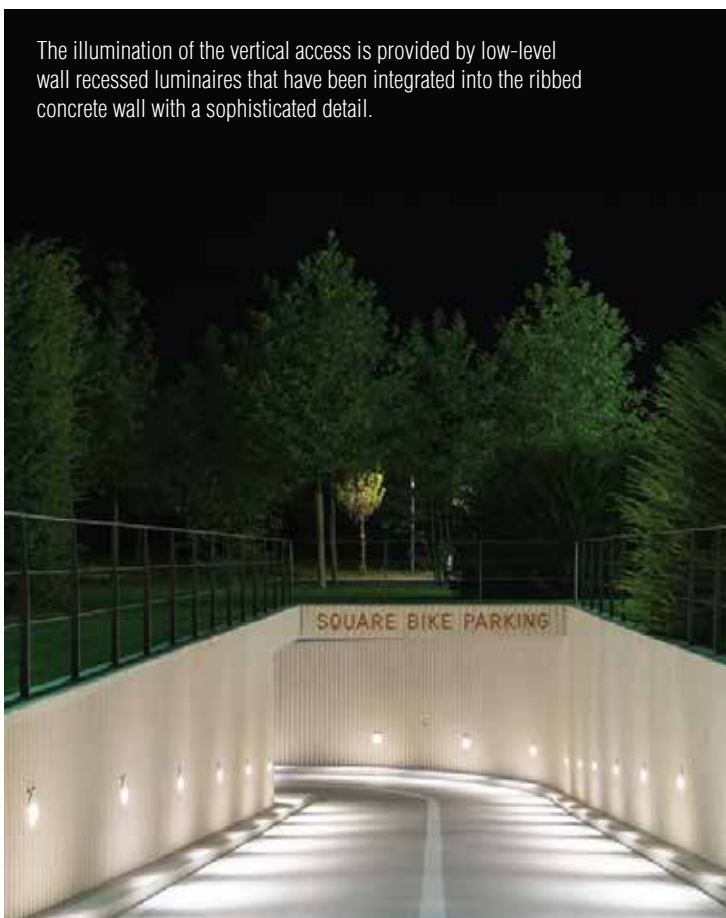
Bike Square,Novartis Campus, Basel, Switzerland

More and more people are switching from cars to bikes for their daily commute, this is also true in the Swiss city of Basel. Exclusively for bicycles, the pharmaceutical group Novartis built an underground parking garage for its staff members on the campus. Completed in the summer of 2017, a generous subterranean space for more than 800 bicycles was created which forms an impressive architectural site.

Inspired by the famous Brazilian architecture of Lina Bo Bardi, architect Marco Serra gave the underground space corrugated concrete walls, while the exposed concrete ceiling and the PU flooring display a deep blue hue. The organic design vocabulary of the ribbed wall is continued in 16 large circular ceiling recesses, into which the team at Licht Kunst Licht planned oversized diffuse ring luminaires with a stately exterior diameter of 7m. The striking graphic gesture of the 16 luminous “wheels” is the result of a complex custom luminaire development.

Each luminaire consists of an annular slanting shell of white translucent PMMA, which has been divided into 12 individual segments. The light source consists of an LED ribbon with a 120° light distribution. In addition to insect proofing requirements, the concrete's construction tolerance represented an enormous challenge.

The illumination of the vertical access is provided by low-level wall recessed luminaires that have been integrated into the ribbed concrete wall with a sophisticated detail.



A daylight- and presence detecting control system guarantees an energy efficient lighting solution that ensures a general illumination of at least 150lx in the garage, thus providing orientation and a sense of safety.

For the entrances to the bike parking, generous ramps and stair cases are illuminated by low-level wall recessed luminaires. A sophisticated detail integrates the fittings discreetly into the wavy concrete wall.

The park located above the bicycle garage was designed by the American landscape design practice Good Form Studio from Columbus, Ohio. Over the years, the pavilion's glazed roof will be overtaken by natural vegetation and shading through grapevines. Underneath, a playful installation of unshielded LED filament lamps on catenary cables has been implemented. The boardwalk crossing the park is illuminated by light bollards, which have been designed specifically for this project. They gently enhance the wooden deck and guide the evening visitor in a glare-free manner.

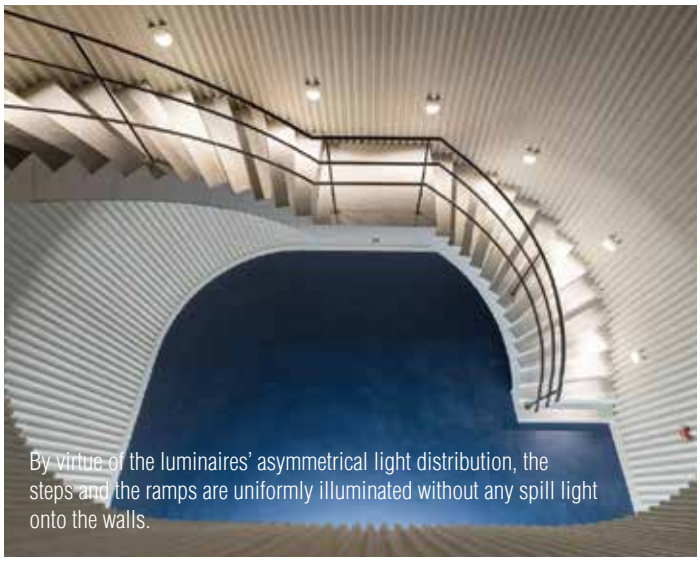
LANDSCAPE DESIGNER
Good Form Studio, Columbus, Ohio

ARCHITECTS
Marco Serra Architekt, Basel
Staff member Julian Trachsel

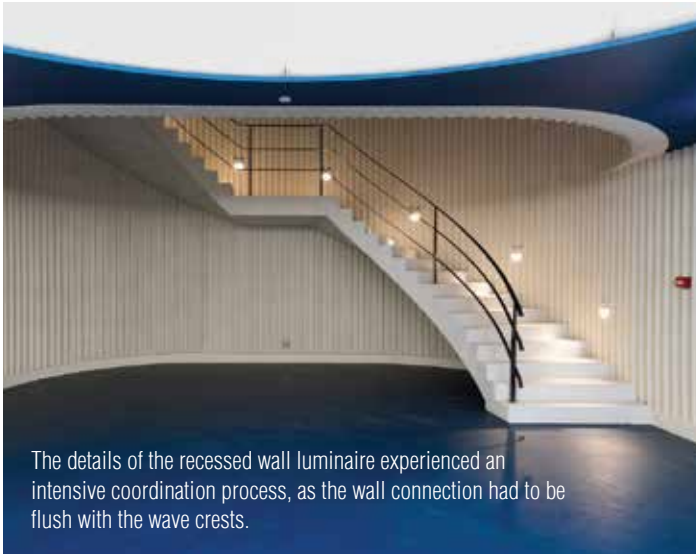
LIGHTING DESIGN
Licht Kunst Licht AG, Bonn / Berlin
Project- and team leader: Martina Weiss
Project team: Till Armbrüster, Thomas Möritz, Andreas Schul

PHOTOGRAPHY
Johannes Roloff

Inspired by the famous architecture of Lina Bo Bardi in Brazil, the elongated underground space is enclosed by corrugated concrete walls, while the exposed concrete ceiling and the PU flooring display a deep blue hue.



By virtue of the luminaires' asymmetrical light distribution, the steps and the ramps are uniformly illuminated without any spill light onto the walls.



The details of the recessed wall luminaire experienced an intensive coordination process, as the wall connection had to be flush with the wave crests.

The staff members reach the parking area comfortably via a ramp, or two generous staircases that connect the space with the newly created park above.

Blue-Light Hazard and LEDs : Fact or Fiction ?

Little is certain about the health implications of long-term exposure to LED lighting, but the proliferation of phosphor-coated white LEDs in everyday applications has sparked a renewed interest in research. Recent investigations have centered on the spike in the short-wavelength blue region of LEDs' spectral power distributions (SPDs). Studies in disciplines outside of lighting have linked exposure to everything from circadian disruption to blue-light hazard, the latter of which this article will focus on. But should the general population be alarmed? Not really, say the lighting experts.

The Hazards of Blue Light

Blue-light hazard was discovered in the field of occupational health and safety in the 1970s, predating the invention of white LEDs. The term describes the acute photochemical damage to the retina caused by "staring at an intense light source," such as a welding arc or the sun, says David Sliney, chairman of the IES Photobiology Committee. The radiation absorbed by the retina unleashes a series of chemical reactions that can lead to retinal inflammation, cell death, and white lesions within a day or two of exposure.

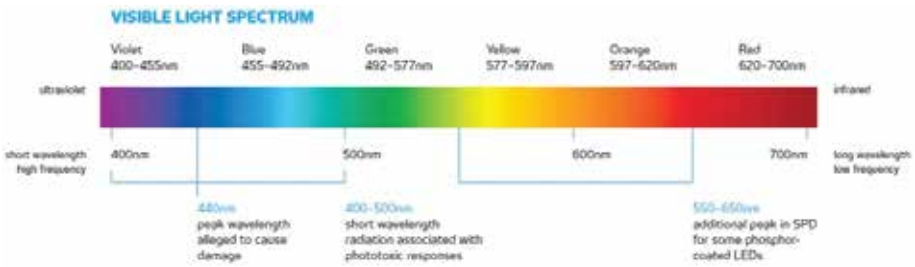
Research conducted over the last 40 years in medical academia has connected these phototoxic responses to short-wavelength radiation in the range of 400 to 500 nanometers - with a peak around 440 nanometers - prompting speculation about the safety of blue - rich light sources used in general illumination. Fluorescent sources also faced scrutiny for the blue peak in their SPDs, but as John Bullough, director of the Transportation and Safety Lighting Programs at the Lighting Research Center (LRC) in Troy, N.Y., explained in the Journal of the Illuminating Engineering Society in 2000, their low luminance makes any potential for risk of blue-light hazard "negligible."

Photochemical damage from blue light exposure has also been implicated in age-related macular degeneration (AMD), a leading cause of vision loss in people over 65. Biomedical researchers suspect that long-term exposure to short-wavelength blue light can create oxidative stress on retinal cell structures, resulting in the accumulation of lipofuscin, a lipid-containing waste product that has been attributed to AMD.

Why So Blue?

Typical white LEDs consist of gallium nitride (GaN) and blue dye and a phosphor coating that converts a portion of the blue light into white. These phosphor-coated white LEDs can be fabricated with customized spectral profiles, but the process necessitates a spike in blue radiant energy. The phosphors produce a second, broader, and, in some cases, higher peak between 550 and 650 nanometers.

LEDs with correlated color temperatures (CCTs) topping 3000K are often singled out for their high blue content. In June, for example, the American Medical Association released a report cautioning against the use of high-CCT LEDs in outdoor applications, citing health concerns such as melatonin suppression and circadian disruption—which are technically distinct from blue-light hazard. Although CCT does correlate with a source's blue-light content, the U.S. Department of Energy (DOE) states in its 2013 "Optical Safety of LEDs" fact sheet that the proportion of blue emissions in the



spectrum "is not significantly higher for LEDs than it is for any other light source at the same CCT."

The brightness of LEDs has also raised concerns. As a point source, the diodes emit a concentrated directional light that can be unpleasant to view directly. Still, their output is less than what the DOE cites as a risk for blue-light hazard: a luminance exceeding 4 gigacandela per square meter, and an illuminance exceeding 400,000 lux. Moreover, in interior lighting applications, the sources are often diffused, mitigating any discomfort.

Studies in Blue

The 1976 Nature article "Retinal Sensitivity to Damage from Short Wavelength Light," by William Ham Jr., Harold Mueller, and David Sliney continues to be the go-to reference in contemporary research on blue-light hazard and AMD. Undertaken to differentiate between thermal and photochemical injuries caused by short-wavelength light, the study established minimum thresholds for damage by irradiating the retinas of anesthetized monkeys with lasers at wavelengths between 442 nanometers and 1,064 nanometers. Exposure periods ranged from 1 second to 1,000 seconds.

In his literature review, Bullough notes that the researchers determined "light at 442 nanometers was 100 to 1,000 times more damaging than energy at 1,064 nanometers" and that the lesions produced by the former seemed chemically induced while those inflicted by the latter were burns. This and a subsequent study by Ham formed the basis for the safety guidelines by the International Commission on Non-Ionizing Radiation Protection on protection against laser radiation, as well as for ANSI Z136.1-2007: American National Standard for Safe Use of Lasers.

Similar laboratory experiments also observed photochemical retinal damage associated with intense short-wavelength radiation. In a 2011 literature review in Photochemistry and Photobiology, Dutch researchers Dirk van Norren and Theo G.M.F. Gorgels examined 56 such papers, the most recent of which were published in 2009 and 2010, involving the directing of light from multiple sources into the retinas of live monkeys, rats, rabbits, or squirrels for a period of time, ranging from one second to five hours.

Extrapolating lighting recommendations from research can be tricky. In the 2014 post "Blue Light Hazard … or Not?" on the blog All Things Lighting, Ian Ashdown, chief scientist for Lighting Analysts and president of Vancouver-based ByHeart Consultants, notes that the light intensities used in much of the research to date were often too high to be instructive in determining health risks from long-term exposure. While the studies demonstrate that "both ultraviolet and blue light can permanently damage the retina if focused onto a small spot," he says in an email to architectural lighting, "the exposure time necessary to do damage was equivalent to staring at the tropical noonday sun for 15 minutes without blinking."

"The exposure time necessary to do damage was equivalent to staring at the tropical noonday sun for 15 minutes without blinking." –Ian Ashdown, chief scientist, Lighting Analysts, and president, ByHeart Consultants.

The Problem with Pinpointing LEDs

Excessive light levels have plagued similar studies on LEDs. In "Photoprotective Effects of Blue Light Absorbing Filter Against LED Light Exposure on Human Retinal Pigment Epithelial Cells In Vitro," published in 2013 in the Journal of Carcinogenesis & Mutagenesis, the researchers subjected cultured, human retinal cells to intensities of 5mW per square centimeter of white, blue, green, and red LED light in three 12-hour on–off cycles, with and without a blue-light-absorbing filter. Although the filter did prevent phototoxicity from LED lighting, Ashdown says that the light exposure used on the cells was "hundreds of times more light than the human retina would be exposed to from LED light sources." Moreover, because the experiment was done with cultured cells, it did not factor in the ability of a human's "biological system" to repair cellular damage.

