RNI Reg. No. DELENG/2001/4847

October 2009 Vol. IX No. IV

LIGHT the official NEWSLETTER

of the **indian society of lighting engineers**

Printed & Published by Mr. Harcharan S. Mamak, A 274, Defence Colony, New Delhi 110 024 on behalf of Indian Society of Lighting Engineers and printed by him at Graphic Point Pvt. Ltd., WZ-429 B, Naraina Village, New Delhi.

FROM THE PRESIDENT'S DESK

The public spaces both nationally and internationally are full of discussion on the environment. The issues are global warming, carbon emissions, green house gases etc. This is true of the newspapers, television, the internet, inter government meetings, professional bodies and grassroots NGOs.

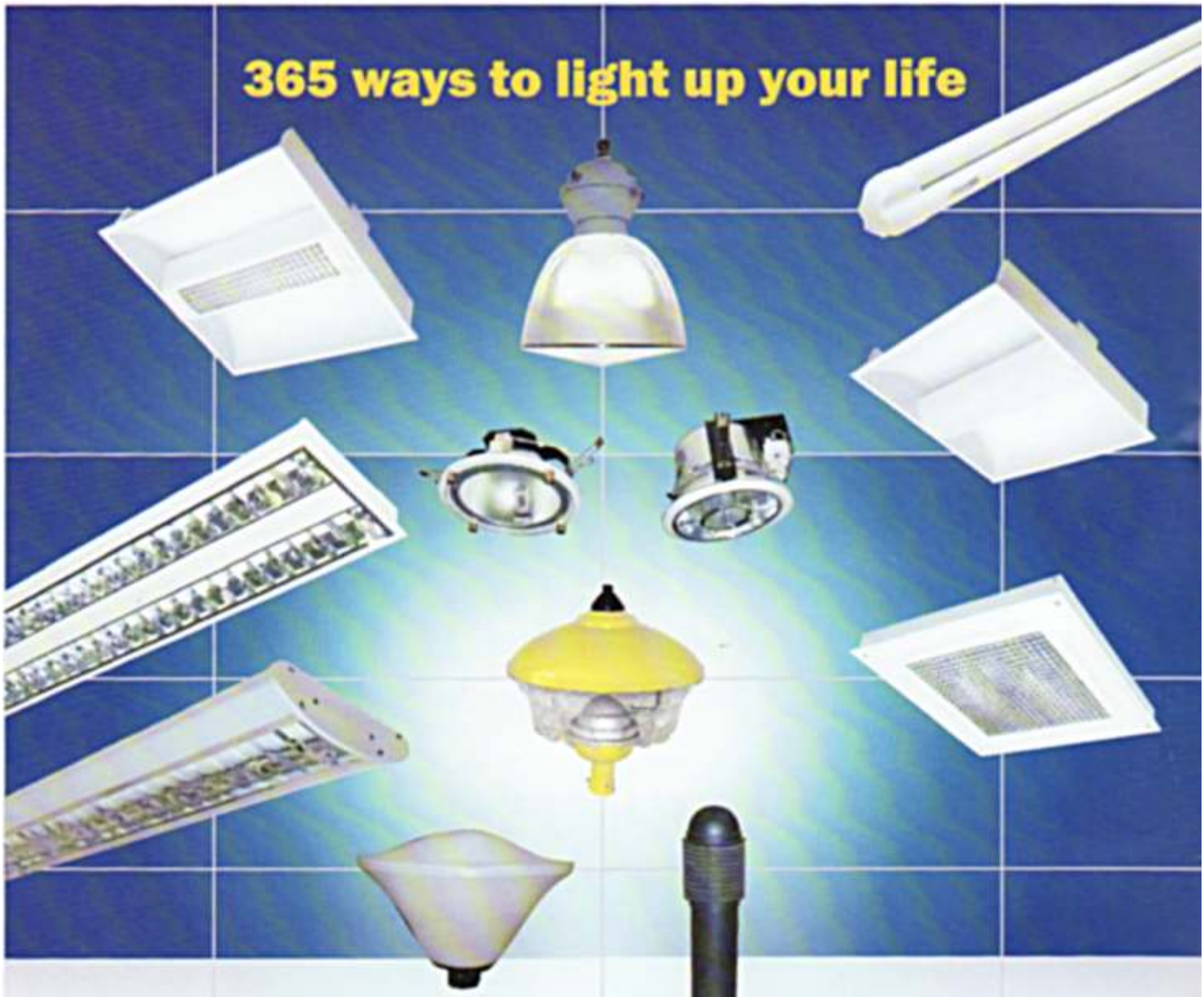
For those of us in lighting this discussion takes the form of energy efficient lighting. Till recently one of the principal means of dealing with the problem was to replace GLS points with CFLs. The government in particular took to this idea and promoted it to get consumers to make the switch.

However, while this does result in substantial energy saving, it does raise other environment related problems. As long as the numbers were in the region of a few million, this approach was not questioned. Now that we are talking of annual quantities in excess of 200 million CFLs, the question of safe disposal of mercury and electronic ballasts has become a major concern. I wish to initiate a debate on this subject through this Newsletter.

While those of us involved in lighting are aware of these facts, I am referring to them to emphasise the importance of Societies like ours to engage in constant discussion so that we can spread awareness and help work towards solutions, because as responsible lighting practitioners it becomes our duty to help in the formation of standards and the prescribed methods of disposal. We must also keep in touch with international practice by attending international conferences. We must be aware if any down side to energy saving propositions as well.

There is the CIE Conference on Lighting Quality and Energy Efficiency in Vienna in March. While Mr. S. Chakraborty will be making a presentation to represent the position in Asia, I would urge all those of you who can to attend this conference. It is now late for the submission of papers, but it would be truly worthwhile to attend and participate and interact with the world's experts on the subject.

365 ways to light up your life



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During my visit to LRC (Lighting Research Centre, which is a part of Rensselaer Polytechnic Institute, located in Troy, NY., USA) in July, I discussed the possibility of a course conducted by LRC faculty in India and I am happy to report that they have responded very positively and we are now in the process of working out details. Besides teaching, LRC does product testing, designing, technical consultation, and contract research. For ISLE for the creation of Lighting Excellence Centre in India the LRC is a good example to follow. Some steps are being taken in that direction.

Ever since I was entrusted with the President's office I have been making efforts to see how we could put into operation an internet based lighting course with certification. I am happy to tell you that my predecessor Mr. S. Venkataramani has used his international contacts to take this forward and I hope that in the coming months we will be able to make this operational.

Avinash D Kulkarni
President
dradk@hotmail.com

EDITORIAL

This issue comes to you in the aftermath of Dusshera and Diwali and I wish you and your families a very prosperous and purposeful year ahead.

The festival celebrations and obligations have not reduced the level of activity in ISLE and you will find reports from the Centres at Kolkata, Delhi, Karnataka, Rajasthan and Indore.

In addition to the letter of the CIE President in our last issue, the VP Technical, Dr. Schanda in his article on solid state lighting gives very good reasons why it is important to attend CIE 2010 in Vienna next March.

CIE Past President, Prof. Wout van Bommel has sent us an excellent article on the importance of understanding the issues related to Mesopic and Photopic vision.

In the Letters to the Editor column you will find exchanges between three ISLE members which were prompted by Mr. Howard Brandston's letter in the July issue. We hope that this will be the start of a process where ISLE members will use this platform for discussion on a wide range of lighting issues.

I hope that in spite of the pressure of their professional and personal obligations members do take the time to check out the links provided in the WebWatch column contributed by Mr. Anool Mahidharia as it is full of useful and interesting information.

H.S. Mamak
Editor

ISLE ACTIVITY

Education Committee

Scholarship

The Education Committee has finalised the disbursement of scholarships for the current year. The evaluation of the students was done on the basis of 3 criteria – Financial Condition, Knowledge of Lighting Engineering and Academic Results.

The examiners at Kolkata were Mr. Biswajyoti Joarder, Mr. Ratan Ganguly, Mr. P.K. Majumdar and Mr. Rajat Roy; at Bangalore, Mr. Bhavani Prasad, Mr. M.S.N. Swamy and Mr. Biswajyoti Joarder and at Mumbai, Mr. K. Naveen, Mr. Rajesh Naik and Mr. Biswajyoti Joarder.

The scholarship recipients are given below:

Sucharita Dalui	Hooghly Engg.& Tech.College
Gourab Das	Hooghly Engg.& Tech.College
Sudipa Nandi	Hooghly Engg.& Tech.College
Prabal Kanti Ghosh	Jadavpur University
Ankita Bhaduri	Hooghly Engg.& Tech.College
Ajoy Kumar Khata	Hooghly Engg.& Tech.College
Partha Ghosh	Calcutta University
Amarjeet Kumar Prasad	Hooghly Engg.& Tech.College
Ranjan Mondol	Jadavpur University
Saroj Kumar Ghosh	Jadavpur University
Soumyadeep Chatterjee	Hooghly Engg.& Tech.College
Abhishek Anand	Manipal Institute of Technology
Chirantan Kumar	Jadavpur University

Prizes for Student Projects

The Committee had decided to evaluate and give prizes for the student projects at the Undergraduate and Post-Graduate levels. The projects were evaluated on six criteria:

Merit of the project in terms of practical approach
Involvement of candidates
Knowledge of the subject lighting (related to the project)
Innovative ideas
Progress of the project and
General knowledge on Lighting Engineering

The synopses of the prizewinning projects are given below

First Prize UG Level

Solar Powered Interior Lighting System: Solid State Lighting With Color Control for Accent Lighting.

In our project we explore the avenues of illumination using LED's. We have incorporated high intensity power LED's of 1W rating at present. We may advance to the use of 3W power LED's at a later stage depending

upon its availability in the market. The lumen output of an RGB module of 1W rating has been found to be 50 lumens/watt. We plan to make a lamp of around 600 lumens.

Using solar panel of appropriate wattage output, the battery will be charged through an energy efficient power converter stage. The power converter stage will be controlled by a microcontroller to optimize the output power under variable Sun's insolation conditions.

The controller 1C in use is PIC 18F2550 and the driver used is 1C 5940. These 1C's will be programmed to produce many different colour outputs from the RGB LED lamp. It is also possible to control the light intensity of this lamp by these 1C's. PIC 18 microcontrollers have the following advantages:

High computational performance at an economical price-with the addition of high endurance/ enhanced flash memory. In addition to these features the family introduces design enhancements that make these microcontrollers a logical choice for many high performance, power sensitive applications.