Even when researchers have attempted to approximate real-world applications of LEDs, a lack of lighting expertise has led to uncontrolled experimental conditions. In a 2014 paper in Environmental Health Perspectives, researchers exposed albino rats in cages to light from a blue LED, 6500K white LED, a 3000K yellow compact fluorescent lamp (CFL), and 6500K white CFL in 12-hour on–off cycles for up to 28 days. Although the light sources had verified SPDs and intensities, they were set 20 centimeters away from the rats and measured for 750 lux, exposing the rats to "completely different levels of blue light," Ashdown says. Furthermore, the light levels far exceeded what the rodents, which have light-sensitive retinas, encounter in reality. While blue-light-induced retinal damage was found, he notes, this study was flawed.

In fact, Ashdown, who has studied solid-state lighting and its impact on human vision since 1999, says that not one academic paper associating blue light with retinal injury "presents credible evidence that light levels encountered in everyday life will cause retinal lesions."

The real issue, says Robert Clear, a retired staff scientist with Lawrence Berkeley National Laboratory and a sitting member of the IES Roadway Lighting Committee, is that this topic requires "an intersection of two sets of expertise. The people who are knowledgeable in biology are generally not familiar enough with lighting to be able to evaluate it."

In epidemiology, the findings are even slimmer. Few studies have demonstrated the health effects of long-term exposure to blue light or yielded evidence of a connection to increased risk for AMD. "Maybe one out of 20 will show there's a possible linkage," Sliney says. An often-cited example is Hugh Taylor's study of 838 Chesapeake Bay fishermen chronically exposed to sunlight, published in Transactions of the American Ophthalmological Society in 1990, which found only a marginal association.

Going Beyond Blue-Light Hazard

Considerable research has focused on the

impact of short-wavelength light on the eye's functions unrelated to vision, such as melatonin and circadian regulation. Although light exposure in general can inhibit the release of melatonin, the hormone that signals to the body the onset of darkness or night, studies have shown that blue light seems to exert a more powerful effect. For example, boosting light levels and color temperature for 30 to 45 minutes has helped astronauts feel more awake, says Stan Walerczyk, principal of San Francisco–based Lighting Wizards, an energy-efficiency consultancy.

Other evidence suggests that nocturnal use of LED-lit mobile devices and computer displays, which emit a bluish cast, can delay sleep. Walerczyk recommends avoiding "blue light one to two hours before you go to bed." For those who can't stay away from their screens, free apps such as F.lux will increase and decrease the blue component in an electronic display according to the time of day, he says. Apple also offers a "night shift" option in its mobile devices that casts a hue atop screens during evening hours.

In outdoor applications, such as street lighting, LEDs with higher amounts of blue light could potentially suppress melatonin production, as the June AMA report alleges. However, the DOE and the LRC, in their responses to the AMA report, note that any conclusions to be drawn need to factor in the amount and duration of light exposure.

Avoidance Strategies

Despite the vast amount of research conducted on blue-light hazard and other blue-light-related health issues, much remains unknown about the health implications of the chronic exposure to LED light at levels encountered in daily life. However, based on a host of current international standards, such as CIE S 009-2002: Photobiological Safety of Lamps and Lamp Systems and ANSI/IES RP-27: Recommended Practice for Photobiological Safety for Lamps and Lamp Systems, the DOE has found no risk of blue-light hazard in LEDs or any other source used in general lighting applications.

All of this is not to say that the brightness of LED lighting and its blue content pose no harm to certain segments of the population, such as infants who might not avert their eyes frequently enough from light sources, and people with AMD and other eye disorders.

For the general population, Walerczyk says, "it is important to have sufficient 460 to 490 nanometers—which some people just call 480 nanometers—of light most of the day." The best way to check an LED light source's blue emission, SPD, and light output, he says, is to invest in a spectrometer and "skip CCT and CRI." •

ABOUT THE AUTHOR

Alice Liao

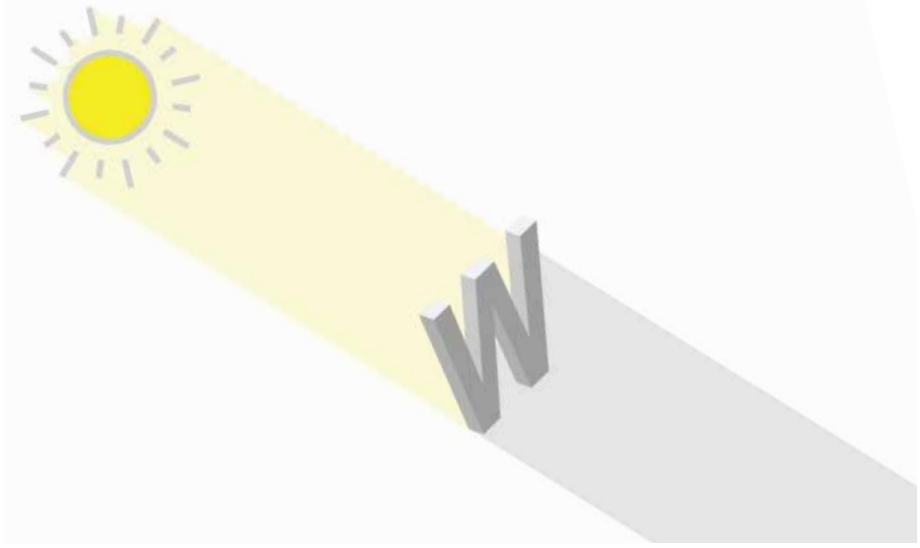
An independent writer and editor, Alice Liao has covered the building and design industry for more than 15 years. She is a former editor of Architectural Lighting and Kitchen & Bath Business. Her articles have appeared in several publications, including EcoStructure, SNAP, and Hamptons.

Daylighting in an LED World

How has the implementation of project daylighting strategies fared with the increasing ubiquity of solid-state lighting?

No building strategy intertwines the disciplines of architecture and lighting as daylighting design does. Drawing on core principles of siting, solar orientation, and environmental awareness, daylighting gives basic form to architecture through illumination. "Daylight is the primary source for architecture," says Hayden McKay, AIA, a New York–based principal at HLB Lighting Design and leader of the firm's daylighting and sustainable design studio. "It has been over time and it still remains the first thing that should be considered in creating architectural forms and fenestration orientation."

However, underlying any discussion of daylighting and architecture is the former's ability to reduce a building's energy consumption and improve its overall performance. This benefit emerged in the late 20th century, which saw the emergence of "energy-conscious architecture," a phrase that describes a generation of building projects that incorporated daylighting design as the driver for energy savings and the analytical tools used to measure their performance, says Mark DeKay, an architect and professor at the University of Tennessee, Knoxville's College of Architecture + Design, and co-author of Sun, Wind, and Light: Architectural Design Strategies (John Wiley & Sons, 3rd ed., 2014).



Since that time, energy efficiency and sustainable design have secured their place in the architectural lexicon with the introduction of stringent energy and building codes and marketable sustainable design metrics, such as the ratings of the U.S. Green Building Council's (USGBC's) LEED system.

Critically, changes were also occurring on the lighting front. The switch to LEDs and the phaseout of incandescent sources, as mandated by the Energy Independence and Security Act of 2007, have forever changed the way in which energy performance arguments are made, particularly when specifying whole categories of light sources and associated fixtures. Simply put, lighting's analog-to-digital paradigm shift has upended the industry.

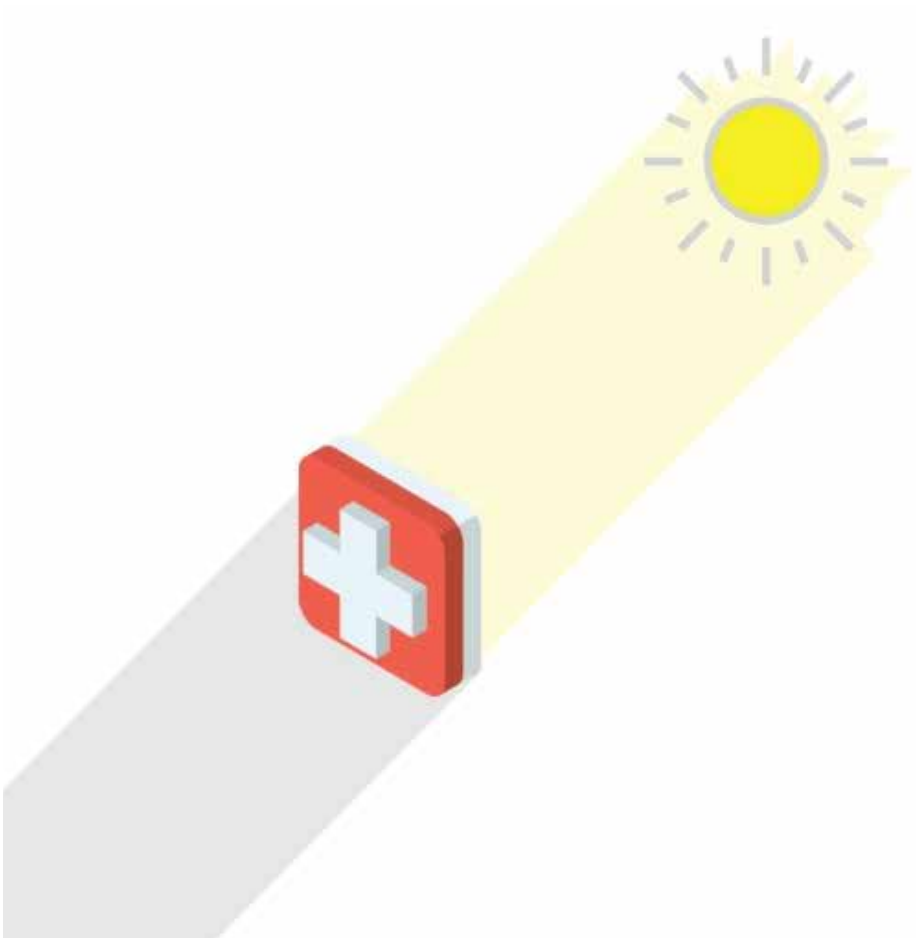
Accordingly, the case for daylighting design must transform to one that elevates its potential benefits not in energy consumption, but rather in occupant health and well-being.

Ending the Energy Argument

LED luminaires are overwhelmingly more efficient than their counterparts that utilize legacy sources such as incandescent, halogen, metal halide, or fluorescent lamps. An LED downlight today can be expected to use between 9W and 24W, while its legacy predecessor could consume between 13W and 50W—essentially double the wattage.

Multiply the savings of switching a single fixture to LED by all the luminaires on a project—and tack on the fact that designers must comply with some of the strictest building, energy, and lighting codes, such as California's Title 24—and the result is high-performance, energy-conscious lighting design. "Because LEDs are so efficient, there's very little energy to be saved with electric lighting and daylight harvesting controls," McKay explains.

Gregg Ander, FAIA, former chief architect of Southern California Edison and the author of Daylighting Performance and Design (John Wiley & Sons, 2nd ed., 2003), concurs: "The energy densities are much less now—below 0.5W a square foot in many cases as opposed to 3W a square foot as in previous decades." With states such as California, Massachusetts, Texas, Minnesota, and Hawaii leading the way on what he calls the "decarbonizing" of their economies, "you have this massive transformational market shift going on driven by executive orders, legislation, regulation, codes, and a whole bunch of things that's leading to a perfect storm."



In this case, the perfect storm is a good thing: increased building efficiency, advanced automation of building controls, and a demand for people who can develop these systems and associated products. But where does this leave the argument for daylighting design?

Elevating Health and Well-Being

As the impact of LEDs and daylighting on increased energy efficiency veers toward self-obsolescence, interest in the lighting mediums' roles in occupant performance is ramping up. Research correlating the presence of daylighting in work and school environments to increased occupant productivity began emerging in the 1980s and 1990s. A number of studies found that better employee performance led to fewer sick days, which then resulted in lower business operating costs. Similarly, studies such as those conducted by architect and lighting specialist Lisa Heschong and her firm, the Heschong Mahone Group (now part of the TRC Companies), found that students with greater exposure to daylight recorded better test results and fewer absences. More recently, the argument for daylighting's ability to influence health has received a boost from advancements in technology. Designers can now adjust or tune electric light to create a specific color temperature range for a designated time of day or activity level in a manner that draws on daylight as the base layer of illumination. When the lighting of a space is calibrated to work with our biological needs and circadian cycle—which, of course, daylighting innately does—the design represents a stronger understanding of how light and architecture can coordinate and how occupants interact with their environment.

This human-centric approach to lighting has emerged as the strongest case for incorporating daylighting design strategies in buildings today and in the future. The ability to integrate color-tunable fixtures into a daylighting strategy also addresses concerns about sacrifices to the quality of light that had emerged in the wake of the incandescent phaseout, when building codes pushed lighting power densities to

near zero levels, and a crop of spaces with an overall poor quality of illumination emerged. Daylighting projects today "have to make the case on lighting quality and experience," says Matt Franks, associate principal and senior lighting consultant in the New York office of Arup.

The global firm has installed a full circadian-light system in its Boston office that emulates the sun's changing hues from dawn to dusk. The electric lighting follows a color temperature curve from 3000K (warm) to 5000K (cool) and then back to 3000K over the course of the workday.

The system adjusts over the year to correspond to longer daylight hours in the spring and the summer. Arup is working on similar systems in its Chicago and San Francisco locations, and exploring a system for its Seattle office, says New York–based principal Brian Stacy, who also leads the firm's lighting group in North America. "Some are full circadian systems, some are tunable systems; we're playing around with what that means because there is a distinction."

Most tunable systems focus on color temperature without factoring in illuminance and glare metrics, he notes. "The key is to meet target illuminance (brightness) levels at the work surface and vertically at the eye."And similar to how energy performance attracted more public attention with programs like the USGBC's LEED rating system, circadian lighting is getting help from the WELL Building Standard, which offers guidelines and metrics for creating healthy living and working environments. "LEED is focused on buildings," says Matthew Tanteri, associate principal and daylighting practice leader in HLB's office in Austin, Texas. "WELL has its focus on the body and the person: It's human-centric."

"LEED is focused on buildings. WELL has its focus on the body and the person: It's human-centric." - Matthew Tanteri, associate principal and daylighting practice leader, HLB Lighting Design

New - and Old - Obstacles

While daylighting might find new relevance in a light and health context rather than as a means for energy savings, its place in architectural design remains uncertain. One longstanding question is where this field sits in the realm of architecture and lighting. Practitioners remain firmly rooted in either the architecture or the lighting camp and few events, if any, work to foster interdisciplinary communication.