TLC 5940 has 16 channels each of which has an individually adjustable 4096 step grayscale PWM brightness control and a 64 step constant current sink (dot correction). This adjusts the brightness variations. This IC also indicates a discontinuity as well as over temperature condition.

An appropriate thermal protection would also be designed for the lamp as each 1W module will take at least 350mA of current.

In the later stage of the project we are also going to incorporate a wireless connection between the controller and the LED lamp. It would thus be possible to control the billion colour outputs of the lamp by just using a remote control.

The complete demonstration model using locally available resources will cost in the range of Rs. 8000 to 10,000.

Kokila Duraisamy, Dipti Lohchab, Simranjit Singh Sandhu, Amit Srivastava

Department of Electrical Engineering, Fr. C. Rodrigues Institute of Technology, Vashi, Navi Mumbai

Guide: Prof. Sushil Thale

Second Prize UG Level

A Project on Hospital Lighting:

Hospitals are structurally complex. There are numerous areas, which are distinctly different in the nature of the tasks performed. Each area has its own specific need for illumination. Also lighting schemes are versatile in a hospital and medical science has to be blended with illumination engineering in order to achieve a competent design. Hospital Lighting concerns the lighting of various functional (both medical and non-medical) areas of hospital interior, as well as the hospital exterior. The design has been accomplished using Dialux 4401, lighting design software. Average and maximum values of illuminance for particular areas have been consulted from IS 3646 mainly, and ILA (International Lighting Academy) prescribed table of illuminance. Then the area has been designed according to the prescribed illuminance. Overall Uniformity has been given great importance. Efforts have always been to maintain it as 0.7 or higher in case of general lighting in indoors areas. For localized general schemes it is maintained higher than 0.6. From the point of conservation of energy, each lighting solution is designed for minimum value watts/ sq.m. In order to utilise the natural light mostly, a scheme of daylight linking has been proposed. Individual lighting needs and the functional nature of the different areas have been emphasised. When designing the lighting for wards, i.e. the area for the patients, along with the sufficiency of examining light, the cosiness and reassuring nature of the lighting has been kept in mind. Again, when the lighting is designed for staff, cool daylight has always been the choice as it enhances activeness in staff, which increases their efficiency and drive for work. Public areas like the reception and entrance have been designed not only to satisfy their lighting needs, but towards the branding of those areas as distinctive landmarks to attract people. The light sources and control gears are chosen accordingly. Some of the areas are combined. They are used both as public areas and staff areas. These are treated specially and directional lighting has been used in order to satisfy their combined needs. In the case of the exterior, the design concentrates on the fact that this area should be clearly visible from the neighborhood, and distinct as well as inviting. All the special areas like Operation Theatre, X-Ray rooms etc. have treated carefully according to their special functional nature. In doing all this, overall cost efficiency has been maintained at the maximum level possible.

Sucharita Dalui, Ankita Bhaduri, Sudipa Nandi, Gourab Das, Amarjeet Prasad
Hooghly Engneering.and Technical College
Under the guidance of Mrs. Debadyuti Banerjee

3rd Prize UG Level

A Project on Office Lighting:

Lighting systems for offices must be cost effective and provide a comfortable, productive and energy efficient workplace.

The plan of the office is made with Autocad'07. The entire lighting design is made with the software DIALUX 4.4.The office lighting design on which the project is based consists of the following rooms.

At first there is a reception which is quite large and decorative, so we have used recessed luminaires with T8 lamps. Beside the reception there are two toilets side by side and the two are separated by a partition. Immediately next to the toilet there is the employee's room whose design is based on an open office plan. As this is a large room we have to consider the power consumption, uniformity, total cost and the lux value and considering all this we have used suspended luminaires with TFL. The window should be large enough for good ventilation and should be tinted wherever needed so that direct or indirect glare does not occur on VDUs. The furnishing of furniture should also be taken care. The colour and texture of the walls, ceiling and floor should be of light colour so that higher reflectance is achieved and a lower number of luminaires are required to achieve the required lux level than would have been required if dark colour was applied. Excessive use of smooth surfaces should be avoided as it may produce glare. Glare has been avoided by using appropriate luminaires. Dimmers using photo sensors are used to minimize power consumption by regulating the lighting level during the 24 hour cycle. In front of the employee's room there are two rooms. One room is the store room and the other is the MD's room. The MD's room should be the most decorative and clean. On the walls we have used decorative wooden planks and on the floor red carpet is used. Here we use recessed TFL luminaires in addition to localized lighting to maintain low power consumption and a good uniformity ratio, as it is an essential requirement of good lighting design. Beside the MD's room there is a toilet. In the toilets, we have used LED type surface mounted luminaires, as the present demand is for low power consumption and LED is the best solution. After designing we get the photometric results as output from DIALUX.

Subir Biswas, Soumyadeep Chatterjee, Ajay Kr. Khata, Prashant Kumar
Hooghly Engneering.and Technical College
Under the guidance of Mrs. Debadyuti Banerjee

1st Prize PG Level

Industrial Shed Lighting

Good lighting does not mean only providing lux level at working planes, it is providing right light at the right time along with uniform distribution of light. Industrial lighting not only includes Industrial Shed lighting but also includes Office area lighting, Lab area lighting etc.

Industrial area lighting is guided by IS. But in the practical field of application, lux levels at different areas are sometimes decided by the client himself. For this particular project, area wise illumination levels were decided by the client.

This is an electronic goods manufacturing industry. So in comparison to other industries, the illumination level requirements will be much higher. Particularly for the lab areas, illumination level is most important along with uniformity and CRI of the light source.

The complete design has been done on the lighting software and accordingly the fixtures are positioned in the AutoCAD drawing. It is very practical that sometimes the number of fixtures as per calculations cannot be positioned in the actual area due to structural constraints. So it is the aesthetic considerations that are taken into consideration at that time.

Dipayan Nath,
M.E. Illumination Engineering,
Jadavpur University.

2nd Prize PG Level

Energy Efficient Lighting Design of Academic Building

The project is the Total Lighting Design (Indoor & Outdoor) and Electrical Installation of the Academic Building of Dr. R. Ahmed Dental College & Hospital (Under Construction) in Kolkata. It is going to be a six-storied building.

Design Approach: In the old building mainly T12 and Incandescent have been used for lighting. Now at first in different rooms the average illumination levels have been taken from the IS chart. The above illumination level can be achieved by using different lighting software. In the case of indoors mainly fluorescent lamps T8 and T5, and CFLs of 11 watt, 18 watt, 36 watt can be used. For T8 only Super 80 of Philips is used. For beautification LEDs can be used. As it is going to be an energy efficient building the design is done considering Energy Conservation Building Code (ECBC) and National Building Code of India. Every floor consists of different types of rooms. For example the ground floor consists of seventeen types of rooms (H.O.D. Room, Teachers' Room, Oral Surgery Ward Male & Female, Emergency Room, Radiology, Dark Room, General Waiting Room, Faculty Room, O.T. Bed, Emergency O.T. Seminar Room, Dental Chair, etc.).

To achieve proper illumination the seminar hall is designed with 5 nos. of 2x18 watt CFLs and 2 nos. of 1x11 watt CFLs. All others rooms are designed with other types of lamps and luminaires of different companies.

Another part of the project is the electrical installation of the total building. At first wiring of every floor is done. After that SPNDB & Power Distribution box (PDB) is placed. From the single line power diagram of each floor the total load has been calculated. This load is checked according to Energy Conservation Building Code. From this connected load considering Diversity Factor (DF) the utilized load has been calculated. Thus the transformer

is selected according to load, considering 25% extension load in future.

Animesh Bhattacharya,
M.E. Illumination Engineering, Jadavpur University

No suitable candidate was found by the Committee for the 3rd prize.

KOLKATA STATE CENTRE

Quiz Progamme

August 12, 2009, Kolkata

A programme was organised at the Auditorium of Heritage International College of Technology, Kolkata where Mr. Sisir K. Ganguli, Former Chief Engineer., PWD gave a presentation on 'Conservation of Electrical Energy' with special emphasis on lighting.

The lecture was followed by a quiz on lighting conducted by Ms. Kamalika Ghosh, Faculty, Elect. Engg. Dept., JU for the students of 1st year of Electrical/Electronics stream. About 130 students participated in the quiz. Prizes were distributed to the successful students.

Technical Programme

October 24, 2009, Kolkata.

A programme was organised at the Seminar Room of the Electrical Engineering Dept. of Jadavpur University, Kolkata. The meeting was chaired by Prof. Siddhartha Dutta, Pro Vice Chancellor, Jadavpur University.

The students of award wining projects for 2008 from the eastern region gave detailed presentations of their projects. A total of four projects were presented.

After that Prof. S. Sengupta, Vice Chancellor, West Bengal University of Technology, who was the Chief Guest, distributed the ISLE scholarships and certificates to the recipients for the year 2008 from the eastern region.

The meeting was followed by tea and snacks.

DELHI STATE CENTRE

Seminar

September 12, 2009, New Delhi

The Delhi State Centre organised a seminar at the India International Centre on September 12.

The seminar featured two presentations. The first was made by Mr. B.M. Bhatia of Keselec Schreder on Urban Lighting. The second presentation was made by Mr. Pankaj Sharma of Instapower.

Mr. Bhatia's presentation underlined the importance of urban lighting in the context of the increasingly complicated urban landscape, traffic and pollution and social problems. Urban lighting needed to be used as a design tool to alleviate these. The use of right light can reduce dazzle and light pollution while contributing to safety and comfort as well as to saving energy. He emphasised the need for luminaries with greater dust and water resistance and lower maintenance costs. Mr. Bhatia illustrated his lecture with images of installations and presented some future generation luminaries including miniature and micro reflectors for use with modern lamps.

Mr. Sharma indicated that with a projected GDP growth of over 6% for the next few years India had the daunting task of augmenting its energy resources to keep pace with energy requirements which were expected to be 700 GW by 2030 against available 140 GW as on date.

While bridging the gap he said it was necessary to bear in mind the need for keeping under check the carbon emissions. Since lighting loads account for approximately 15% of the total energy consumption there was substantial scope for energy savings.

It was in this context he explained that Light Emitting Diode (LEDs) have emerged as an energy efficient and environmentally safe solution for most indoor and outdoor lighting applications.

He said that LEDs with a unique feature of uni-directional light, longer life > 50000 hrs, CRI of >75 and very low lumen depreciation of 15% during its life cycle, was an optimum energy efficient alternative for many applications and could contribute more than 50% in energy savings as compared to CFLs. The pay-back time for most applications was less than 2.5 years.

Giving several examples of LED applications, he felt there was an urgent need to switch to LEDs to bridge the energy deficit.

The seminar was chaired by Mr. A.K. Jain, Chairman, Delhi State Centre. The vote of thanks was given by Mr. Sudesh Gupta, Secretary of the State Centre.

Technical Booklets

ISLE has decided to publish technical booklets on various subjects of interest to lighting users. The first in this series will be on the subject of Office Lighting. The Governing Body has decide that this task will carry an honorarium.

Potential authors who feel that they have the expertise and resources to carry out this task, please contact with background information and credentials:

President, ISLE at isledel@vsnl.com

KARNATAKA STATE CENTRE

Training Programme

September 25, 2009, Channapattana

In its endeavour to work at the grassroot level, ISLE KSC has joined hands with Koushalya Shale to launch a unique training programme at the village level for imparting training at the basic level for "Solar Cell LED light technician".

Mr. Swamy addressing the gathering

The first program was held in the village near Channapattana on September 25, 2009 and was attended by 38 young ladies. Mr. Ranga Swamy welcomed the guests and the Programme was inaugurated by Mr. Bhavani Prasad, former DG CPWD, Chief Guest and Mr. M.S.N. Swamy, Chairman, ISLE KSC and presided over by Mr. Mohan Rao, Director Koushalya Shale.

Mr. Bhavani Prasad said that this unique programme needed to be properly supported and encouraged by the village elders. At the end of the course there should be a trade test and those who qualify should be given a certificate. For this Koushalya Shale and ISLE KSC have to finalize the trade test and certification issues.

Mr Swamy said that this was a very well thought out programme to train Rural Men and Women and if implemented properly with the support of Elders and the Village Panchayats would create employment and enable the trained personal to stand on their own feet.

Further Mr. Swamy said that under this program the training is imparted for familiarisation of the components of a LED lighting system. This module is planned as the next level after the primary level of Basic Electrical Wiring for a house.

The components covered are the

- LED Array,
- Control circuit PCB,
- Battery and its charging,
- Solar cell,
- Housing/Cabinet/Mounting Kit.

The training covers interconnections, testing, mounting and troubleshooting.

The trained persons would be capable of undertaking assembly of component modules to form the finished product of a wired lighting for a house or as an emergency light. The training will also cover general management aspects for

- The procurement of the component sub-assemblies
- The sale or distribution of the finished product in the neighborhood
- Trouble shooting, battery charging and maintenance
- Basic self-employment entrepreneurship concepts.

Mr. Swamy felt that this programme has a lot of potential as most of the villagers are experiencing a shortage of power and they will gain confidence when they get service at their door step from people known to them. He also emphasised the need to take this up with the concerned Ministry for implementing the training programme in other Panchayats also.

Mr. Poonish Mehra, Proprietor, Rajalaxmi Enterprises along with Mr. Ramesh of Meghana Electronics explained in detail the different components and their working. They also showed how to assemble

Training session in progress

the product when the materials are received in a knocked down condition.

Mr. Mohan Rao, Director, Koushalya Shale was very happy that ISLE KSC has agreed to conduct such programmes as a joint venture to encourage the village youth. He also said that the Panchayats would encourage such activity since this will create employment

Mr. Mohan Rao pointed out that this skill trade is not at present covered under the Modular Skill Training programme or the Government of India and the NCVT. ISLE-KSC and the Government of Karnataka through the Koushalya Shale should take up the introduction of the skill under the MES programme of the NCVT.

Similar startup training programmes in (villages in) Ramanagaram, Kanakapura, Magadi, Hosakote will be conducted in the first (or the pilot) stage and after the standardisation of the contents, level etc., on the basis of the feedback in the pilot stage, ISLE will look forward to organising such programmes over the entire state of Karnataka.

A member of the Panchayat proposed a vote of thanks with an assurance that they would encourage this type of activity for the benefit of the local youth.

ISLE Interaction with Professional Bodies

Members of ISLE KSC have been active in spreading the message of good lighting practice to other professional bodies. Below are listed some of these activities:

Mr. Bhavani Prasad addressed a group of Contractors in a meeting conducted by the INSRUCT on the subject of Energy Saving and the Contractual Obligations.

On July 21, 2009 Mr. M.S.N. Swamy addressed the Rotary Club of Bangalore Orchards on "Lighting - What Everyone Should Know" in their Tuesday Meeting as the Speaker of the Week.

On September 4, 2009 Mr. Bhavani Prasad addressed the Engineers at the Bengaluru International Airport on the Lighting Code on the occasion of Sir M. Vishweshvarayya's birth anniversary.

RAJASTHAN STATE CENTRE

Inaugural Programme

July 11, 2009, Jaipur

In its 11th meeting at Jaipur on July 11th the Governing Body decided to approve the request of the Jaipur Local Centre to become a full fledged State Centre as the Rajasthan State Centre since the relevant criteria were met.

Lighting the inaugural lamp

The inaugural programme of the State Centre began with a technical seminar on Green lighting – A New Paradigm.

The dignitaries were formally welcomed with traditional Rajasthani safas. This was followed by the lighting of the ceremonial lamp.

Mr. Balakrishna Sugumar

Mr. R.S. Saxena, Chairman, Jaipur Local Centre (now Rajasthan State Centre) welcomed the dignitaries, participants and speakers to the inaugural function. The gathering was then addressed briefly by ISLE President, Dr. A.D. Kulkarni and Past Presidents, Mr. H.S. Mamak and Mr. S. Venkataramani.

The first presentation was on Architectural Lighting by Mr. Balakrishna Sugumar, General Manager of Ligman Lighting India. After this Mr. Swarup Bolar, DGM Crompton Greaves made a presentation on Mesopic Vision Street Lighting. The final presentation of the evening on Green Lighting was made by Mr. Jyotirmoy

Mr. Swaroop Bolar

Mathur, Reader, Malaviya National Institute of Technology, Jaipur. This was followed by a discussion on the three presentations.


Mr. Jyotirmoy Mathur

Mementoes were presented to the speakers and members of the Governing Body by Mr. Saxena and Mr. Jain

Mr. A.K. Jain, Secretary, Jaipur Local Centre proposed a vote of thanks.

The seminar was followed by a vibrant cultural programme featuring folk artistes from Rajasthan. The evening ended with cocktails and dinner.

INDORE LOCAL CENTRE

New Committee Takes Charge

July 21, 2009

The Indore Local Centre organised a meeting on July 21 where the newly elected Committee Members took over charge. The new Committee of the Centre comprises the following:


The new Committee members

Mr Akhilesh Jain	Chairman
Mr Dinesh Wadhwa	Hon. Secretary
Mr Kiran P Shinde	Hon.Treasurer
Dr. R.L. Sawhney	Member
Mr. Vijay Panse	Member
Mr. Dilip Dharkar	Immediate Past Chairman

Welcoming everybody present, Mr Akhilesh Jain, the newly elected Chairman, mentioned that ILC plans to conduct programs every month. He invited suggestions from everyone present. He also requested the lighting companies and other institutions to inform the Centre whenever any dignitary or knowledgeable expert in the field of lighting plans to visit Indore, so that ILC could organize a lecture.

Dr. Prakash Barjatia, Chairman of Mumbai State Centre, who was specially present for the occasion welcomed the new Committee and expressed his appreciation of the commitment given by the newly elected members in undertaking the future activities of the Centre.

Dr. Prakash Barjatia

This was followed by an an interesting presentation made by Dr. Barjatia on Green Lighting and Lighting Education. Dr. Barjatia said that like so many other things Light is taken for granted, but in the present context of global warming it was becoming increasingly important to use energy efficient lighting. He pointed out that it was the wastage resulting from bad lighting that lights up the sky around our cities. The awareness of energy efficient light sources and appropriate luminaries can be spread through greater emphasis on lighting education across the country.

Shri Dinesh Wadhwa, Hon. Secretary gave the vote of thanks. The programme was organised at Hotel South Avenue, Indore, and was well attended by members and other professionals interested in the field of lighting.

CIE ACTIVITY

New TCs

The following new TCs have been established:

TC 1-75: A Comprehensive Model of Colour Appearance
(Chair: M. Ronnier Luo, GB)

Terms of Reference: To derive colour appearance models that include prediction of the appearance of coloured stimuli viewed in typical laboratory conditions: - that appear as unrelated colours; - that are viewed under illumination down to scotopic levels; - that include consideration of varying size of stimulus.

TC 1-76: Unique Hue Data
(Chair: Sophie Wuerger, GB)

Terms of Reference: To study and report on unique hue data, including an analysis of the scatter of those data: this to include practical viewing conditions.

TC 1-77: Improvement of the CIE Whiteness and Tint Equations
(Chair: Robert Hirschler, HU)

Terms of Reference: To recommend improvements or modifications to the existing CIE Equations for Whiteness and Tint to extend their scope of application to a wider range of instrument conditions and white materials; e.g. various tints and levels of fluorescence.

TC 1-78: Evaluation of Visual Performance in the Real Lit Environment
(Chair: Monica Billger, SE)

Terms of Reference: To investigate and report on current research on visual performance that relates to psycho-physical and physiological measurements in the real lit environment, and to produce a plan for future work.

TC 1-79: Limits of Normal Colour Vision
(Chair: John Barbur, GB)

Terms of Reference: (1) To document the correlation between performance on colour matching, colour discrimination, colour naming, and colour deficiency tests and factors such as variation in the peak spectral sensitivity of the M and L cones, density of the lens, density of macular pigment, variation in the optical density of the cones, L to M cone ratio, rod intrusion, illumination level, stimulus size, gender, stimulus duration and identify any substantive gaps in the existing literature. (2) Using the above database, develop a model or models that will allow the prediction of the effect of the above factors on colour discrimination, colour matching, and colour naming performance.

TC 2-65: Photometric Measurements in the Mesopic Range

(Chair: Teresa Goodman, GB)

Terms of Reference: (1) To produce a Technical Report setting out measurement requirements and procedures for implementation of the CIE task-based system for mesopic photometry. (2) To consider the implications of the new system for mesopic photometry for existing Div.2 publications.

TC 2-66: Terminology of LEDs and LED Assemblies
(Chair: János Schanda, HU)

Terms of Reference: To review LED and LED assemblies related terms and definitions in other international and regional organisations and prepare a recommendation for CIE.