Also out of reach is agreement on universal performance metrics and technical vocabulary, even among daylighting practitioners themselves. In his 2008 Architectural Lighting article "Daylight Dialect," Kevin Van Den Wymelenberg, Assoc. AIA, director of the Institute for Health in the Built Environment at University of Oregon's College of Design, wryly noted this lack of consensus: "Most designers working in the medium of daylight are a bit cloudy when it comes to explaining just what is meant by describing a building or a space as daylit. Or is the correct term 'daylighted?' "

The regulation bodies are not particularly helpful. Updates to the various technical documents to reflect advancements in solid-state lighting or empirical findings between daylighting and occupant health have not occurred with great frequency. It was not until 2013 that the Illuminating Engineering Society (IES) published Lighting Measurement (LM) 83-12, Approved Method: IES Spatial Daylight Autonomy (sDA) and Annual Sunlight Exposure (ASE), the first IES-adopted, evidence-based annual daylighting performance metric in the lighting industry.

Then there is the ongoing issue of limited funding for lighting research. In the United States, the Department of Energy and its network of national laboratories have served as key partners for a wide variety of research and development initiatives in areas such as fenestration, glazing, and building systems. Cutbacks and reductions in funding - and even threats to do so - not only jeopardize the future of this work, but also the ability of scientists, researchers, and academics working in these areas to continue these public–private sector partnerships, which provide a direct route to the marketplace for new products and materials. And, like many industries, daylighting is facing a generational shift in workforce. Many of the practitioners and researchers who developed the canon of studies from the 1980s through the early 2000s have recently retired or will do so in the next few years. While a new generation of lighting designers is stepping into these positions, the ranks are nevertheless smaller, and a cohort of knowledge and experience is further removed from projects of today and tomorrow.

"I always believe in designing daylight first. It is the direct process of any lighting design." —Florence Lam, fellow and global lighting design leader, Arup

Finally, the new technical capabilities that LEDs offer in lighting controls and the modulation of natural and electric light raise potential ethical questions. Essential to any daylighting strategy has been the connection to view. "I always believe in designing daylight first," says Florence Lam, a London-based Arup fellow and the company's global lighting design leader. "It is the direct process of any lighting design. Daylight should come first as the base layer to get [light] right, to get the right view and sequential experience. Then, after that, it's about applying the electric light overlay.

"But when new control platforms, through LEDs, offer the ability to not only complement variations in daylight, but also to mimic them devoid of real-time settings, the question arises: When the simulation of daylight crosses a perceptual boundary, what in our understanding and experience of light and space are we at risk of losing?

Liz West's Latest Installation "Colour Transfer" Opens in London

The installation is the artist's latest exploration of color and light.

British artist Liz West, a graduate of the Glasgow School of Art, once again explores the interplay of light, color, and reflection in her latest artwork, "Colour Transfer." The site specific sculpture, which just opened in June, is West's first permanent piece in London, located at Paddington Central underneath the station's Westway Bridge. The artwork was commissioned by British Land and curated by Rosie Glenn for Paddington Central, London and is on permanent display.

The artwork uses a sequence of angled, colored mirrors installed on a steel, aluminum, and PVC structure that vertically span the underside of the bridge's brickwork and "create an optically vibrant and kaleidoscopic installation." The prismatic shapes and their color change depending on where the viewer is standing. Overall, the mirrors are organized "in a spectral arrangement running from dark red to pale pink when entering the underpass from the left and the opposite when entering from the right."

In all her work, “West aims to encourage a new way of seeing.” She notes that “Color and light together help illuminate, therefore increase and heighten people’s individual visual perception and wellbeing.” Exploring light and color and its reflective qualities depending on the materials employed, West’s goal is to create new environments that enable people to interact with space and draw their attention to “…elements of the architecture that they might not have noticed previously.” By playing with and adjusting color, she is able to “…bring out the intensity and composition of her spatial arrangements.

Artist Liz West explores light, color, and reflection in her new installation “Our Colour Reflection.”

The piece is on view at Kraftwerk Berlin through Sept. 24 as part of the group show “Perspective Playground.”

Liz West's latest work, “Our Colour Reflection,” explores the interplay between light, color, and reflection using colored acrylic mirrors in different sizes.

For her latest work, “Our Colour Reflection,” Manchester, England–based artist Liz West continues her examination of the interplay between light, color, and reflection. The piece, on view at Kraftwerk Berlin, an event space housed in a former 1960s East Berlin power station, is part of a group show titled “Perspective Playground,” sponsored by camera manufacturer Olympus, and on view through Sept. 24.

The artwork is comprised of more than 765 colored acrylic mirrors in four different diameters—30 centimeters, 40 centimeters, 50 centimeters, and 60 centimeters. The mirrors, which use a palette of 15 colors, are set at different heights from the floor to create a carpet-like kaleidoscope effect through the main hall. The artist relies on the space’s existing lighting—electric and natural—to illuminate the artwork, allowing for a dynamic color interplay and ensuring a different visitor experience each time.

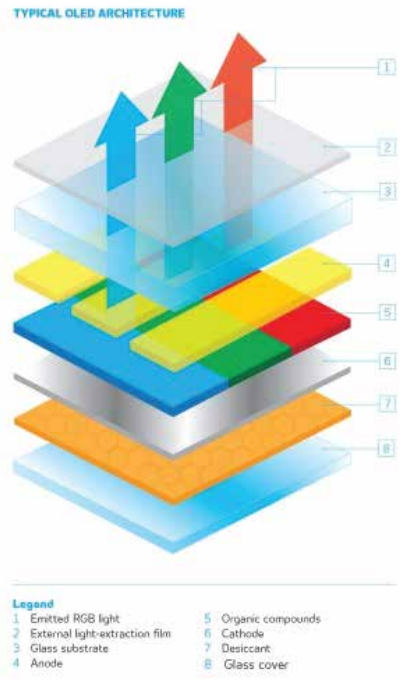
Architectural Lighting: OLEDs in the Spotlight

Recent advances in organic light-emitting diodes accompanied by successful field-testing have brought the technology closer to more mainstream use by architects in the built environment.

LEDs and OLEDs are often grouped together in industry discussions, but while the former has taken ahold of - and transformed—the lighting sector, the latter has followed a more gradual trajectory of development and adoption. Performance, life span, and cost have set the two lighting sources apart, but recent advances in OLED panel technology accompanied by successful field-testing have narrowed the gap.

The Basics

OLEDs, or organic light-emitting diodes, share a portion of their name with LEDs but that is where the similarities end. LEDs use two electrodes—a cathode and an anode—to produce and emit light and can be configured in linear or circular arrays as a component directly within the luminaire assembly. OLEDs sandwich organic compounds between the cathode and anode, which are then applied to a substrate that typically is rigid, such as glass. In recent years, OLED manufacturers have explored other substrates such as plastic, which enable flexible and curved OLED panels, as well as larger panel sizes and shapes beyond the conventional 2-inch-square or 4-inch-square format.



Perhaps the most important distinction between LEDs and OLEDs is the type of light they produce. LEDs are direct point sources that offer tight and focused beam control. OLEDs, in contrast, are a thin,

planar, diffuse, and glare-free source, and are well suited for ambient lighting or backlighting applications such as signage.

One factor that affects industry adoption of any light source is its performance and, more specifically, its efficacy, or how many lumens are output for every watt a source consumes. As of the U.S. Department of Energy's (DOE) October 2016 OLED Stakeholder Meeting Report, the efficacy of OLED panels ranged from 40 to 50 lumens per watt (lm/W), compared to the measured 98 lm/W of commercial LED luminaires in product testing for the DOE's now-defunct LED Lighting Facts database. Today, OLED panels can output 85 lm/W.

With these technical advancements come an unprecedented opportunity to challenge conventional luminaire form factors. Still, the lighting industry's mindset remains a lingering challenge. Because the performance of first- and second-generation OLED panels could not compete with that of LEDs, designers considered OLEDs more suited for specialty installations and one-off decorative designs. One of the first OLED-only light fixtures was Ingo Maurer's Early Future task lamp, which featured 10 5.2-inch by 1.3-inch OLED panels on a glass substrate.

Designed in 2008 and manufactured by Osram Opto Semiconductors, the Early Future task lamp was mostly an experimental exercise, as the cost of OLED panels at the time were prohibitively expensive. "The design community has a preconceived idea of what OLED is about and what it can do," says Jeannine Wang, the San Francisco–based director of design partnership for Acuity Brands Lighting's Custom Architectural Lighting Solutions (CALS) group, which is tasked with developing OLED luminaires for the commercial marketplace.

Advancing OLEDs

OLED panel manufacturers are not alone in driving the technology's adoption. Luminaire manufacturers have a vested interest, motivated by the source's quality of light and potential for new form factors and applications. OLEDWorks is another company, along with Acuity, that is seeking to advance the technology and educate lighting professionals about OLEDs.

OLED Gateway program installation at DeJoy, Knauf & Blood office, in Rochester, N.Y.

Headquartered in Rochester, N.Y., OLEDWorks is the only OLED panel manufacturer based in the United States. The company acquired Philips' Lumiblade OLED technology platform and business unit in 2015 and maintains offices in Aachen, Germany, where the Lumiblade technology originated. OLEDWorks has developed three generations of OLED panels, all with increasingly greater efficacies and life spans, which in turn have helped to reduce OLEDs' overall cost.

The latest generation, Brite 3, released earlier this year, introduces a round shape to the existing square and rectangular OLED panels, in direct response to specifiers' request. The round OLED can deliver up to 200 lumens and 75 lm/W, acceptable for functional lighting applications, while the square and rectangular panels can deliver up to 300 lumens and 85 lm/W. All panel shapes offer two color temperatures—3000K (warm-white) and 4000K (neutral-white)—and a color rendering index of 90-plus.

OLEDWorks' customers "love the light quality" of its latest OLED family, says Gina Phelan, the company's director of business development. Coupled with the higher efficacy and life span approaching 100,000 hours, it makes OLEDs an enticing option for the illumination of architectural spaces, despite their still-higher cost over LEDs.

Also included in the company's Brite 3 family is Curve, one of the first bendable OLED panels to hit the commercial market. (LG Display also makes a bendable OLED panel.) Produced on 0.1-millimeter-thick Corning Willow glass, Curve's thickness totals approximately 0.5 millimeter, making it among the thinnest products available to date.

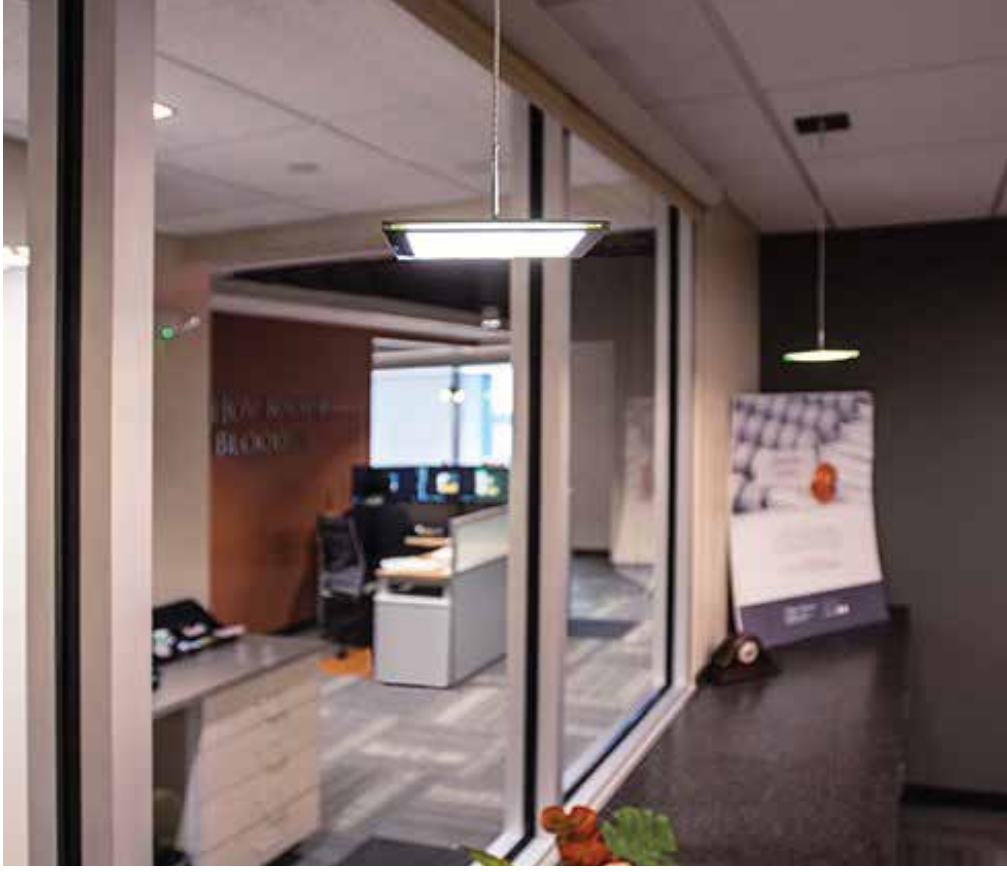
Acuity has also prototyped several OLED luminaires and hybrid OLED–LED luminaires that have now entered the company's brand portfolios. With products that include the ceiling-mounted Revel and Trilia fixtures, the Nomi wall sconce, and the Canvis pendant, Acuity hopes that specifiers will recognize OLED luminaires as market-ready lighting solutions.

OLEDs at Work

Though the latest technical specs are promising in themselves, few things are more convincing to designers than real-world installations. Though some office spaces currently use OLED luminaires, it wasn't until the DOE's 2016–2017 Gateway program installation at the offices of DeJoy, Knauf & Blood (DKB), an accounting firm in Rochester, N.Y., co-founded by OLEDWorks chairman and co-founder David DeJoy, did the lighting industry have an installation with measured performance data and user

DKB office showing the 24- and 56-panel Acuity Brands Winona Trilia configurations installed in the foreground and brackground, respectively.

Visa Lighting Petal pendant



Birot Zhen single-panel OLED pendant installed at the DKB office

feedback that could serve as a reference for evaluation.

The overall project is notable for a few reasons. First, it incorporates several OLED fixture types—tasklighting and decorative accents—throughout the office, including several from Acuity Brands, to complement the workplace's primary fixtures (LEDs) and natural light. Second, the OLED luminaires were installed at "visually prominent" locations, including conference rooms and breakrooms so that employees could experience and perform activities under OLED lighting conditions.

The study included fixtures with OLEDWorks' Brite 2 panels and dedicated OLED drivers (both integral and remote) that were connected to zero-to-10V dimmers. According to the accompanying July 2017 Gateway report, none of the OLED panels or drivers failed during the nine-month test, nor did any of the panels exhibit flicker exceeding what's allowable by IEEE (the Institute of Electrical and Electronics Engineers). The study also found that all of the OLED fixtures delivered between 21 lm/W and 58 lm/W, and that luminance levels (the amount of light provided) was measured as high as 9,318 candelas per square meter and as low as 3,000 candelas per square meter when employees dimmed the fixtures. Those readings are significant because they demonstrated that the OLED fixtures provided a sufficient and comfortable amount of light to perform work without any visual discomfort.

Overall, DKB employee feedback was positive with workers noting that the OLED fixtures provided a "soft, minimal shadow lighting" that made facial expressions easy to see and recognize. They also noted that the additional ambient OLED light helped to increase the overall room brightness and was particularly good for delivering light to vertical surfaces without glare. And, finally, participants lauded the ability and ease by which they could dim the panels. To ensure that the ongoing study remains up to date, some of the hybrid LED/OLED fixtures first installed were replaced with newer OLED products introduced in 2017. With such positive performance data from the second generation of panels, the numbers only stand to improve with the third generation as well as future generations.

Expanding OLEDs' Design Potential

This past spring, Brooklyn, N.Y.–based studio Rich Brilliant Willing (RBW) used OLEDWorks' panels for its "Light Inflection" installation at the company's SoHo showroom. As the first foray into OLEDs for the design studio, which had until that time focused on LED fixtures, the project explored the technology's sculptural and functional potential, including five different lighting concepts and oversized sconces and pendants in S-curves and arcs of up to 12 feet long.

Because RBW wanted to emphasize "the extreme flexibility and the evenness" of OLED light, says founding partner and director of development Theo Richardson, the designers used "similarly slim, flexible components: long swaths of 1/8-inch-thick aluminum and 3D knit fabrics" in the design of the OLED luminaires. This allowed RBW to "explore simple gestures: light and shadow, flexibility, the bending of material under its own weight, and the

irregularity of fabric stretched across a surface."

As a result, the work offers a design perspective that blends experimentalism with pragmatism and is not limited by the traditional processes of luminaire design. "The success of our design practice stems from embracing and adopting technological advancements, pushing the boundaries of our services and product offering," Richardson concludes.

The Outlook of OLEDs

At press time, the 20th annual OLEDs World Summit was underway in San Francisco. The greatest challenge for the OLED community will be how it charts the technology's course for growth and development beyond the automotive and display-screen markets.

To that end, OLED panel manufacturers are aware of the growing interest in architectural lighting applications. The OLED Coalition, an industry-based organization, was formed in 2013 to provide a forum for sharing technical information and market data. Members include large- and small-scale companies involved in different types of OLED panel production.

In 2009, Barry Young, now the Austin, Texas–based CEO of the OLED Association, predicted at the OLEDs World Summit that the OLED industry might be as large as $900 million by 2015. According to the OLED Association website, "In 2016, OLED displays dominated the high-end of the smartphone market and in total shipped over $15 billion U.S." What percentage of that OLED panel market is dedicated to lighting applications is unclear. OLEDs hold great potential in architectural lighting applications and luminaire design. But if the design community is to acknowledge OLED as a viable, market-ready light-source option, it will require more lighting manufacturers to get on board. "We need all manufacturers to embrace this [technology] and get behind it so it gives confidence to the specifications market," says Ron Schimmelpfenning, vice president of Acuity's CALS group. "Designers need to see that this is real and that there are options."

So long as OLED panel development continues to yield increasing efficacies and, as a result, more accessible price points, then OLED lighting solutions stand a chance to compete with LEDs for certain applications. Most importantly, the lighting community needs to remember that OLEDs are a complementary technology and market to LEDs with an extraordinary ability to redefine lighting quality, form factors, and ultimately how light is integrated into architecture.

ABOUT THE AUTHOR

Elizabeth Donoff

Elizabeth Donoff is Editor-at-Large of Architectural Lighting (AL). She served as Editor-in-Chief from 2006 to 2017. She joined the editorial team in 2003 and is a leading voice in the lighting community speaking at industry events such as Lightfair and the International Association of Lighting Designers Annual Enlighten Conference, and has twice served as a judge for the Illuminating Engineering Society New York City Section's (IESNYC) Lumen Award program. In 2009, she received the Brilliance Award from the IESNYC for dedicated service and contribution to the New York City lighting community.

Over the past 11 years, under her editorial direction, Architectural Lighting has received a number of prestigious B2B journalism awards. In 2017, Architectural Lighting was a Top Ten Finalist for Magazine of the Year from the American Society of Business Publication Editors' AZBEE Awards. In 2016, Donoff received the Jesse H. Neal Award for her Editor's Comments in the category of Best Commentary/Blog, and in 2015, AL received a Jesse H. Neal Award for Best Media Brand (Overall Editorial Excellence).

Prior to her entry into design journalism, Donoff worked in New York City architectural offices including FXFowle where she was part of the project teams for the Reuters Building at Three Times Square and the New York Times Headquarters. She is a graduate of Bates College in Lewiston, Me., and she earned her Master of Architecture degree from the School of Architecture at Washington University in St. Louis.

Altitude Trampoline Park - Norway

ÅF Lighting has, in close collaboration with the client, created a lighting design for the Altitude Trampoline Park. The lighting supports the activities of the space, the architecture of the indoor space, and the client's vision of a well-planned and playful leisure and sports destination. Lighting can be seen as the main driver in creating a magical atmosphere in an otherwise ordinary, industrial structure.

The space consists of an area of 14,000sqm filled with trampolines, a foam pit, a climbing wall, dedicated birthday rooms and other entertainment facilities for families or groups of happy and energetic visitors. It is not only the biggest trampoline park in Norway, but also where lighting is an integral part of the fun.

The lighting concept for Altitude is all about letting the light play and adapt to the activities that occur in the space. Dynamic light transforms the ambience of the room as it reflects off the ceiling.

Bespoke boxes conceal uplights with RGB light, and a powerful, focused, high quality downlight luminaire. Balancing the output of the two sources enables widely different lighting scenes ranging from a dramatic, high contrast look, to a subtle colourwash that waves across the ceiling. The lighting fixtures at the entrance and café area follow the same design language of the boxes to create a holistic look.

The trampoline park also contains several rooms dedicated to birthday celebrations. The lighting in these rooms consists of groups of textile wires in sparkling colours with an E27 base, to suit and reflect the colourful design of Altitude Trampoline Park.

A domed ceiling signifies the centre of the trampoline park. The area underneath the dome is for special events. Moving heads, normally used for theatre lighting, are used to illuminate the space, project the logo of the park or create a spectacle of the big disco ball suspended underneath the dome.

All functional lighting has a CCT of 3000K, and by lighting the ceiling and elements on the walls with coloured light, ÅF Lighting ensured that the place comes to life. By using high light levels combined with directional light in the activity zone, a scenographic vibe is created. This gives a sensation of "being on a stage" when bouncing on the trampolines.

All solutions are carefully planned to meet technical requirements and light levels in compliance with lighting recommendations. A high quality lighting control system is in place that uses both DALI and DMX-protocols. ÅF Lighting did the programming of the lighting system together with the client. But since the software is with a simple interface, the lighting installation is programmable by the management if wanted for special occasions.

LIGHTING DESIGN
AF Lighting, Norway

INTERIOR DESIGN
Tegn_3, Norway

PHOTOGRAPHY
Tomasz Majewski

CITATION FOR ART INSTALLATION

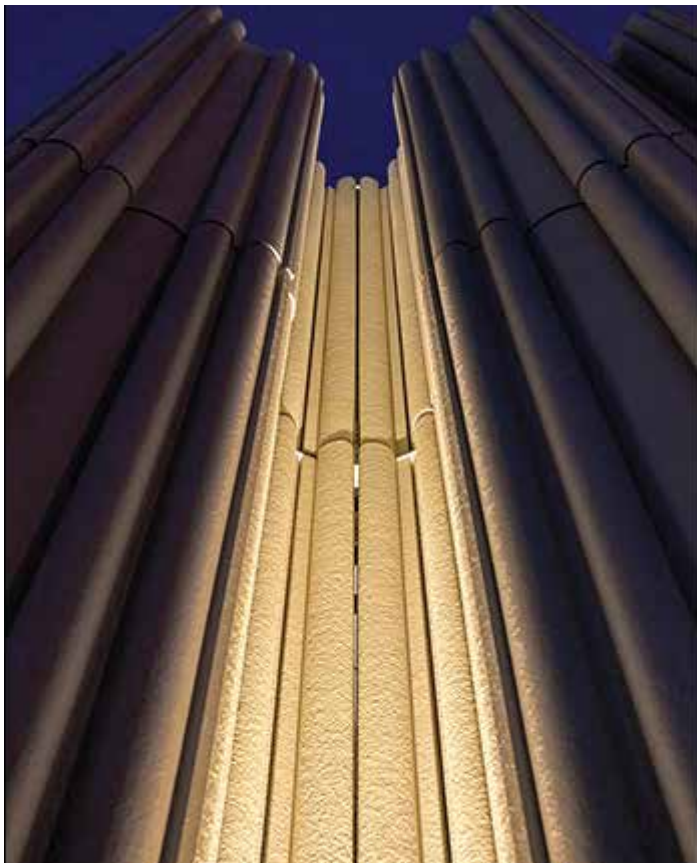
Wave / Cave, Milan, Italy

PHT Lighting Design

Peiheng Tsai
Mariana Basilio Verdeja

"Wave/Cave: The wave that opens up to the sky. The cave that can only be inhabited in our minds."

- Peiheng Tsai



ARCHITECT
SHoP Architects
Christopher Sharples
William Sharples
Sameer Kumar
Andrea Vittadini

CONSTRUCTION MANAGEMENT & INSTALLATION
Metalsigma Tunesi s.p.a.
Adriano Capuozzo,
Technical Director

STRUCTURAL ENGINEERING
Arup
Daniela Azzaro, Associate

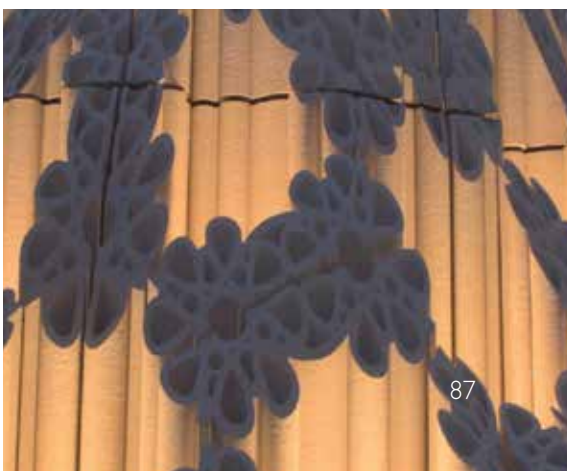
OWNER
Interni/Gruppo Mondadori
Michelangelo Giombini,
Special Projects Architect

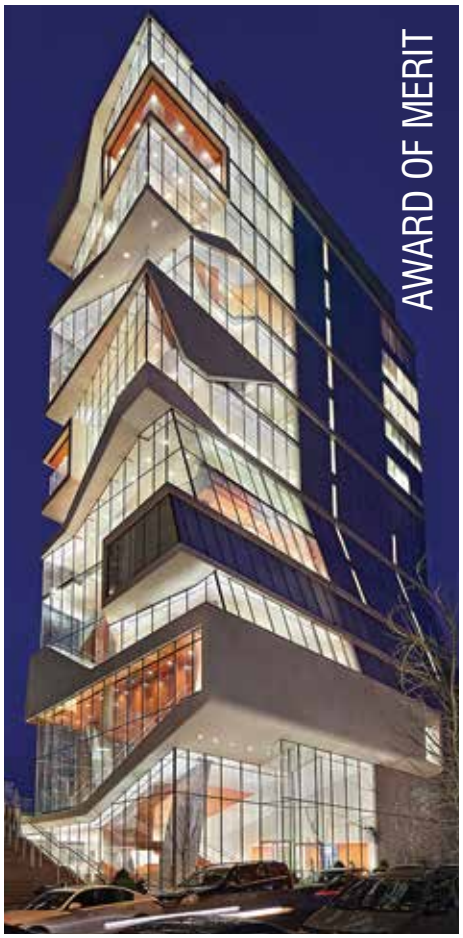
PHOTOGRAPHY
Peiheng Tsai

SHoP Architects developed this 60 ton outdoor sculpture, fabricated from custom terracotta blocks, for the 2017 Milan Design Week. Designing the terracotta modules, negotiating an ideal location within the exhibition ground, and developing a viable assembly process while maintaining structural integrity challenged the design, fabrication, and installation teams. The sculpture's final configuration was concluded just 3 months before installation began, leaving a compressed 8 week timeline for lighting design. Lack of information on the surrounding ambient light level – due to concurrent artwork installations – presented additional demands on an already-constrained timeline.

Lighting was strategically focused on the sculpture's central structure, allowing the perimeter "walls" to act as both filter, blocking the surrounding incidental light, and reflector, dispersing the core lighting. A single, low-wattage spotlight fixture type was used on the entire project, streamlining the tight production and installation process.

As night fell, light emanated from the core and reflected outward, revealing the intricate patterns of the terracotta blocks. Narrow-beam, 2700K LED uplighting enhanced the richness of the clay-based material, then softly dispersed within the groupings. The glowing center invited passersby to pause, reflect, and slow the hectic pace of our contemporary life – just for a moment.