TC 2-67: Photometry of Lighting and Light- Signalling Devices for Road Vehicles

(Chair: Göster Werner, SE)

Terms of Reference: To prepare guidelines for the measurement of photometric performance of lighting and light-signalling devices for road vehicles

TC 3-49: Decision Scheme for Lighting Controls for Tertiary Lighting in Buildings

(Chair: Peter Dehoff, AT)

Terms of Reference: To offer guidelines in order to balance lighting quality, user comfort and energy efficiency in lighting controls solutions for tertiary lighting in buildings (i.e. for commercial, institutional and industrial buildings). Work on a decision scheme with focus on the user requirements (visual comfort, performance, personal control) to determine the most applicable control solution, including the consequences for possible savings. In this, it needs to be assumed that there are no technological or financial hurdles.

The following new Reporterships were established:

- **R1-48:** Colour Emotion and Harmony
  (Li-Chen Ou, TW)
- **R1-49:** Above-Threshold Pulsed Lights
  (Ian Tutt, GB)
- **R2-42:** Measurement Methods for LED Luminaires
  (Jiangen Pan, CN)
- **R2-43:** Measurement of Integrated LED Light Sources
  (Pei-Ting Chou, TW)
- **R2-44:** Photometric Characterisation of Large Area Flat Sources Used for Lighting
  (Armin Sperling, DE)
- **R2-45:** Measurement of the Illumination Uniformity or Critical Applications
  (Meena Lysko, ZA)
- **R2-46:** Photobiological Safety Measurement of Lighting Products
  (Tongsheng Mou, CN)
- **R-6-41:** The Issues of Vitamin D Kinetics (Irina Terenetskaya, RU)

CIE and Solid State Lighting

Solid State Lighting, or as now abbreviated SSL, has become a buzz-word.

One can find no lighting journal or magazine that would not feature an article on its properties and advantages. CIE tried to clarify some of the obscure points at its 2009 Midterm Meeting, where the subtitle of the conference was “with special emphasis on LEDs and Solid State Lighting”. LEDs (light emitting diodes) certainly provide opportunities for the modernization of lighting, and SSL will change many of our lighting techniques. There are, however, a number of unsolved questions, both fundamental and applications oriented, where further research is needed, and CIE is busy to solve these.

In every aspect of life the proper use of terms is important. CIE has a long history of terminology documents, and the updating of its International Lighting Vocabulary is in its very final stage. Unfortunately this new dictionary will not contain detailed terms on SSL, as the collection of terms to be included was started before the rapid growth of this new field of lighting. But CIE realized this lack of information and suggested to the Board of Administration the establishment of a new Technical Committee dealing with the subject. Hopefully this will help to avoid such nonsense terms, as “LED incandescent lamp” that some advertisements use to describe LED lamps with Edison screw base as replacements of traditional incandescent lamps.

But there are many fundamental questions that have to be solved. CIE is struggling for some time with the proper description of the colour quality of LED light sources. The CIE Technical Committee, TC 1-69, dealing with the issue had a meeting at the Budapest Conference and one can hope that in the near future the first draft recommendations will become available. In this respect it is also worth mentioning that the results of the very fundamental research done by CIE 1-36 (Fundamental Chromaticity Diagram) might have implications on describing the colour of LEDs, and helping applied lighting engineering in blending the light of different coloured LEDs in a modern coloured environment. SSLs will certainly bring to light further fundamental questions where CIE still has no answer, thus e.g. in determining

the discomfort glare of LED luminaires: To calculate the UGR glare rating value one has to determine the effective projected area of the luminaire. This was easy in case of luminaires, where the luminance of the luminaire was more or less homogeneous. But the luminance of LED luminaires is very inhomogeneous, consisting of tiny high luminance spots and quite dark regions in-between. Further investigations will be needed to find out how this has to be taken into consideration in the discomfort glare calculation.

A major problem in SSL quality evaluation is the determination of its luminous efficiency. The usual technique in luminaire photometry is to measure the spatial distribution of the luminous intensity, determine the total luminous flux of the luminaire and of the lamps used in the luminaire, and finally report the efficiency for 1000 lumen lamp luminous flux. This technique cannot be used in case of LEDs, where the temperature of the LEDs in the luminaire determines their luminous efficacy, and if the same LEDs would be powered outside of the luminaire (what is in most cases impossible), their efficacy would be quite different.

There are recommendations in the literature how this should be taken into consideration, but the CIE reports providing guidance on luminaire photometry have not dealt with this question yet.

The temperature of the LEDs in the luminaire has a strong influence on the lifetime and aging of the LEDs as well. Standardized techniques are needed to determine the LED junction temperature that can be used in case of SSL equipment. A CIE TC is working on this question (TC 2-63: Optical measurement of high-power LEDs), but harmonisation with methods recommended by other international organisations will be needed.

Regarding the measurement techniques of LEDs there is a further issue, where CIE is active already for some time and that is the recommendation how the luminance of LEDs and their visually effective surface should be determined (TC 2-58). This is of particular interest for the determination of the photo-biological evaluation of LEDs. In the past there were two – partly contradictory standards – one by IEC that regarded LEDs as a sub-category of lasers – and one by CIE that regarded LEDs to be incoherent light sources. Although the standpoint of the two organisations was quite close to each other, with the ever increasing radiance of modern LEDs the proper safety categorization of high power LEDs is still a question that has to be solved.

LEDs become used in an increasing number of internal and external lighting applications. Together with promotional descriptions also the number of complaints is increasing that the installations do not fulfil the expectations. In interior applications in the past mainly decorative applications were described, where the aesthetics predominate, thus these were generally accepted. With the ban on incandescent light bulbs the demand for Edison screw LED lamps has increased, and a number of such lamps has been brought onto the market and the proper quality evaluation of these products becomes urgent. Here the fundamental standard requirements that should be used, have to be developed by CIE. Light distribution, correlated colour temperature, colour rendering are quite frequently very different from the similar parameters found in incandescent lamps. Also the production and control of electronic smog – a question that is perhaps not a CIE problem – is important in case of these replacement lamps.

In outdoor lighting LED systems proved to be superior to traditional ones in every application where coloured light has to be applied for signalling purposes, should it be traffic lights or automotive signalling. But again the colour of these signal lights is slightly different from those of the traditional ones, and that leads to many complaints of glare and visibility, a question that will need reevaluation.

Much interest has been directed towards SSL applications in both automotive headlamps and in street lighting. CIE is actively investigating the application of LEDs in transport signalling and lighting (TC 4-47), and organized a very successful workshop in conjunction with the CIE Midterm Meeting in Budapest this May. There are many questions in street lighting that have to be answered, starting with best correlated colour temperature (can the blue shift under mesopic conditions, the Purkinje effect, be utilized in redefining street-lighting luminance levels?), visibility and glare problems, encountered in these modern sources with unusual spectral power distributions, but also issues that were not so important with traditional light sources have to be solved, e.g. the light distribution of LED systems can be designed very precisely, so that only the road surface is illuminated, leaving the surrounding in darkness.

This was not possible with traditional luminaires, therefore up to now less attention was given to what the required illumination of the surrounding has to be. The necessary surrounding illumination will have to be provided in the standards in the future, as this influences design parameters and efficacies of the illumination. Also in these applications electronic smog, third harmonics, and thermal issues, related to life expectancy, vulnerability by high voltage pulses (lightning) become important and users need proper guidance.

Continued on page 21

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MAKHIJA 5364

FEDERAL STATE PARLIAMENT

VADUZ, LIECHTENSTEIN

The members of Parliament of Liechtenstein have a new home that the IALD International Lighting Design Award Judges praised as "a project of unflinching sensitivity to both technical challenges and aesthetic occasion. From space to space, the design team provided insightful, integrated solutions to often complex problems."

The architect designed a three-story "Long House" with offices, conference rooms and a terrace, as well as a two-story "High House" with a distinctive pitched roof. A glazed volume creates the "Conjuctive House" in between.

All luminaires are fitted with energy saving lamps. For the cafe, the conference room and the assembly hall, the lighting designers of Licht Kunst Licht chose low-voltage halogen lamps using the new IRC technology, thus offering a high lamp efficacy as well. All lamps are operated exclusively on electronic control gears.

AWARD OF MERIT
LIGHTING DESIGNERS
Andreas Schulz Associates A.D.
Licht Kunst Licht
Thomas Ruppen
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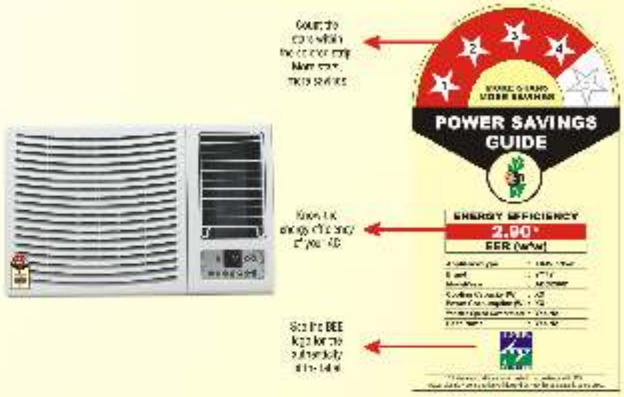

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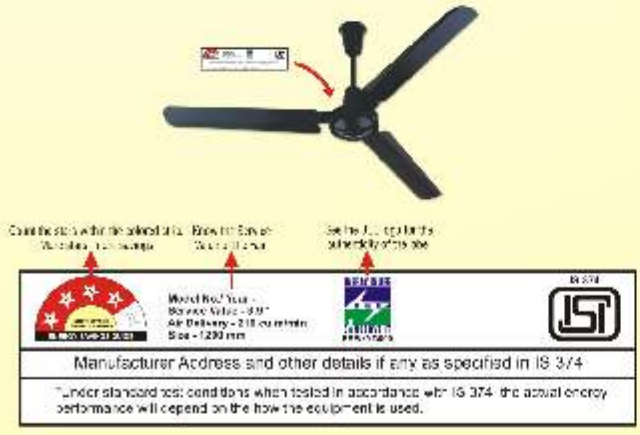

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Speirs and Major Associates
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THE SHEIKH ZAYED BIN SULTAN AL NAHYAN MOSQUE INTERIOR

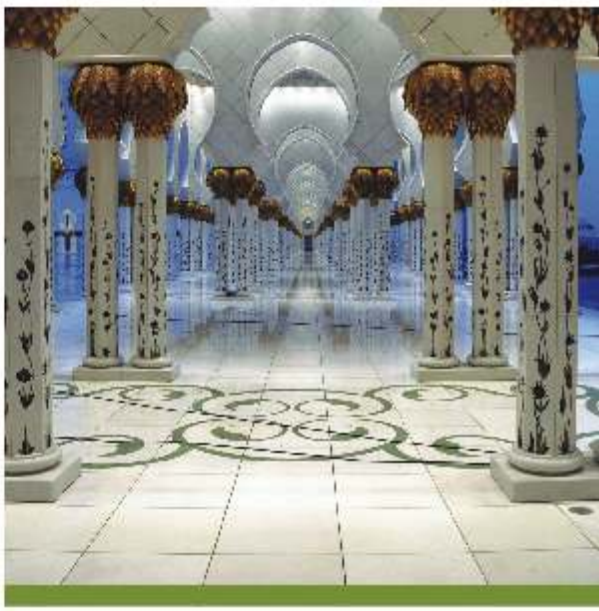
ABU DHABI, UAE

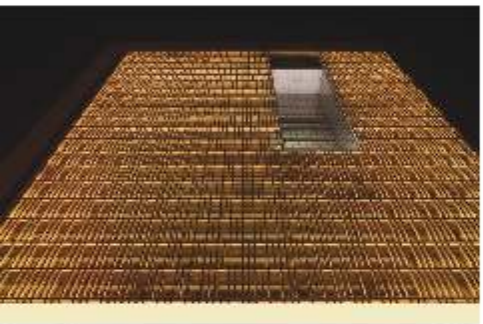
The challenge of this project was to create well-lit spaces highlighting architectural features for all interior front-of-house areas of the Grand Mosque of Abu Dhabi, a religious icon in the UAE, yet provide substantial functional light without exposing luminaires. A complex layered control system was required to set various scenarios and monitor lamp life/performance.

"The lighting design for this project is a stunning example how traditional art forms can be made into sculptural 'light' elements that complete the architectural experience of the space," a judge stated in reference to the mosque's design.

Along with concept design and workshops, mock-ups were required such that layered lighting effects created a single lit composition. Well concealed light sources in designed coves, niches, ledges and behind musharabia details hid many of the light sources. The result is that the building appears to emit light and glow with a natural luminance.

Lighting accentuates marble panels and mosaic, glass mosaic and carved gypsum panels and calligraphy. Constraints included complexity of architectural and interior design plus installation speed. Coordination was solved on site through drawings. Many interior areas are predominately artificially lit, therefore lighting is an integral part of the appearance/image of the building.





BEIJING NEW POLY PLAZA

BEIJING, CHINA

The design brief for the new Beijing headquarters for the China Poly Group Corporation was to create an expression of the company's strength while also balancing a sense of allusion to its cultural significance as a guardian of China's cultural antiquities.

'This building is an excellent example of how lighting creates a building identity," an IALD judge said of the New Poly Plaza. "The lighting enhances the building architecture to create a splendid visual experience."

At more than 100,000 sq. meters (approx 1.1 million sq. feet) of office, retail, museum and theater spaces, the building's architecture and its lighting had to convey power but also sensitivity. At night, the intricate detailing of the façade is revealed while maintaining a sense of overall strength and solidity.

The south and west façades of the building were designed as a double wall comprised of an outer stone skin and inner glass curtain wall. The outer stone skin provides texture and daylight shading to help protect the building's conditioned spaces from glare and excessive solar heat gain.

The double-wall construction provided the opportunity to reveal the texture and delicate nature of the exterior stone cladding. The lighting designers worked closely with the architects on the placement and access of the T5 fluorescent linear luminaires to uplight the vertical and horizontal surfaces of the stone.

AWARD OF MERIT
LIGHTING DESIGN
Pete Sampas, ALD
Jonathan Plumpton
Shannon Burry
WSP FLACK + KURTZ
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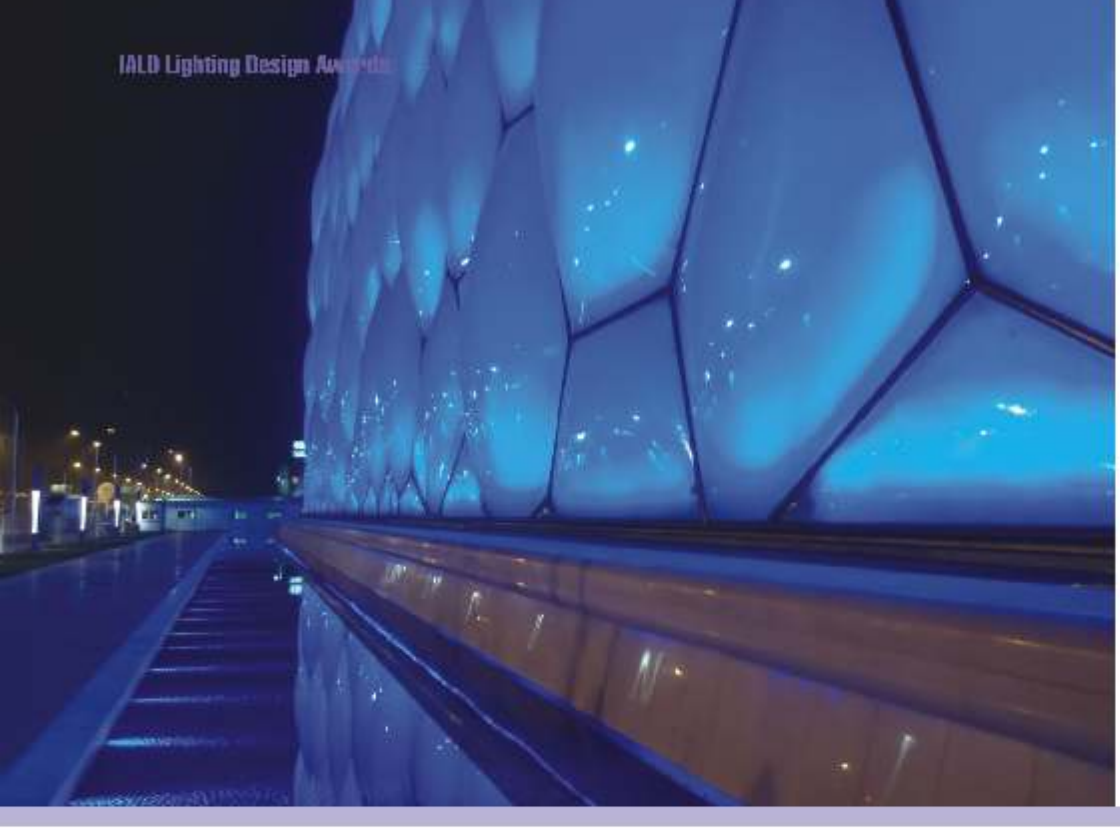

AWARD OF MERIT
LIGHTING DESIGN
Dr. Yan Weimin
Mr. Qi Hao
Mr. Liu Yingwen
Mr. Wang De in
Guangdong Lightscape Co. Ltd
PHOTOGRAPHY
© Mr. Duan Hongjun

LED LIGHTING ART OF THE WATER CUBE

BEIJING, CHINA

The LED lighting of the China National Aquatics Center, more commonly referred to as the Water Cube, has become a landmark since its debut at the 2008 Beijing Olympics. As athletes broke huge records in the Water Cube, the LED lighting art broke lighting milestones, using 470,000 1 Watt RGB LEDs, 1473 IP addresses, and 37,000 patented LED lights, illuminating a 53,000 square-meter surface.

"A truly meaningful application of a technology so often used gratuitously," one IALD awards judge stated. "Its simple allegiance to the building's intended program is indelible as both a personal or global experience."

Located next to the Birds Nest, the main stadium of the 2008 Olympics, the Water Cube's proximity to the Olympic Square demanded an autokinetic effect that would resonate with the visitor's eyes and hearts. The design motif is inspired by 'Rhythm of Water, Beauty of Cube'. Thanks to the lighting art, the Water Cube glitters with changing facades every night, standing as a gorgeous queen in the Beijing Olympic Square.

TORRE DEL AGUA (WATER TOWER)

ZARAGOZA, SPAIN

The main intention in the lighting of the Torre del Agua was to enable architecture to transmit the impression of water through the application of nuances in light and color.
At night, the visual image of the tower is based on transparency and subtle brightness, as a water container extruded from an organic shape. Judges praised that "[the] elegant lighting solution has given this structure a near-iconic presence after dark."
Architecture is emphasized by the dominant horizontal lighting using color variations connected to the shape of the structure.
The interplay between architecture and light creates multiple visual perceptions depending on the observer's position. The structure's six blue tones refer to the concept of water present in the five continents plus the poles.