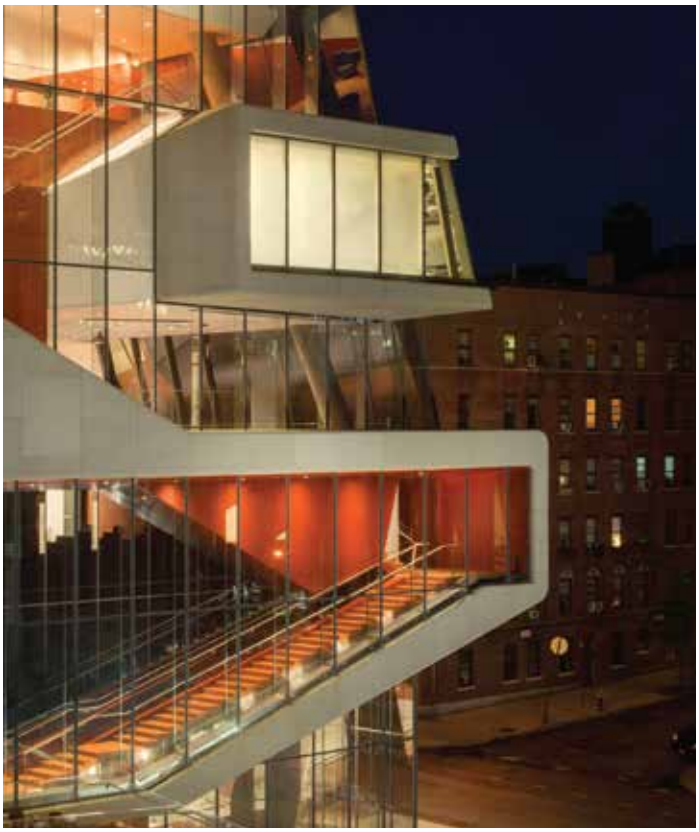




The Roy and Diana Vagelos Education Center New York, NY

Tillotson Design Associates

Suzan Tillotson
Erin Dreyfous
Scott Baillie-Hinojosa
Christopher Cheap



The discreet architectural lighting design for this medical research and teaching facility emphasizes the vertical reorganization of typical learning spaces. Reflecting the client's goal of a holistic learning environment that inspires collaboration, interior lighting highlights the wrapping wood and white plaster surfaces that connect the cascading spaces on the south side of the building – without creating trespass glare in a primarily residential neighborhood.

The sloped entry soffit is uplit from exterior in-grade accent lights, drawing visitors in and up through the public study spaces, classrooms, lounges, and outdoor terraces. Custom in-grade fixtures with five individual 3W gimbal heads highlight the wood lining as it transitions into ceilings, walls, stairs, and floors. The fixtures are integrated into a service band along the glass façade, adding a soft uplight to further emphasize the cascading spaces.

Interior circulation zones are illuminated by spill light from a series of stacked rooms with a translucent frit on the dividing walls, creating a glowing central core. Small-aperture accents provide task lighting for the group study spaces, while daylight sensors automatically adjust sun shades and light levels.

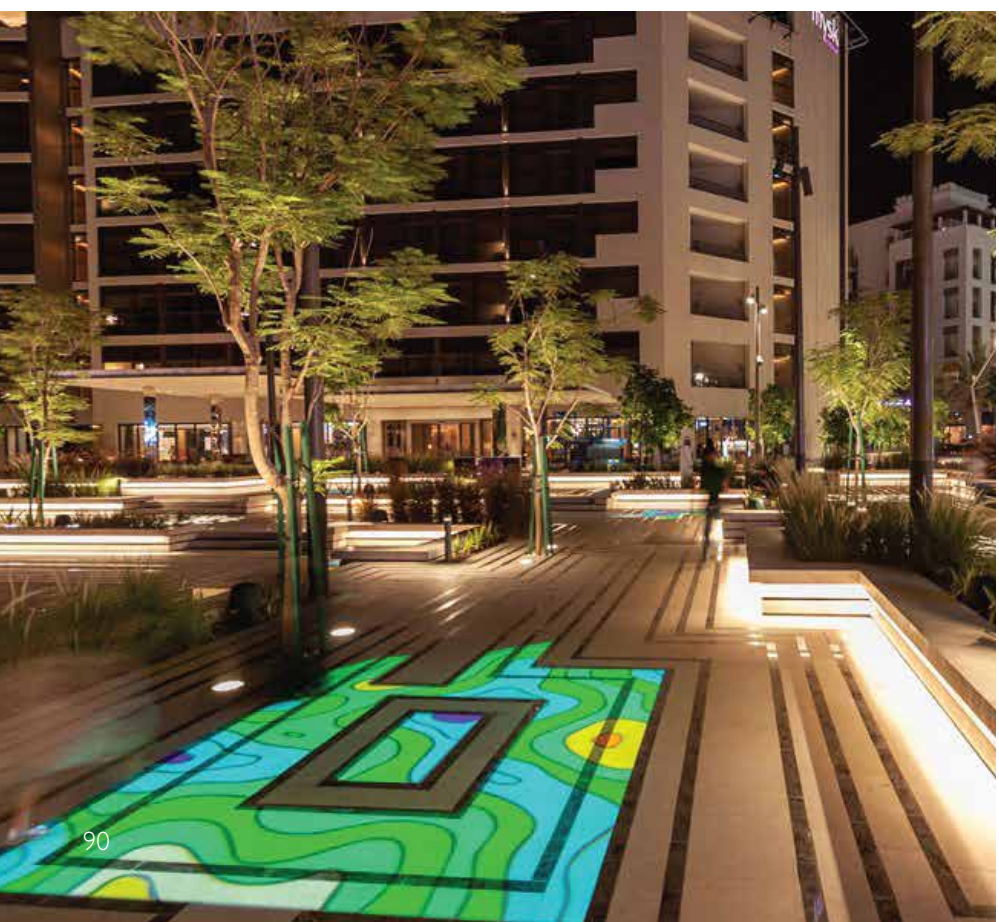
Enhancing the architect's dramatic gestures of floating balconies and sloping surfaces, the unobtrusive lighting approach conveys openness and connectivity.

ARCHITECT
Diller Scofidio + Renfro
Elizabeth Diller
Anthony Saby
Chris Hillyard
Barak Pliskin

Gensler
Madeline Burke-Vigeland
Kristian Gregerson
Joanne Fernando

PHOTOGRAPHY
John Muggenborg
Iwan Baan Photography
Nic Lehoux Photographie

Oman's New Lifestyle and Social Destination



Marsa Plaza, Oman

Marsa Plaza is a newly build public space in Al Mouj Muscat, Oman. The square is located at the end of a central avenue and offers a panoramic view over the marina and it serves as a corridor for people crossing through the newly developed area. The Plaza has been designed by Acme Architects, who have used elements referring to traditional Omani geometric floor patterns and architecture as well as to the principle of an amphitheatre. ÅF Lighting have developed a lighting design that supports the architectural design and the ambition of building an inviting public space by creating a light setting with extraordinarily high visual comfort and reference to being in an oasis at night time.

The lighting design consist of four different layers:

The layer of functional lighting aims at creating a place where people generally feel comfortable, safe and find it easy to move around and orientate themselves. The

functional lighting consists of pole mounted projectors, pointed at the ground floor at the walk-lines around the heart of the Plaza. To support the movement across the Plaza in a more meandering manner, and to create a more intimate atmosphere, bollards are used in the middle part of the square alongside the small plant beds. This way the greenery is also accentuated.

The architectural layer aims at enhancing the characteristic features in the design and at creating a balanced composition between the different vertical elements. The architectural lighting consists of projectors mounted in the canopy structures around the edges of the Plaza. The canopy structures offer shade in daytime and their tectonic inspired structure, with reference to traditional Omani Architecture, are an important visual feature of the square.

The layer of social lighting aims at creating an inviting and more intimate atmosphere, where people will find it comfortable and natural to take a seat. Integrated bench lighting at the Plaza creates a light setting without glare, and in-ground luminaires around the trees enhances the organic roof over many of the benches adding to the feeling of being in a smaller intimate space at the square.

Finally, the layer of scenographic lighting aims at giving people something to look at and enjoy during their stay at the square. It also aims at creating an atmosphere and identity with connection to the middle eastern terrain. This is done by using static gobo - projections projecting a pattern onto the pavement. The pattern resembles small pools of water contour lines intersected precisely between the lines in the pavement. In addition, gobo - projections mimicking light falling through foliage, enhances the greenery. Small light dots in the pavement lead the way into the Plaza from the avenue and they demarcate the actual waterfront. It has been important to have a good representation of colours and warm colour temperature, which accentuates the sand-coloured surfaces. Together, these design elements create the feeling of being in an oasis.

The lighting of the fountain and the screens at the square have not been a part of ÅF Lighting's project.

PROJECT
Marsa Plaza

LOCATION
Al Mouj Muscat, Sultanate of Oman

LIGHTING DESIGN
ÅF Lighting, Sweden

CLIENT
Al Mouj Muscat

ARCHITECT
Acme Architects, UK

MAIN LIGHTING SUPPLIERS
iGuzzini, Erco, Philips, Osram, Insta, Concept

ARTIST
Tsao & McKown, New York

LIGHTING DESIGNER
Unolai Lighting Design & Associates, Shanghai City, Shanghai

INTERIOR DESIGN
Neri & Hu Design and Research Office, Shanghai

PHOTOGRAPHERS
Pedro Pegenaute

Sangha by Octave, Suzhou, China

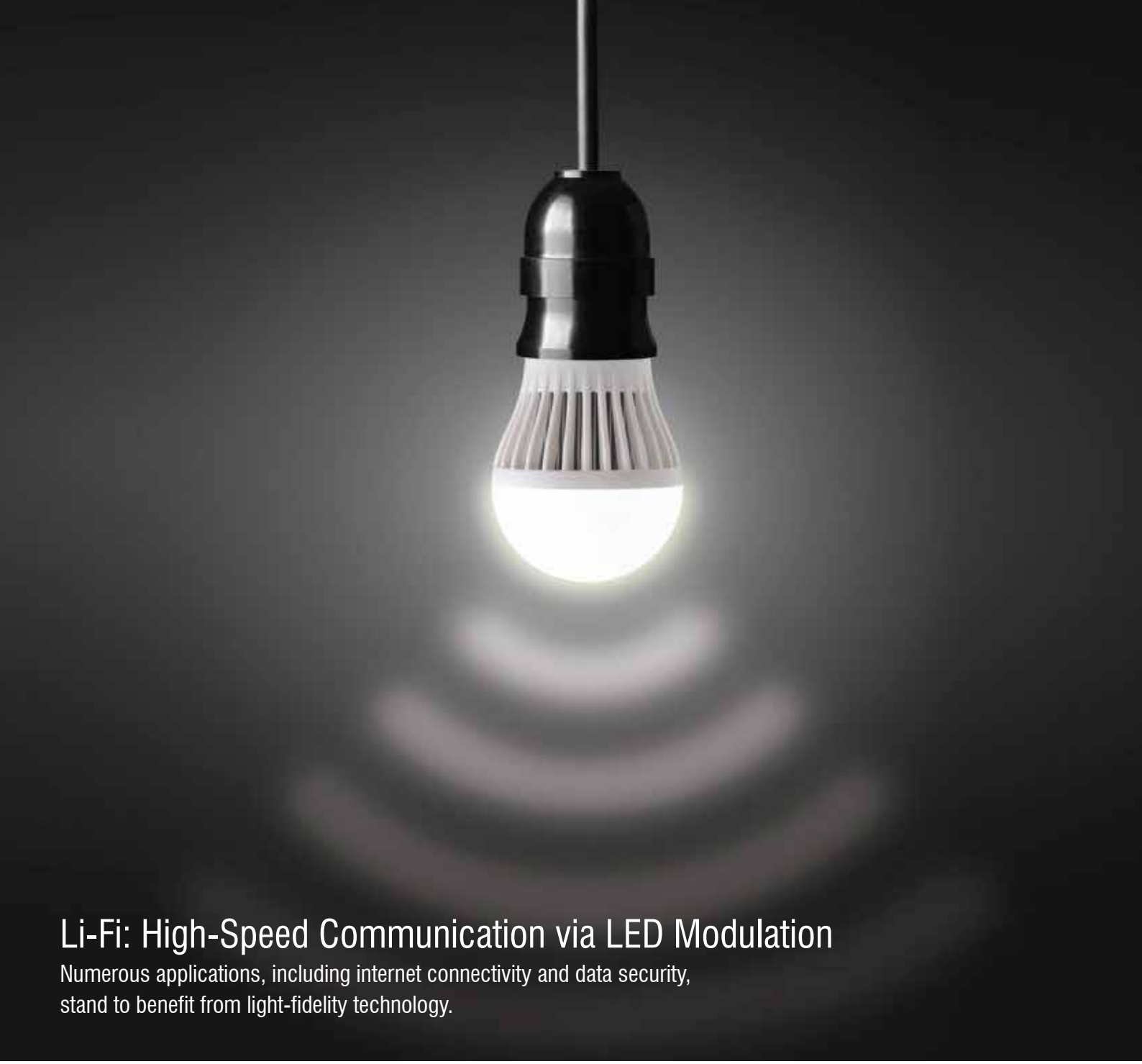
UnoLai Lighting Design & Associates

Uno Lai, Jenna Liu, Jerry Han

The Sangha Resort, on Yangcheng Lake in Suzhou, China, features a series of hotels, villas, and spa facilities that are surrounded by outdoor spaces meant to create a holistic and natural environment for guests who are seeking a retreat-like experience away from Shanghai. To illuminate the vast scale of the complex and diversity of its architecture and interiors (a dozen firms were involved with the project), UnoLai Lighting Design & Associates approached the project as an opportunity to create a lighting master plan. This way, the lighting serves as the unifying element, while still allowing for individual designer expression.

Lighting calculations and site studies determined appropriate light levels across the site taking into consideration time of day as well as seasonality. Illumination is treated as a textural element–dot, lines, and glowing surfaces–to respond to the surroundings. To eliminate any visual disruption, the lighting team prohibited the use of pole lights and instead opted for bollards and in-ground fixtures to illuminate pathways.

The Chapel serves as the physical and spiritual center of the resort. Situated among native grasses and trees, it resembles a “light box” that glows from within due to its illuminated glass curtain-wall. Throughout the resort, lighting serves as the connection point for the architectural elements and the guests as they commune with nature and one another.



Li-Fi: High-Speed Communication via LED Modulation

Numerous applications, including internet connectivity and data security, stand to benefit from light-fidelity technology.

As our nonstop exchange of information fills the electromagnetic spectrum available for Wi-Fi, light fidelity (Li-Fi) is emerging as one solution to pick up the slack. Li-Fi turns LED lamps into internet and broadcast data transmitters, creating a new form of high-speed, optical wireless communication that leverages the visible and infrared (IR) light spectrums.