AWARD OF MERIT
LIGHTING DESIGN
Mauricio Girés
Jose Garcia
José de Jesus Gonzalez
Isabel Dominguez
artec3
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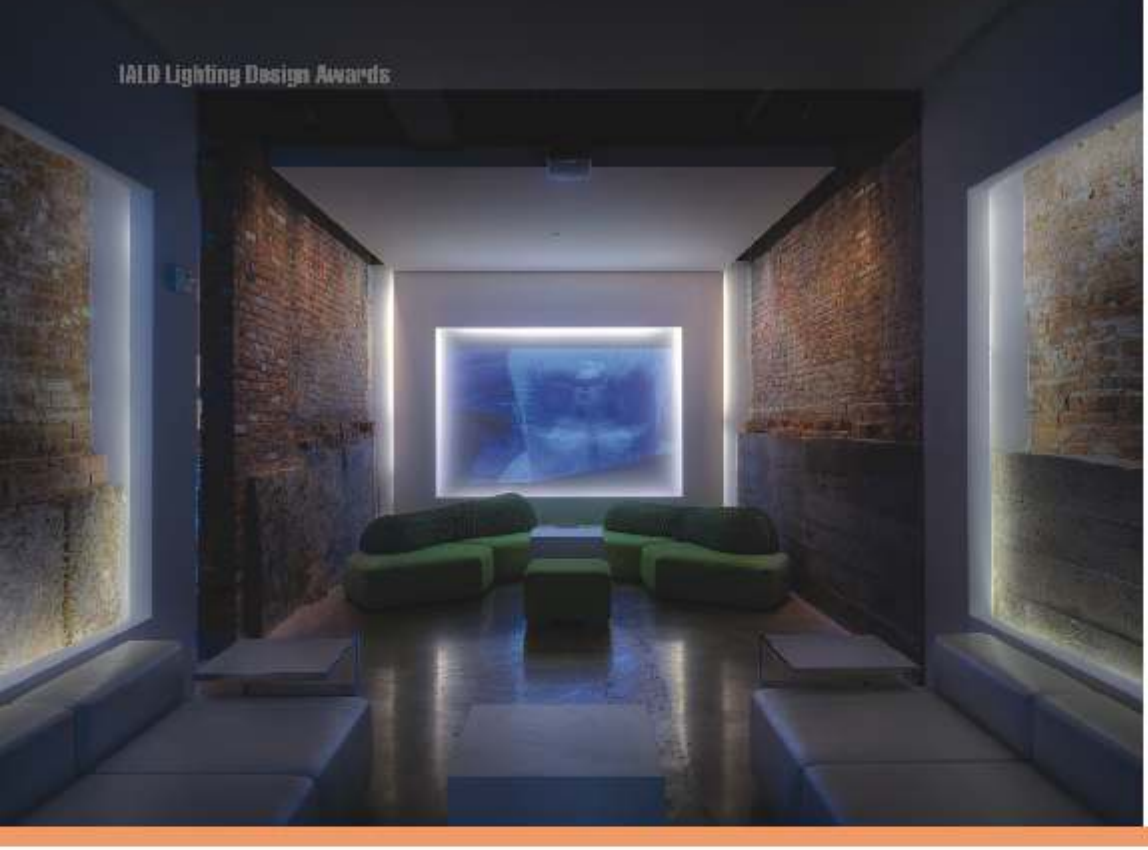

AWARD OF MERIT
LIGHTING DESIGN
Lauren Moran, A.D.
Scott G. Guenther, IALD
VOA Inc.
PHOTOGRAPHY
Sy Hakaan Patel

L2 LOUNGE

WASHINGTON, DC USA

L2 is a membership-based lounge located in the Georgetown section of Washington DC. It is situated in the mixed-use complex of historic townhouses and warehouses known as Cady's Alley.

Judges praised the "designers' methods of highlighting the architecture" and the "playful use of light in the bathroom design."

The creating of a unique, refined environment was the overall goal. The basement space had to feel inviting and warm. The layering and differentiation of materials was to be reinforced and subtly accented. The abundance of white finishes provided reflectance challenges for a typically dim environment. Wherever possible, the lighting was integrated with the architecture. The lounge was intended to be a destination worthy of the membership costs.

Continued from page 12

The complex character of these issues that branch over many international organisations dealing with only one segment of the question, makes it more difficult to deal with them. Therefore CIE initiated international and inter-society cooperation to solve these and other energy related questions by organizing next March in Vienna an international conference, where all players of this game can meet and discuss mutually interesting questions. CIE Technical Committees and all interested organisations are urged to take advantage of this possibility to air their requirements, suggest solutions by organizing workshops, satellite meetings and/or only offering contributed papers for this unique opportunity to discuss energy and vision related issues at the CIE 2010 Lighting Quality & Energy Efficiency Conference in Vienna, Austria next March 14-17.

Dr. János Schanda
CIE Vice President Technical
(reproduced from CIE News)

CIE PUBLICATIONS

Ocular Lighting Effects on Human Physiology and Behaviour (including Erratum 1)

CIE 158:2009

The nonvisual biological and behavioural effects of light in animals and humans are mediated by specific neuroanatomical pathways. Controlled empirical studies have shown that light can be used to treat some clinical disorders and may have broader, nonclinical applications for problems of shift work and jet lag. Studies are testing how lighting may be incorporated into architectural designs that are optimal for vision as well as physiological and behavioural stimulation.

This publication corrects and replaces CIE 158:2004 "Ocular Lighting Effects on Human Physiology and Behaviour". The Technical Report consists of 60 pages with 9 figures. The price of this publication is EUR 56,-- (Members of the National Committees of the CIE get 50% discount).

The spectrum of light sources and low lighting levels: the basics

Introduction

Already for quite some time worldwide heated discussions take place about certain lamp spectra having advantages on vision at low lighting levels. The terms "Mesopic Vision" and "Scotopic Vision" are key in this discussion. The discussion is important for road and residential area lighting where we have relatively low lighting levels. Today this discussion is especially important because with LEDs all kind of light colours and all kind of different tints of white light can be produced.

In the discussions sometimes quite a bit of "non-sense" pops up. Often the reason is lack of knowledge, probably understandable, because many different complicated aspects play a role.

Sometimes a direct comparison of only photopic and scotopic vision without taking the state of adaptation into account is used for making, wrongly, direct conclusions for road lighting. Another mistake quite often made is that only one aspect of mesopic vision is taken into account. We have to consider on-line and off-line vision aspects together with the aspect of how well a certain light spectrum, even at low lighting levels, contributes to visual performance via colour recognition. Sometimes the conditions of a uniform luminance field, as used in most investigations, are simply directly, and wrongly, used for road lighting circumstances. Last but not least, the fact that the spectral transmittance of the human eye changes considerably with age is often not being considered. This could have serious negative consequences for the older road user, let it be a car driver or pedestrian.

Probably this year the CIE will come out with an important extensive Publication focussing especially on the off-line vision aspect of mesopic vision. While this will help to direct the discussions in the right direction it also could mean that some readers will forget to take the complete picture into account.

This text is written in as easy language as possible and as short as possible with the purpose to give the complete fundamental basics on this subject without going into scientific detail. No overall conclusions on suitability of specific spectra of light sources for use in road lighting are given. Readers of this publication can draw correct conclusions themselves with the basics given in it.

1 Photopic Vision

Cones are light sensitive cells which are concentrated on the fovea of the retina of the eye. Outside the fovea the number of cones diminishes very rapidly (Figure 1). The fovea is the area of the retina on which a sharp image of the small area immediately around the viewing direction is formed: "central" or "on-line" vision. The cones are maximum active with adaptation luminances larger than some 3 to 10 cd m^{-2}. We then talk about photopic vision. Color vision is possible because we have red-, green-and blue sensitive cones. The spectral sensitivity with photopic vision is characterized by the V(*lambda*) curve and reaches its maximum sensitivity at a wavelength of around 555 nm, corresponding to a green-yellow color (Figure 2). Light sources with a high yellow content therefore can have high efficacies. Normally, all lighting measurements (luminous flux, luminous intensity, illuminance, luminance etc.) are made using the photopic spectral luminous efficiency function.

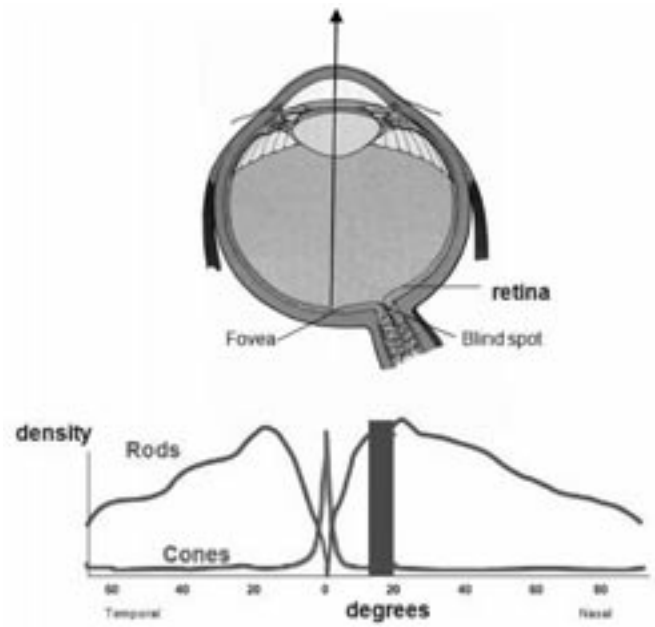

Fig. 1: Density of cones and rods on the retina of the eye.

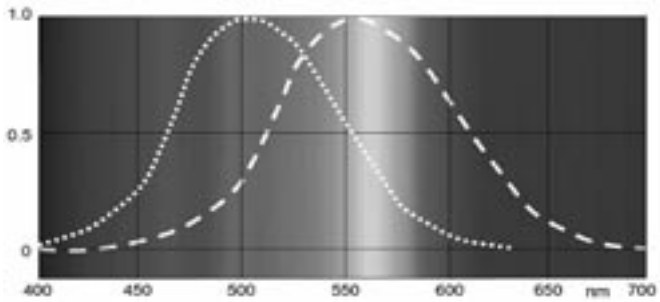

Fig. 2: Photopic V(lambda) curve ....., and scotopic V'(lambda) curve ....

2 Scotopic Vision

Rods are light sensitive cells with a high sensitivity, their concentration increases on the outer (peripheral) area of the retina. The maximum concentration is at about 15° from the direction of view; the central area of the fovea does not have rods (Figure 1). Rods are thus important for "peripheral" or "off-line vision". Since many rods are interconnected the image formed is not sharp.

At adaptation luminances lower than some 0,01 to 0,003 cd m^{-2} only the rods are active and we speak of scotopic vision[1]. Color vision is impossible with rods only. The spectral sensitivity with scotopic vision is characterized by the V'(lambda) curve. It reaches its maximum sensitivity at a wavelength of around 505 nm, corresponding to the color blue-green: relative to the V(*lambda*) curve there is a clear shift towards the blue end of the spectrum (Fig. 2).

As a characteristic for how effective the spectrum of a light source is under scotopic vision the S/P ratio is used. It is the ratio between the scotopic luminance (according to V'(lambda)) and photopic luminance (*according to V(lambda)*) for that spectrum[2]. Table 1 gives typical S/P values for different light sources used in road lighting[3,4].

Light Source	**S/P Ratio**
yellow-white High Pressure Sodium	0,65
warm-white Metal Halide	1,25
warm-white LED	1,3
cool white Metal Halide	1,8
blue rich white LED	2,15

Table1: *Approximate S/P ratios for different light sources.*

3 Mesopic Vision

At adaptation levels between approximately 10 and 0,003 cd m^{-2} both the cones and rods are active.

From high to low adaptation levels the activity of the rods becomes more important. The overall spectral sensitivity gradually shifts into the direction of small wavelengths that is in the direction of blue. This adaptation dependent effect is also called the "Purkinje effect".