Harald Haas, a professor of mobile communications at the University of Edinburgh, in Scotland, debuted Li-Fi technology to the public during a 2011 TEDGlobal Talk before co-founding PureLiFi, a company that builds on his university research. The technology has since taken off. In April 2017, the Institute of Electrical and Electronics Engineers (IEEE) even formed a task group to revise 802.15.7-2011: IEEE Standard for Local and Metropolitan Area Networks in part to include Li-Fi.

Li-Fi Fundamentals

To send data, Li-Fi relies on the modulation of light at frequencies that are imperceptible to the human eye in most lighting applications. As semiconductors, LEDs can turn on and off up to a million times per second, enabling the diodes to send data quickly, says Tom Van den bussche, founder of Toric, a lighting-technology company based near Paris.

In a Li-Fi installation, a digital signal processor integrated or attached to an LED driver takes data from a network, server, or the internet and converts it into a digital

signal—basically a sequence of discrete voltage levels. The LED driver in each fixture converts the digital signal into a photonic signal, transmitting it at a very high frequency as an Orthogonal Frequency Division Multiplex (OFDM) signal, says PureLiFi chief operating officer Harald Burchardt. OFDM signals are also employed in 4G LTE and Wi-Fi technologies because they use many small-bandwidth channels collectively rather than a single large-bandwidth channel. The decoder on the receiving device—say, a computer or smartphone—then translates the OFDM signals into data for the user.

PureLiFi currently offers a product that acts as "a Li-Fi access point that replaces a bulb [and] unites the signal processor and driver into a single replacement LED lamp for the room lighting fixture," Burchardt says. Each access point has a unique IP address, allowing the fixtures to talk to each other and to hand over data transmissions seamlessly as, for example, a user walks down a hallway with their device.

Currently, PureLiFi's technology requires each receiving device to have a USB dongle with a photoreceptor to receive the signal and a decoder to convert the data from photonic to electronic, Burchardt says. The dongle also houses an infrared LED to modulate the upload signal for returning data to the luminaires and into the network.

Ideally, the Li-Fi access point, lamp driver, router, and LED system would connect to the internet using either power-line communication (PLC), which sends data over cables also used to power the hardware, or power over Ethernet (PoE), which sends power over Ethernet cables, says Peter Babigian, a partner at New York–based technology consultant Cerami & Associates. Both PLC and PoE aim to reduce costs by providing data and power over the same cable.

Li-Fi's Competitive Advantage

The capabilities of Li-Fi are more advanced than visual light communication (VLC) and Wi-Fi. VLC is a one-way, point-to-point optical communications technology while Li-Fi enables two-way communications over multiple frequencies for mobile and networked connections. While VLC and Li-Fi are both "light communication technologies," Babigian notes, the latter is a hybrid of VLC and IR communications. "The downlink [aspect]—LED to photodetector—is VLC, but the uplink is infrared," he says.

Currently, devices must employ a USB dongle, such as this one by PureLiFi, to receive and decode downlink data, and to modulate an upload signal for sending uplink information via Li-Fi.

Burchardt says that the radio spectrum allotted for wireless communications spans only 300 gigahertz while the visible light spectrum spans 300 terahertz, from red light at 400 terahertz to violet at 700 terahertz. Thus, light has 1,000 times more frequency available for wireless communications than radio—though its full capacity has yet to be realized. "While Li-Fi has the potential to achieve much higher data rates than we can currently achieve using Wi-Fi," Burchardt says, "we haven't seen any commercial systems that are 100 times faster." PureLiFi's product currently reaches upload and download speeds up to 43 megabits per second, he says, though speeds have topped the tens of gigabits per second under controlled settings in the lab.

Unlike Wi-Fi, Li-Fi transmits data to devices via direct and incident light without risk of disrupting sensitive electronics, such as those found in hospitals or on airplanes. And because Li-Fi is directional, requiring a line of sight between the transmitter and the receiving device, it cannot transmit data through walls. "Li-Fi's security concerns will be very few because you have to be physically in the area where the light is to hack it—and then people will notice you," says Toric's Van den bussche.

Li-Fi's directionality also reduces the risk of interference with other devices vying for a connection. "Co-channel interference, a source of noise, and electrosmog (electromagnetic radiation from the simultaneous use of mains electricity and wireless technology), which exist in radio waves, are absent in Li-Fi," Babigian says.

Data density—the broadband capacity and data rates per square meter—is also greater in Li-Fi than Wi-Fi. While people using the same Wi-Fi access point will compete for bandwidth, Li-Fi's limited coverage—it has a range of about 10 meters (33 feet)—and multiple access points per room reduce competition for bandwidth. Keep in mind though that the amount of bandwidth allocated to a business or residence is ultimately determined by its internet service provider (ISP); that is, no matter how quickly a device connects to the internet, the bandwidth from there on out will only be as fast as the ISP offers.

Van den bussche notes one final advantage: The Li-Fi spectrum, unlike Wi-Fi, is entirely free to everyone as no regulatory body owns the light spectrum—and no entity will ever be able to claim it because this is physically impossible. Thus, no license will be required to communicate with it.

Ideal Li-Fi Applications

Li-Fi can be used anywhere that can be outfitted with wireless communications and electric lighting: commercial buildings, retail environments, and smart cities for

in-vehicle data transmission. “As IoT [Internet of Things] and smart applications gain traction, Li-Fi offers the omnipresent wireless connections that these devices and applications need,” Burchardt says.

"As IoT and smart applications gain traction, Li-Fi offers the omnipresent wireless connections that these devices and applications need."

Along with its use in bidirectional internet communications, Li-Fi holds promise in cataloging and entertainment applications. Toric and Luciom, a French VLC company acquired by Philips Lighting in late 2016, refer to these three respective applications as Li-Fi Internet, Li-Fi Tag, and Li-Fi Broadcast categories. Li-Fi Tag uses a router to broadcast the same tag repeatedly, for example, to confirm the specific row and shelf of a product in a store or distribution center, Van den bussche says. The data flows one way from the emitter to the receiver, such as a device used for tracking inventory. Li-Fi Broadcast uses a router to transmit data, videos, music, and shopping coupons one way to consumer devices, such as smartphones.

Li-Fi is also advantageous in indoor navigation and warehousing uses because it can pinpoint the location of a product in three dimensions while RFID only offers dimensions along the horizontal plane. “In applications for the disabled,” Van den bussche says, “you could use Li-Fi to guide the blind not only to where the door is, but to where the handle is.”

The Economics of Li-Fi

Incorporating Li-Fi Tag into a project requires a relatively straightforward modification to the driver of each LED fixture. “You then need to check again whether the fixture is still within its spec,” Van den bussche says. “This is mainly an electromagnetic compatibility check, which the fixture manufacturer would perform.”

The complexity of installation increases with Li-Fi Broadcast since it requires an internet LAN connection—which most commercial businesses have—for each transmitter as well as a dongle for each receiving device.

Li-Fi Internet, at least in the case for PureLiFi’s networked technology, requires the installation of integrated Li-Fi luminaires, or access points, and either PoE or PLC for the backhaul.

Still, the logistics of installing Li-Fi is just one factor. Cost is another. Even as the radio spectrum fills up, Li-Fi will likely complement Wi-Fi but not replace it. “It is not cheap to run Ethernet cables to every Li-Fi module when you can just use Wi-Fi,” says Vitaliy Vinogradov, an internet-industry veteran and the CEO of Modern Place Lighting, an LED fixture manufacturer in West Palm Beach, Fla. Installing PoE LED lighting helps clear a path for Li-Fi because the associated backhaul cost is less when both power and data use the same infrastructure.

However, other Li-Fi components are also expensive. “Li-Fi needs to come down in cost by a factor of 50 to 100 as internal Li-Fi stacks cost $1,000 to $2,000 per transmitting unit,” Van den bussche says. Plus, Li-Fi requires more transmitting units than Wi-Fi. “These need to come down to $100 a piece to be comparable.” Shrinking Li-Fi systems so smartphones and laptops can house internal Li-Fi receivers is an ongoing and expensive R&D effort, he adds, but “costs will come down as usage increases.”

Takeaways for Lighting Designers

Each commercial Li-Fi vendor will package the components of Li-Fi—specifically, the router, lamp driver, and LEDs—differently so lighting designers will need to understand these distinctions and learn how to work with, install, maintain, and use each vendor’s products. When reviewing Li-Fi products to specify, lighting designers should also evaluate performance metrics, including whether the Li-Fi system truly offers bidirectional (downlink and uplink) communication, and its compatibility with other manufacturers’ LEDs.

Operating LED lights below 60 lux will typically cause Li-Fi transmissions to cease; some loss of network speed and transmission range may even begin beforehand. “There are solutions for encoding data into ultra-short light pulses that are imperceptible to humans, increasing the potential for using Li-Fi in darker environments,” Babigian says.

PureLiFi’s integrated LED luminaire serves as a Li-Fi access point and features a router and lamp driver. It is compatible with LEDs from multiple manufacturers.

Solid objects like walls and doors can keep Li-Fi from escaping a room, but within a room, a Li-Fi transmitter's lamp would have to be entirely covered by something that does not allow light to pass in order to cut off the signal completely. "[Designers] have to be concerned about the availability of the light in a room due to concerns over line-of-sight," Van den bussche says. "You can't have things inappropriately reflecting or blocking the light." The exception, of course, is when reflection is desired to increase the availability of the signal.

In the Real World

PureLiFi is currently in trials in Singapore, with the blessing of the city-state's Info-communications Development Media Authority. "Though Li-Fi will eventually need to be available natively on smartphones and computers, people are putting the money into R&D, and it is only a matter of time," Van den bussche says. "The first solutions should come to market in three to five years with more mainstream solutions in five to 10 years."

But as long as the internet connection leading up to the Li-Fi remains slower than Li-Fi itself, Li-Fi won't have a lot of viability. "For example, Cox Communications gives its Pensacola, Fla., customers a 1-gigabit-per-second router even though the fastest internet speed offered to residential customers is 300 megabits per second, which is less than one-third of the router's capabilities," Vinogradov says. "Implementing Li-Fi is like trying to sell a city on a big bridge over a small creek."

In commercial applications, a fiber-wire connection is currently much faster and far more reliable than Li-Fi, Vinogradov notes. Gigabit fiber optic internet currently offers speeds up to 1 gigabit per second. However, if Li-Fi can reach the tens of gigabits per second in real-world applications that researchers have witnessed in the lab, it could become a true game-changer in wireless communications. •

ABOUT THE AUTHOR

David Geer

David Geer is a former internet - service - provider and telecommunications technician who writes about the internet, emerging technology, and a host of other topics for national and international publications.

Illumination Award for Outdoor Lighting Design

FUZHOU STRAIT OLYMPIC SPORTS CENTER, Fuzhou, Fujian, China

The sports center's design is simple and gentle - a nod to the ocean culture of Fuzhou City. The main stadium features conch lines; the gymnasium resembles a dolphin emerging from the sea; and the tennis and swimming center design calls to mind seagulls. All luminaires match the architecture, and scenes can be programmed so the façade represents golden sunlight emerging from the clouds, for example, or a new moon rising from the sea horizon. With its advanced controls, lighting for the four individual stadiums can be coordinated or run separately.

DESIGNERS
Xin Yingjie, Deng Yunshan, Li Yutian,
Xie Yuping – Shanghai Grandar Light Art & Technology Co., Ltd.
PHOTOS
Zhang Jun

Jørpelandsholmen Nature Walk Norway

The island of Jørpelandsholmen, situated just outside of Jørpeland in Strand Municipality, had prior to 2017 only been accessible by boat from the mainland. Historically used as farmland, but now disused, the municipality saw the untapped potential of the island as a recreational area for the residents of Jørpeland and a destination for the 200 000 + tourists visiting the nearby Pulpit Rock every year. A pedestrian bridge connecting the island to the mainland was established and the landscape subtly adjusted to create a stunning 2.1 km nature walk around the island.

Designing lighting for an island that had previously been unlit was a rare opportunity to explore how little light is needed to see and to make the experience of the walk a truly magical experience after dark. Light Bureau developed a design where the artificial light would balance visually against the night sky so that views out across the fjord could be maintained, glare avoided and light levels kept so low that the

night vision of people using the nature walk would remain intact.

Realizing that most standard luminaires have been designed for bright urban environments and would be overpowering in an otherwise dark, natural environment, Light Bureau developed a family of bespoke fixtures suitable for low light areas with a reduced light output and very well shielded light sources. The luminaires had to withstand the harsh salt water environment of the island, frequent rainfall, even grazing sheep maintaining the landscape on the island. Corten steel was the material of choice due to its robust qualities and natural patina that would blend in and be complementary to the natural environment both during day and night time.

A local mechanical workshop located only a 15 minute drive from the island was selected to manufacture the bespoke luminaires. Certified and IP-rated miniature luminaires from Mike Stoane Lighting were used as light sources. The fixtures were designed as a family of four products, each performed a different task: path lighting, illuminating tree canopies, vertical structures and sculptures. The luminaires were designed in a bollard style to keep light sources below eye height in order to avoid glare, but out of the ground to reduce the risk of water ingress.
Observers of different age groups and genders took part in onsite light tests and discussed the perceived brightness of the lighting design. The tests enabled us to use low power and well shielded light sources in all luminaires. The path lighting bollards required no more than 4.2 watts of power and illuminated the path itself, but also to the landscape immediately adjacent to the path for improved legibility. Bollards for uplighting trees and cliff walls were designed to use two adjustable light sources with anti-glare optical accessories each light source required 2 watts of power.

The restrained use of light resulted in a low power consumption. It is estimated that the lighting for the path 2.1 km path uses 575 W in its dimmed state, less than 0.3W per meter.

PROJECT
Jørpelandsholmen Nature Walk

LOCATION
Jørpeland, Norway

LIGHTING DESIGN
Light Bureau, Norway

CLIENT
Strand Municipality

ADDITIONAL DESIGN
Ekrheim Elconsult, Ryfylke Elektriske, Tau Mekaniske, Norway

AWARD OF EXCELLENCE

Bloomberg European Headquarters, London, United Kingdom

Tillotson Design Associates

Suzan Tillotson
Mitul Parekh
Erin Dreyfous
Sara McElroy
Krista Kennedy

" An unexpectedly striking lighting system reinforces a beautiful workplace interior. The integration of lighting into the fabulous ceiling system creates a textural and visually exciting lighting solution that is comfortable and performs well for an office environment."

- Lumen Judges

Bloomberg's new European HQ provides 1.1 million sqft of office space, the most sustainably designed project in the world. The exterior facades give a consistent impression of an interior glow. Indeed, a continuous uplight recessed within the interior base of the windows renders the rich bronze and stone soffits. Vertical ribbed fins, edgelit with LEDs, define the base of the buildings, while louvered accent lights provide sidewalk illumination. Stone soffits are uplit from linear LEDs regressed within the top of a continuous stone plinth.

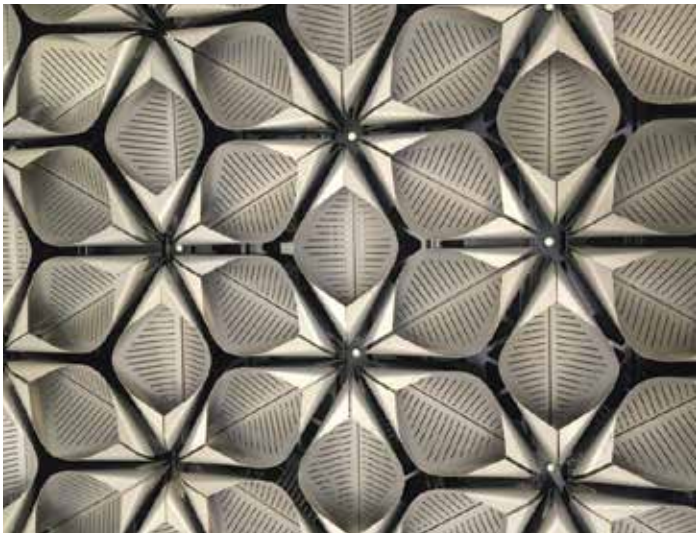
The focal point of the lobby is the "Vortex." Continuous uplighting at the base brings the art piece to life. The spiral stair ascends six floors, with louvered slotlighting at each riser. The custom ceiling system integrates cooling, lighting, and acoustic functions within a 4 inch–deep plane. Developed with and detailed by the architect, 2 million formed-metal "petals" house individual LEDs at the panel intersections. This low-brightness system is dimmed to minimize wattage consumption while still achieving the desired 300 lx on the workplane throughout. Custom pendants add sparkle for dining, and wallwashers illuminate a commissioned felt artwork. The exterior terrace stone soffit is washed by shielded uplighting mounted flush at the perimeter.

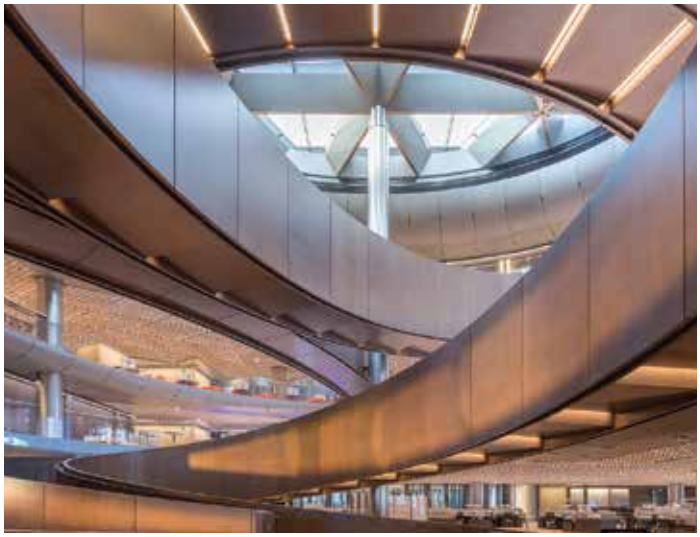
ARCHITECT & INTEGRATED CEILING DESIGN
Foster + Partners
Michael Jones
Kate Murphy
Simona Bencini
Owe Schoof

DEVELOPMENT MANAGER
Stanhope

OWNER
Bloomberg L.P.
Michael Bloomberg

PHOTOGRAPHY
Aaron Hargreaves / Foster + Partners
Nigel Young / Foster + Partners
James Newton / Foster + Partners





Resell + Nicca, Norway

The space had been disused for almost 10 years when architects Resell+Nicca moved into the ground floor corner unit of the 1930's international style building overlooking Kampen Park. Major refurbishment was required to turn the small, then subdivided space, into an inspiring studio that is welcoming to clients, functional as a collaborative space and a positive contribution to the public realm outside. The space was reimagined into an open plan office that included a kitchenette, desks and a meeting space as well as a library and surfaces to display physical models that Resell+Nicca had created.

Light Bureau collaborated closely with the Resell+Nicca on the design and manufacture of tailor-made luminaires that

populate the space, ensuring consistent geometry and materiality across all elements added to the space.

High quality LED products from LED Linear were used as the light source within the bespoke luminaires, providing an excellent quality of light to work from. The luminaire bodies were made from sheets of darkened steel. By folding steel in three different ways, three unique luminaire types with different light distributions were created from the same material, using the same light source:

- Suspended linear uplights provide glare-free light above the desks, extending the natural light outside deeper into the space
- A linear downlight illuminate the kitchen counter with a focused light
- Wall mounted wallwasher create a feature of the architectural models on display for clients visiting the studio and curious passers-by in the park outside.

By using Casambi Bluetooth modules to control the lighting in the space, an intuitive and familiar, yet flexible and powerful controls interface was achieved. Employees are able to control the lighting in the space from their smartphones and tablets and set up automated scenes that are triggered based on presence, calendar events, time of day or sunset/sunrise times. This avoids the need for physical switches and routine based interaction with the lighting, the space is automatically tuned and personalised to the user's preference.

The design makes use of innovative lighting controls solutions and high quality light sources at an overall cost of less than £5 000, luminaires and professional fees included. It is a strong example of how lighting designers can add great value without great cost to a project by curating our designs and only adding light where light is required in a careful and thoughtful manner.

PROJECT
Resell + Nicca

LIGHTING DESIGN
Light Bureau, Norway

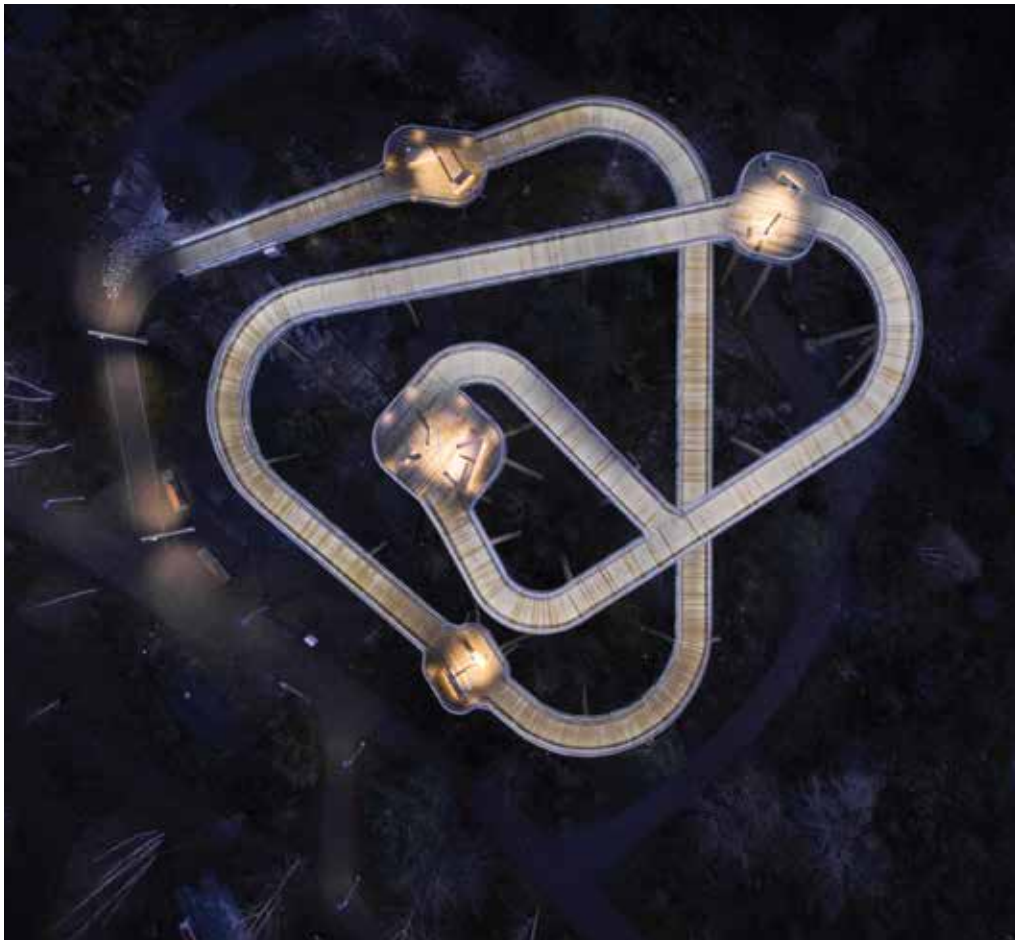
ARCHITECT
Resell + Nicca, Norway

MAIN LIGHTING SUPPLIERS
LED Linear, Casambi

Stovnertarnet - Norway

Stovner Tower is a newly opened scenic tower located in the outskirts of Oslo, Norway.

The district of Stovner and Oslo Municipality, among others, initiated the project with the intention of adding a unique destination in the area to attract visitors from near and far, at all hours. The lighting is designed to create a stunning landmark for Stovner after dark and add an evening and nighttime identity to the area.
The tower is easily accessible on the slopes behind the Øvre Fossum Gård, situated between residential and commercial buildings. The clearing on which the tower is located is part of a listed area containing remnants from the Stone Age.



This unique and eye catching viewpoint is designed by LINK Arkitektur and includes several observation decks with a view of the valley and lookout over the treetops, with the Oslo Fjord in the distance. LINK Arkitektur is well known for their ability to merge modern architecture with natural

landscapes – and Stovner Tower is no exception. Their inspiration for the design of the tower derives from birds' flight between the treetops. Moreover, the tower is universally designed making it accessible regardless of any disability, enabling everyone the opportunity to enjoy the stunning view.

The illumination of the tower is designed to emphasise the architects' aim to create a "walk among the tree tops".

The lighting is integrated into the architecture, with hidden light sources placed beneath eye level and anti-glare equipment, providing a glare-free lighting. The result is an undisturbed viewpoint without light pollution or the risk of unnecessary light projected on to the surrounding areas.

The lighting changes character between the footbridge and viewing platforms, called "nests", from the evenly lit footbridge in neutral white light to the nests in warm white light with varied illumination. The tower is equipped with motion sensors ensuring both reduced energy consumption and a pleasant effect. For instance, the light levels on the footbridge will rise when motion is detected, and lower again as motion drops. The nests are constantly lit in warm light, ensuring that if a visitor stays on the bench for some time, the footbridge dims down, while the surrounding light stays the same. The light levels on the footbridge will rise again as they start moving along.

From the ground, the shape of the footbridge is emphasised through the opaque elongated lines of light that are integrated in the handrails all through the tower. Light fixtures, mounted underneath the footbridge, gently illuminate to the terrain beneath the tower to counter the dark and connect the tower to the ground. Overall, the lighting contributes to a sense of security in the area and facilitates orientation after dark.

This project is part of "the Grorud Valley Project", which is an initiative by the City of Oslo and the Norwegian Government to improve the living conditions in the area through new and interesting urban design and installations.

PROJECT
Stovnertarnet

LOCATION
Oslo, Norway

LIGHTING DESIGN
AF Lighting, Norway

CLIENT
Oslo Kommune - Bymiljøetaten

LANDSCAPE ARCHITECT
LINK Arkitektur, Norway

PHOTOGRAPHY
Tomasz Majewski

MAIN LIGHTING SUPPLIERST
iGuzzini, LED Linear, Fox Design

Meixi Urban Helix, Changsha, China

Located in the southwest section of the Chinese city of Changsha, this new urban axis creates a multi-functional public space for visitors to enjoy the panoramic views of Lake Meixi and the city's planned expansion. The 111.5-foot-tall structure rises above a manmade plateau on the lake and features an exposed ramp that varies in width from 20 feet to 26 feet as it spirals from the base to the top of the structure. An interior ramp provides access back down to the new public plaza.

In order to create a specific nighttime identity for the Helix, the lighting design firm OVI purposely concealed fixtures from view so that the architectural surfaces appear backlit. A concealed linear LED cove uplight illuminates the underside of the ramp creating a continuous ribbon of light that guides visitors. RGBW LED luminaires were selected to distinguish the different ramp surfaces with a subtle color temperature variation. An illuminated handrail provides an additional layer of light to help navigate the ramp. The Helix becomes an arrival and a departure point as light weaves the surrounding natural element of water together with this new urban development.