In order to determine the practical effect of the gradual shift of the spectral sensitivity in the mesopic area we have to distinguish between on-line (foveal) and off-line (peripheral) vision.

3.1. On-line mesopic vision

Since the fovea hardly has any rods it are the cones on the fovea that play the determining role. Indeed the V(lambda) curve provides an acceptable good prediction of on-line small task performance for adaptation levels larger than some 0,01 cd m^{-2}. The normal photopic light units should be used. Even dimly lit streets have lighting levels (much) larger than 0,1 cd m-2 (see previous footnote 1).

3.2. Off-line mesopic vision

To determine fundamentally the actual spectral sensitivity of the visual system under off-line mesopic vision circumstances at different adaptation levels is difficult if not impossible. Therefore the procedure is to determine the effect of different spectra on performance criteria. For road lighting these need to be relevant for the task prevailing. Rea and Bullough [1] in the USA used as criterion the reaction time of motorists. A European consortium of five mutually independent laboratories (called MOVE) used a three-phase criterion: can an object be seen by a motorist, how quickly can it be seen and finally can it be recognized [5,6]. Usually off-line investigations are done for an off-line angle of about 10^0 . In a Technical Committee (TC 1-58 "Visual performance in the mesopic range)" of the International Lighting Commission CIE both parties (and more) are working together to define on the basis of this kind of research a unified system of photometry for mesopic vision[7]. As an illustration of the effect of light source spectrum in the mesopic range for off-line vision Table 2 gives results of the MOVE model [2]. The percentage difference between the luminance calculated using the MOVE model and the photopic luminance for light sources with different S/P values are

	Adaptation luminance (photopic cd m^{-2})		
S/P	***0,03***	***0,3***	***3***
0,65	***-24 %***	***-10 %***	***- 3%***
1	***0 %***	***0 %***	***0 %***
1,35	***20 %***	***9 %***	***3 %***
2,15	***61 %***	***28 %***	***9 %***

Table 2: *Percentage difference between effective luminance and photopic luminance for off-line mesopic vision for different light sources characterized by their S/P value. Source [2].*

[1]Full moon at non-tropical latitudes gives around 0,3 lux horizontal illuminance at sea level. On an average asphaltic surface this results in 0,02 to 0,03 cd m-2, so clearly too "bright" for scotopic vision. Dimly lit residential streets have an average luminance of some 0,2 to 0,5 cd m-2, far too bright for scotopic vision.

[2]As an example let us take a theoretical monochromatic light source with wavelength of 500 nm. From Figure 2 we see that the relative scotopic V'(lambda) value is 0,99 and the relative photopic V(lambda) value 0,30. The ratio and thus the S/P value equals in this example 0,99 / 0,30 = 3,3. For non-monochromatic light this procedure has to be followed for all wavelengths contained by that light source.

[3]Colored LEDs (green or blue) have higher S/P ratios but should not be used for normal road lighting because of their unnatural impression, poor color rendering (see Section 3.3 "color vision in the mesopic range") and the inefficiency for the older eyes (see Section 3.4 "effect of age in mesopic vision").

[4]Sometimes we see in publications that the S/P ratio is used as a direct and sole characteristic for mesopic vision. This is misleading and wrong. As will be described under the heading "Mesopic vision" the effect of the spectrum in the mesopic range is dependent upon both the spectrum of the light source (and thus upon the S/P ratio) and the actual adaptation luminance.

[5]Because rods do not give a sharp image the assumption must be that after detecting an (unsharp) image off-line, the eyes turn to focus on-line on the object for final recognition.

[6]The MOVE project received the Walsh-Weston Award 2008 from the Society of Light and Lighting in UK.

[7]May 2009: Following the TC ballot discussions take place to accommodate comments. After this the Report goes for final ballot. With positive result the Publication will be published as an internationally agreed CIE system for off-line mesopic vision.

given for different adaptation luminances. Comparing high pressure sodium (S/P ratio of 0,65) with warm white LED light (S/P ratio of 1,35) and with blue rich white LED light (S/P ratio of 2,15) shows that light levels with warm white LED light are effectively 10 + 9 = 19 % higher and blue rich white LED light 10 + 28 = 38 % higher than high pressure sodium at an adaptation level of 0,3 cd m^{-2}. These percentages concern off-line vision only.

3.3 Colour vision in the mesopic range

Since cones, which allow for color vision, are still partly active in the mesopic range it may be expected that color recognition at road lighting levels contributes to visual performance. Indeed relatively recent research shows that identification of human faces with white light with a color rendering index, R_a, better than about 50 is much easier than with high pressure sodium light sources with a R_a of about 25: with white light only half the lighting level is needed for a same identification possibility [5,6]. Important to note that it is here the color rendering index that is determining and not the color temperature. Both blue rich white light and warm white light will give these advantages. An earlier study by Boyce et.al. did not show a significant difference [7]. Fotios et.al. from Sheffield University in UK will publish a new study on the subject [8]. UK's standard BS 5489 permits a reduction in average illuminance when using a light source with a color rendering index larger than 60.

3.4 Effect of age in mesopic vision

The MOVE studies referred to above, like most other similar studies, have been carried out with subjects in the age range 20 to 35. The human crystalline lens in the eye turns yellowish with age. One of the consequences is blue and green (short wavelength) vision loss. Figure 3 gives the transmission of the eye lens for the age group 60 – 69 relative to the age group 20 – 29. Of course the absorption of blue components of blue-rich white light in the yellowed lens of older people will decrease the total amount of that light reaching both the rods and cones. Blue-rich white light (high S/P values) is therefore less effective for elderly people for both on-line and off-line vision than warm– white light. Since this blue absorption effect effectively lowers the S/P ratio, the off-line mesopic advantages of blue-rich light as described above, are probably totally ignorable for older drivers[8]. Studies are underway to quantify this age effect more precisely [3].

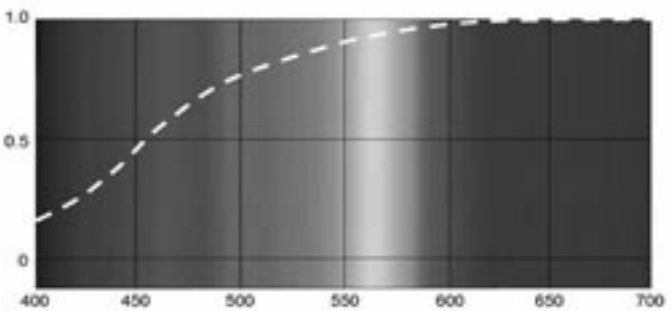

Fig. 3: Transmission of the human crystalline lens of the age group 60–70 relative to the age group 20–30. Calculated on basis of [4].

4 Adaptation luminance under road lighting conditions

When in the earlier Sections the expression "adaption luminance" was used it concerned the uniform luminance of a large sized background of the task. Under road lighting conditions the luminance of the field is not uniform. For reasons of simplicity, often the average road surface luminance is, wrongly, taken as the adaptation luminance. Many other, often high value, luminances in the visual field play a role. Think of the bright road lighting luminaires, headlamps, luminous signs and light reflected off surfaces. All these will increase the adaptation luminance to a value higher than the average road surface luminance. Vision is therefore shifted more into the direction of photopic vision than concluded from the average road surface luminance alone. This could especially be important in residential area lighting where the view of pedestrians walking in the street regularly can be straight into high luminance areas. This is different from motorists whose main view is downward to the road ahead.

Acknowledgement

The author gratefully acknowledges Teresa Goodman (UK), Terry McGowan (USA) and Janos Schanda (Hungary) for reading the draft manuscript and for their valuable comments.

References

[1] Rea, MS., Bullough, JD., "Making the move to a unified system of photometry", Lighting Research and Technology 2007, 39: 393-408.

[2] Goodman, T., Forbes, A., Walkey, H., Eloholma, M., Halonen, L., Alferdinck, J., Freiding, A., Bodrogi, P., Varady, G., Szalmas, A., "Mesopic visual efficiency IV: a model with relevance to nighttime driving and other applications", Lighting Research and Technology 2007; 39: 365-392.

[3] Nakagawa, K., Akashi, Y., "The effect of yellowing human crystalline lens on the mesopic vision", CIE Midterm meeting, Light and Lighting Conference with special emphasis on LEDs and Solid State Lighting, Budapest, 2009.

[4] CIE Publication 158, "Ocular lighting effects on human physiology and behavior", Vienna, 2004.

[5] Raynham, P., Saksvikkrønning, T., "White light and facial recognition", The Lighting Journal 2003; 69: 29-33.

[6] Knight, C., van Kemenade, J., "Wahrnehmung und Wertschätzung der Erdkunden in Bezug auf die öffentliche Beleuchtung", Licht 2006, 10-13, 2006, Bern.

[8]Today artificial lenses used in cataract operations are often of the blue-block type to protect the retina of the eye. Such a lens has a blue and green filtering similar to the 50-year-old natural crystalline lens, again much lower than the natural lens transmission of the younger age group of 20-30.

[7] Boyce, PR., Rea, MS, "Security lighting: effects of illuminance and light source on the capabilities of guards and intruders", Lighting Research and Technology 1990; 22:57-79.

[8] Fotios, SA., Cheal, C., "Road lighting for pedestrians in residential areas: choosing the optimum lamp colour characteristics", CIE Midterm meeting, Light and Lighting Conference with special emphasis on LEDs and Solid State Lighting, Budapest, 2009.

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FORTHCOMING EVENTS

CIE 2010 Lighting Quality & Energy Efficiency

March 14-17, 2010, Vienna, Austria

This important conference will cover Energy Efficiency and Policy Framework, Lighting Quality and Lighting and Renewable Energy with special emphasis on lighting in Developing Countries. Each of these areas will be covered by 3 modules which will be either Tutorials, Workshops or Sessions.

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- Energy efficiency and environmental compatibility

For further details and registration check the conference website at vienna2010.cie.co.at.

NEWS ABOUT MEMBERS

Dr. Radhakrishna S. Aithal at Lux Europa

ISLE member, Dr. Radhakrishna S. Aithal, Joint Director of MIT, Manipal and Professor in Electrical & Electronics Engg., participated and presented a research paper entitled "Impact of self-sustainable rural household lighting – Case study of a typical Indian village" in the Lux Europa 2009, the 11th European Lighting Conference held at Istanbul, Turkey from 9th to 11th September 2009, under the 'Incentives for Excellence in Teaching & Research' policy of the Manipal University. This paper is based on the outcome of 'Light for Life', a Green Light, Rural Community Development Charity Project implemented by the institute in a local village with support of Indian Society of Lighting Engineers (ISLE) and Asian Electronics Ltd., Mumbai. (see Newsletter October 2006)

Dr. Aithal was the sole representative from India in this prestigious international conference attended by more than 350 delegates from 35 leading countries of the world. This project in which an academic institution is actively involved in the development of local rural community through this type of green light project, was appreciated at the conference. This paper is co-authored by Dr. Chandrashekara S. Adiga of MIT, Manipal and Mr. S. Anantharam Patil of Halcrow, Sharjah.