ARCHITECT
KSP Jürgen Engel Architekten, Frankfurt, Germany

LIGHTING DESIGNER
Office for Visual Interaction (OVI), New York

PHOTOGRAPHERS
Ines Leong

Welcome to new members - isle

Name	Membership No.	Grade	State Centre
Osram Lighting Pvt Ltd	I.0202(L)	Institutional (Life)	Delhi
Amitabha Goswami	F.0912(L)	Fellow (Life)	Calcutta
Pradeep Raswantilal Shah	F.0913(L)	Fellow (Life)	Mumbai
Subhash R. Sethi	F.0914(L)	Fellow (Life)	Delhi
Vijaykumar Annaji Kulkarni	F.0915	Fellow	Mumbai PLC
Vijay Kumar Pandey	F.0916(L)	Fellow (Life)	Delhi
Kalavati Harichand Mohite	M.2103(L)	Member (Life)	Mumbai
Pravin Prabhakar Wadaskar	M.2104 (L)	Member (Life)	Mumbai
Hemal Kumudbhai Shah	M.2105(L)	Member (Life)	Mumbai
Rahul Presh Parekh	M.2106(L)	Member (Life)	Mumbai
Nishit S. Mehrish	M.2107(L)	Member (Life)	Mumbai
Ekta Mishra	M.2108	Member	Mumbai PLC
Rajashree Ramakrishna Bokhare	M.2109	Member	Mumbai PLC
Ganesh Hiraman Patil	M.2110	Member	Mumbai PLC
Rutuja Ankush Warbhe	M.2111	Member	Mumbai PLC
Hemlata Sameer Joshi	M.2112	Member	Mumbai PLC
Rutuja Madhusudan Kulkarni	M.2113	Member	Mumbai PLC
Sunil Vishnu Malkar	M.2114	Member	Mumbai PLC
Yogesh Vijayrao	M.2115	Member	Mumbai PLC
Pankaj Kumar	M.2116	Member	Mumbai PLC
Sonalika Dutta	M.2117(L)	Member (Life)	Calcutta
Ravi Kumar Malik	M.2118	Member	Delhi
Rajinder Kumar Grover	M.2119	Member	Delhi
B. Ramakrishna Rao	M.2120	Member (Life)	Karnataka
Indubhushan Kumar	M.2121	Member	Rajasthan
Prateek Singh	M.2122	Member	Delhi
Shashikant Prasad	A.1376	Associate	Mumbai PLC
Dushyant Arun Patil	A.1377	Associate	Mumbai PLC
Trupti Mangesh Dhanadhya	A.1378	Associate	Mumbai PLC
Nipin K.K.	A.1379	Associate	Mumbai PLC
Ajay Agarwal	A.1380(L)	Associate (Life)	Rajasthan
Sunmanta Kumar Nanda	A.1381	Associate	Rajasthan
Priyanka Gaur	S.2664	Student	Rajasthan
Vishal Bhati	S.2665	Student	Rajasthan
Mohit Rai	S.2666	Student	Rajasthan
Jitendra Prajapati	S.2667	Student	Rajasthan
Ashok Kumar Kharwar	S.2668	Student	Rajasthan
Deepak Kumawat	S.2669	Student	Rajasthan
Kamal Kishor Saini	S.2670	Student	Rajasthan
Deepanjali Beck	S.2671	Student	Rajasthan
Rupesh Verma	S.2672	Student	Rajasthan
Rajesh Kumar	S.2673	Student	Rajasthan
Pallavi Verma	S.2674	Student	Rajasthan
Deepanshu Khandelwal	S.2675	Student	Rajasthan
Tushar Jain	S.2676	Student	Rajasthan
Anshul Achra	S.2677	Student	Rajasthan
Virendra Singh Rathore	S.2678	Student	Rajasthan
Mukesh Sharma	S.2679	Student	Rajasthan
Yogesh Kumar Vaishnav	S.2680	Student	Rajasthan
Hally Ranga	S.2681	Student	Rajasthan
Padmanabhan Sundararajan Iyer	S.2682	Student	Rajasthan
Yogesh Tanwar	S.2683	Student	Rajasthan
Devanshu Lama	S.2684	Student	Rajasthan
Vikash Maurya	S.2685	Student	Rajasthan

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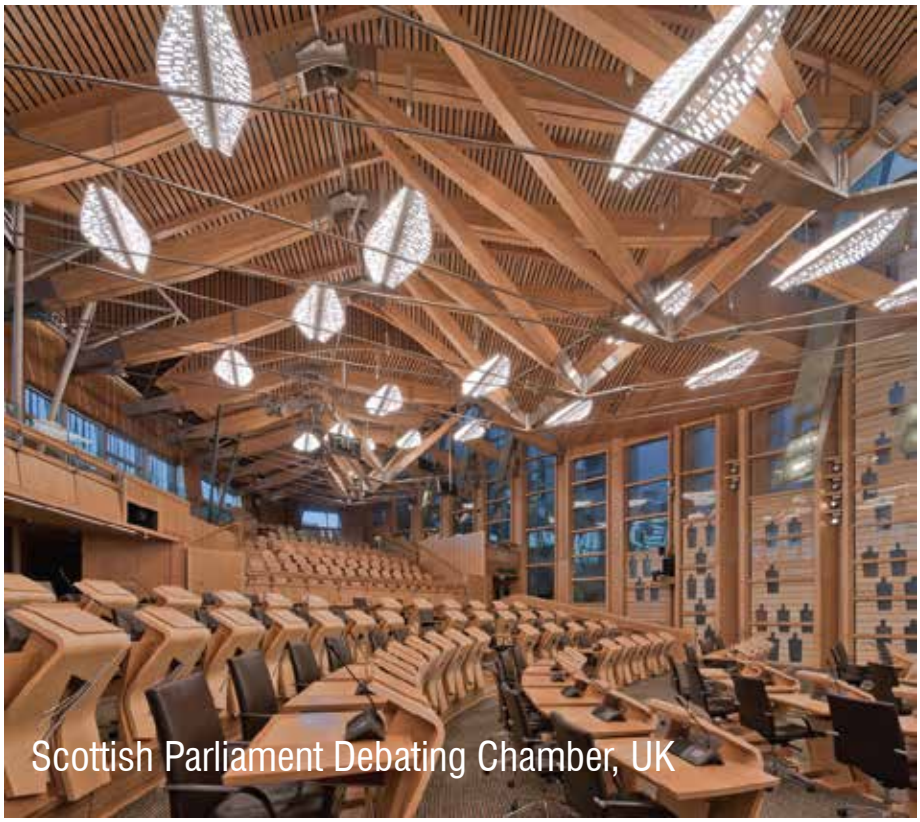
Vikash Sharma	S.2686	Student	Rajasthan
Hemant Kumar Tank	S.2687	Student	Rajasthan
Ayushi Joshi	S.2688	Student	Rajasthan
Akshay Kumar Singh	S.2689	Student	Rajasthan
Rahul Kumar Yadav	S.2690	Student	Rajasthan
Sreedhar N.S.	S.2691	Student	Rajasthan
Kirti Gupta	S.2692	Student	Rajasthan
Ghanshyam Swami	S.2693	Student	Rajasthan
Sandeep Singariya	S.2694	Student	Rajasthan
Aarifa Sheikh	S.2695	Student	Rajasthan
Ayush Kumar	S.2696	Student	Rajasthan
Charul Chasta	S.2697	Student	Rajasthan
Divya Meena	S.2698	Student	Rajasthan
Manas Gupta	S.2699	Student	Rajasthan
Neeraj Bohara	S.2700	Student	Rajasthan
Pushpendra Singh Khangarot	S.2701	Student	Rajasthan
Rachit Gautam	S.2702	Student	Rajasthan
Ranjan Sehgal	S.2703	Student	Rajasthan
Ramakant Gupta	S.2704	Student	Rajasthan
Sagar Sahariya	S.2705	Student	Rajasthan
Sheetal Meena	S.2706	Student	Rajasthan
Shitanshu Yadav	S.2707	Student	Rajasthan
Shubhang Agarwal	S.2708	Student	Rajasthan
Shubhit Singh Bisht	S.2709	Student	Rajasthan
Sourav James	S.2710	Student	Rajasthan
Sunil Kumar Meena	S.2711	Student	Rajasthan
Trinal Dev Sharma	S.2712	Student	Rajasthan
Udayveer Singh Bhati	S.2713	Student	Rajasthan
Utsav Kumar	S.2714	Student	Rajasthan
Vaibhav Trivedi	S.2715	Student	Rajasthan
Vibhuti Narayan Mishra	S.2716	Student	Rajasthan
Vijayraj Singh Rodiya	S.2717	Student	Rajasthan
Vinay Shrivastava	S.2718	Student	Rajasthan
Vinod Kumar	S.2719	Student	Rajasthan
Yogita Modi	S.2720	Student	Rajasthan
Yuvraj Dariya	S.2721	Student	Rajasthan
Shubham Dadhich	S.2722	Student	Rajasthan
Rahul Choudhary	S.2723	Student	Rajasthan
Chetan Madhukar	S.2724	Student	Rajasthan
Deepak Roopsingh Purohit	S.2725	Student	Rajasthan
Esha Singhal	S.2726	Student	Rajasthan
Goverdhan Singh Ratnawat	S.2727	Student	Rajasthan
Himanshu Bansal	S.2728	Student	Rajasthan
Mahesh Sharma	S.2729	Student	Rajasthan
Naveen Kumar Mahawar	S.2730	Student	Rajasthan
Nitish Singh Chauhan	S.2731	Student	Rajasthan
Ravi Sharma	S.2732	Student	Rajasthan
Shlok Budhbhatti	S,2733	Student	Rajasthan
Vansh Chaudhary	S.2734	Student	Rajasthan
Shubhaditya Varma	S.2735	Student	Rajasthan
Prakhar Dusad	S.2736	Student	Rajasthan
Shreya Kulshreshtha	S.2737	Student	Rajasthan
Shivangini Sharma	S.2738	Student	Rajasthan
Diwankar Gajendra Mishra	S.2739	Student	Rajasthan

Welcome to new members - isle

Name	Membership No.	Grade	State Centre
Mohit Jaidayal Sharma	S.2740	Student	Rajasthan
Ronak Chaturvedi	S.2741	Student	Rajasthan
Aditya Ranjan	S.2742	Student	Rajasthan
Pinky	S.2743	Student	Rajasthan
Aman Agarwal	S.2744	Student	Rajasthan
Sachin Agarwal	S.2745	Student	Rajasthan
Yash Sharma	S.2746	Student	Rajasthan
Aalind Mathur	S.2747	Student	Rajasthan
Anchal Kumawat	S.2748	Student	Rajasthan
Shantnu Dulara	S,.2749	Student	Rajasthan
Neha Singh Rao	S.2750	Student	Rajasthan
Arvind Singh Chauhan	S.2751	Student	Rajasthan
Prahalad Singh	S.2752	Student	Rajasthan
Avdesh Singh	S.2753	Student	Rajasthan
Shubham Sharma	S.2754	Student	Rajasthan
Rahul Soni	S.2755	Student	Rajasthan
Sushil Kumar	S.2756	Student	Rajasthan
Sonal Kumar Singh	S.2757	Student	Rajasthan
Rahul Tripathi	S.2758	Student	Rajasthan
Vibhor Jaiman	S.2759	Student	Rajasthan
Kunal Mehta	S.2760	Student	Rajasthan
Sourav Sharma	S.2761	Student	Rajasthan
Mansha Inkiya	S.2762	Student	Rajasthan
Akshay Mishra	S.2763	Student	Rajasthan
Roop Singh	S.2764	Student	Rajasthan
Parth Dosi	S.2765	Student	Rajasthan
Mukesh Rakshak	S.2766	Student	Rajasthan
Vishal Soni	S.2767	Student	Rajasthan
Ankan Bhunia	S.2768	Student	Rajasthan
Pritam Modak	S.2769	Student	Rajasthan
Kamalesh Sarkar	S.2770	Student	Rajasthan
Vishnuyash Udwesh Kumar	S.2771	Student	Rajasthan
Debdeep Majumder	S.2772	Student	Rajasthan
Aritra De	S.2773	Student	Rajasthan
Rittick Jana	S.2774	Student	Rajasthan
Surya Narayan Santra	S.2775	Student	Rajasthan
Siladitya Mahato	S.2776	Student	Rajasthan
Sparsh Dutta	S.2777	Student	Rajasthan
Monsur Ali Mirza	S.2778	Student	Rajasthan
Vijay Kumar Verma	S.2779	Student	Rajasthan
Manoj Malakar	S.2780	Student	Rajasthan
Sourav Banerjee	S.2781	Student	Rajasthan
Subhajit Hazra	S.2782	Student	Rajasthan
Moulina Bandyopadhyay	S.2783	Student	Rajasthan
Ankit Verma	S.2784	Student	Rajasthan
Chitra Gupta	S.2785	Student	Rajasthan
Asmita Samanta	S.2786	Student	Rajasthan
Sloke Jain	S.2787	Student	Rajasthan
Namrata Barma	S.2788	Student	Rajasthan
Sattwik Adhikari	S.2789	Student	Rajasthan
Akash Chakraborty	S.2790	Student	Rajasthan
Subham Biswas	S.2791	Student	Rajasthan
Vishal Aadesh	S.2792	Student	Rajasthan



Scottish Parliament Debating Chamber, UK

The Debating Chamber in the Scottish Parliament functions as a TV studio during parliamentary business. At other times it is presented to visitors as a fine architectural space.

Our brief included reviewing the current metal-halide lighting and daylight ingress, to improve glare and uniformity for MSPs and the broadcasting team. The existing lighting was expensive, difficult to maintain and obsolete. New HDTV cameras required upgraded lighting to fulfil broadcasting standards. Furthermore, the solution had to be installed and fully operational over the summer recess, utilising a birdcage scaffold for safe access above the timber ceiling structure.

Site trials and time-lapse daylight studies determined that a radical concept would better suit parliamentarians, the broadcasting team and Enric Miralles' original architecture, rather than an LED retrofit. We felt our design needed to be bold and rare in concept while pushing technical boundaries, therefore a custom suspended luminaire evolved, creating soft but high light levels for broadcasting, celebrating the architectural structure previously obscured by hundreds of pole mounted spotlights. Integrating suspensions and concealed wiring in the complex ceiling structure was a key purpose.

Our bespoke fitting shape reflects the plan-form of the chamber, and light guide extractors are abstracted graphic figures representing the number of sitting MSPs, derived from the graphic silhouette used elsewhere in the architectural language of the chamber. Layout and heights appear randomised in the complex ceiling structure, yet achieve the required lighting distribution. A soft and high quantity light is achieved, via hidden integrated LEDs.

"Mike Stoane Lighting relished the challenge of this high profile, demanding brief: a dedicated new LED array design, custom aluminium extrusion, bespoke precision turning, multi-axis adjustment, challenging structural and access considerations, ambitious acrylic design, stringent output targets, individual controllability, deep dimming, HD broadcast compatibility and challenging anticipated life targets. I think some M4 screws were off-the shelf." – Dave Hollingsbee, Mike Stoane Lighting.

Simple, fixed, diffuse acrylic louvres to the West glazing allow adequate daylight while reducing solar contrast. Daylight louvre design was developed through time lapse photography and 3D modelling. LED spotlights provide a front fill light during broadcasting only.

The need for scene setting or dimming within the chamber was paramount. Detailed examination of thermal performance, and pre-programmed timed operating states through DALI dimming control, on the basis of planned patterns of use, allowed us to calculate the LED and fitting life of 25 years, which we were aiming for. The scheme saves 60% energy of the previous scheme, requires minimal maintenance and is designed for durability and failure resilience. Four sets of LED boards and power supplies incorporated within each fitting allow a maximum loss of 25% if one board fails. Revamping the lighting design in such a bold manner positively portrays the strength of Scotland's political future. Through considered light placement we have made the broadcasting team's job easier, whilst achieving optimum lighting conditions for parliamentarians. The installation has exceeded the expectations of the broadcasting team and received countless positive comments from the client and individual members of parliament.

LIGHTING DESIGN
KSLD, Scotland, UK

ARCHITECT
Lee Boyd, Scotland, UK

ADDITIONAL DESIGN
Structural Engineer: Will Rudd Davidson, UK. Electrical Engineer: Harley Haddow, UK

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