LETTERS TO THE EDITOR

The letters below are not really letters to the Editor, but this correspondence is in response to Mr. Howard Brandston's letter to the Editor in the July 2009 issue.

Dear Avinash,
Date: 9/2/2009 4:35:36 PM
To: dradk@hotmail.com
Subject: Incandescent lamp

Banning the incandescent lamp

I have read with interest Howard Brandston's views in the July issue of ISLE Newsletter. Again today I read Dhaval Mahidharia's e-mail that 100W lamps are being banned in Europe from Sept 01.

My feeling is that while these lamps are energy guzzlers, CFL'S are equally detrimental to the environment due to the mercury content. I would like to hear your views on this for my personal interest

Regards
Riaz,

———

Dear Riaz,
Date: Wed, 2 Sep 2009 16:51:28 +0530
From: dradk@hotmail.com
To: lumentech@vsnl.com
CC: isledel@vsnl.com; hsmamak@hotmail.com; chatlit@gmail.com; s.venkataramani@philips.com
Subject: Re: Incandescent lamp

I suggest you to write to the ISLE Newsletter and let us start a discussion going on this very important subject.

I agree with you and mercury is not the only problem with CFL, it also the electronic ballast which is also being discarded.

In Europe there is a strong move to upgrade GLS by using advanced halogen technology by:

1. Replacing argon gas in halogen lamp by krypton and xenon,
2. Using low voltage halogen capsule in GLS, and
3. Using IR reflecting coating to further enhance efficacy.

I sincerely hope all this is not too little too late.

Regards,
Avinash

Dear Riaz,
To: Avinash Kulkarni ; lumentech@vsnl.com
Cc: ISLE ; chatlit@gmail.com ; S Venkataramani
Sent: Thursday, September 03, 2009 11:47 AM
Subject: RE: Incandescent lamp

You may be interested to hear that Elcoma is very much in the picture with the Government to find a safe solution to the disposal of mercury in lamps. Elcoma has decided to appoint a competent Consultant to study this entire problem and suggest a method of approach.

You worry about elctronics will certainly be the next issue to be addressed but I am hoping that we will get some ideas from the giants in electronics who are presently also in discussion with the Government.

Dr. Kulkarni's idea of starting a discussion in the Newsletter is a very good one.

Regards,
Hari Mamak

Dear Avinash,
----- Original Message -----
From: Lumentech Pvt Ltd
To: dradk@hotmail.com
Cc: hsmamak@hotmail.com
Sent: Monday, September 07, 2009 5:06 PM
Subject: Banning GLS

Thanks for your prompt reply. My proposal would be that ISLE should take up the matter with BEE and request them not to condemn GLS lamps. I fear if BEE takes the cue from Europe they may suggest to the Government to ban these lamps in India also.

I fully indorse Howard Brandston's point of view. The GLS lamp is not such a demon that it should be banned from use. The Industry should concentrate its efforts to make this lamp more energy-efficient and oppose the move to ban the GLS lamp in India at least.

As regards Mr. Mamak's prompt reply I am reasonably sure mercury disposal in lamps is already in place in Europe as also disposal of electronic waste. In spite of this Europe has decided to ban the lamp. Hence even if these issues are addressed in India the threat to the GLS lamp will still persist.

As far as the general public is concerned there is already enough propaganda which makes them shy away from GLS lamps and use only CFL'S. So I don't see any advantage in BANNING the lamp. After all the first electrical lamp the world has seen should not be given such an unceremonial farewell! Why kill it when it can have a natural death?

All said and done, there are certain advantages of the GLS lamp. It is for the Consultant/User to decide whether he wants to use the lamp. A striking case in point is the lighting of the Mysore Palace. There has been a strong move from the Industry to convince the authorities to change over from GLS to CFL. But the Authorities are adamant that they want GLS and only GLS. This means that there are some examples where only the GLS lamp is preferred.

Regards
Riaz Kagalwala

WEB WATCH

Eternal Sunshine of the Spotless Kind

Mansi Choksi, TNN 14 September 2008

Solar power has changed the face of this village of woodcutters, and it has happened mainly because of the efforts of the aggressive sarpanch. Shivaji Babu Pote is not your standard village head with bushy beard and wracking cough. He is an articulate young man who has studied up to Class XII in Pune and is now determined to develop his native place. So when a Pune-based electrical company called Aar-Em Electronics decided to adopt them a few months ago, he jumped at it.

Link:
http://timesofindia.indiatimes.com/articleshow/msid-3480838.prtpage-1.cms

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LED Lighting Manufacturers Have What They Need - DOE Conference Report, Part I

Attention LED lighting manufacturers: You have no excuse for creating an inferior product… all the information you need to understand the quality requirements and to receive the correct right "stamps of approval" are right there in front of you, whether online or at one of your friendly neighborhood conferences. One opportunity for those answers was the just-concluded SSL Market Introduction Workshop put on by the US Department of Energy. The three-day workshop in Chicago, brought a lot of the answers into one place.

Link I:
http://www.solidstatelightingdesign.com/documents/articles/news/117792.html#editorial

Link II:
http://www.compoundsemi.com/documents/view/generic.php?id=117854

'Nanospears' Could Lead to Better Solar Cells, Lasers, Lighting

Growing - and precisely aligning - microscopic, spear-shaped zinc oxide crystals on a surface of single-crystal silicon, researchers at Missouri University of Science and Technology may have developed a method to make more efficient solar cells.

Dr. Jay A. Switzer and his colleagues at Missouri S&T report in the journal Chemistry of Materials that their simple, inexpensive process could also lead to new materials for ultraviolet lasers, solid-state lighting and piezoelectric devices.

"It's kind of like growing rock candy crystals on a string," says Switzer, the Donald L. Castleman/ Foundation for Chemical Research Professor of Discovery at Missouri S&T. But instead of using sugar water and string, Switzer's team grows the zinc oxide "nanospears" on the single-crystal silicon placed in a beaker filled with an alkaline solution saturated with zinc ions. The process yields tilted, single-crystal, spear-shaped rods that grow out of the silicon surface, like tiny spikes.

The spears are about 100-200 nanometers in diameter - hundreds of times smaller than the width of a human hair - and about 1 micrometer in length. A nanometer - visible only with the aid of a high-power electron microscope - is one billionth of a meter, and some nanomaterials are only a few atoms in size.

The research is reported Tuesday, Aug. 11 in Chemistry of Materials' online ASAP ("as soon as publishable") section and will appear in an upcoming issue.

Link:

http://news.mst.edu/2009/08/nanospears_could_lead_to_bette.html

http://pubs.acs.org/doi/abs/10.1021/cm9010019

Top 10 Coolest Light Gadgets

Here is a Top 10 list containing the coolest lamp and light gadgets out there at the moment.

Link:

http://fosfor.com/top-10-coolest-light-gadgets

1000-Village Solar LED Initiative launches in Southwest China

A project that aims to introduce solar-powered Led lighting in 1000 villages across China, India and Africa was launched recently by Tony Blair and Jet Li.

Former UK prime minister Tony Blair and Chinese film star Jet Li have launched the 1000-Village Solar LED Initiative in Guiyang, capital of Guizhou Province.

Baigongcun, a Miao group inhabited village to Huaxi District of Guiyang city, has become a pilot site of the demonstration project.

The 5-year project, which is a joint initiative between The Climate Group and the Jet Li One Foundation, will engage 400 villages in China in the first two years, and 600 villages in China, India and African countries on the second stage.

Link:

http://www.theclimategroup.org/news_and_events/1000_village_solar_led_initiative_launched/

Eye-Catching Vision Discovery

Nearly all species have some ability to detect light. At least three types of cells in the retina allow us to see images or distinguish between night and day. Now, researchers at the Johns Hopkins School of Medicine have discovered in fish yet another type of cell that can sense light and contribute to vision.

This team of neuroscientists have shown that retinal horizontal cells, which are nerve cells once thought only to talk to neighboring nerve cells and not even to the brain, are light sensitive themselves.

"This is mind-boggling," said King-Wai Yau, Ph.D., a professor of neuroscience at the Solomon H. Snyder Department of Neuroscience at Johns Hopkins.

"For more than 100 years, it's been known that rod cells and cone cells are responsible for sensing light, and therefore, vision," said Yau. "Then, about seven years ago, another light sensor was discovered in the retina, revealing a third type of light-sensitive cells in mammals, so we set out to look at whether this was true in other vertebrates as well."

Focusing their efforts on the melanopsin light sensor, which is responsible for sensing day and night but barely involved — in mammals, at least — in seeing images, Yau's team looked for melanopsin-containing cells in other vertebrates, and found some in the retinal horizontal cells in goldfish and catfish.

Catfish contain two flavors of retinal horizontal cells: those that connect to cone cells, which respond to bright light, and those that connect to rod cells, which respond to dim light. The team took electrical readings from single isolated retinal horizontal cells. They found that light caused a change in electrical current in cone horizontal cells but not in rod horizontal cells.

Link:

http://snipurl.com/rmdje

or

http://www.photonics.com/Content/ReadArticle.aspx?ArticleID=39072&refer=bio&utm_source=bio_2009_8_25&utm_medium=email&utm_campaign=bio

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LEDs Shine at Work

Technology is the great catalyzer, catapulting the LED industry forward by enhancing existing applications and enabling new ones. Many technological advances are pushing LEDs away from the old single-color realm where they were used for specific applications such as emergency exit signs or brake lights, and closer to a domain where they play more versatile roles as replacements for the everyday white lightbulb, street lighting, surgical lighting and more.

Producing LEDs that illuminate our homes and streets – or even our skin, as in surgical applications – would be impossible without advances in phosphors, materials and packaging. Natural white light is measured by the color rendering index (CRI), which is based on the light's ability to produce the truest color of the object being illuminated. Skin, for example, looks best when illuminated by a light source with a CRI of 70 or more.

Link:

http://snipurl.com/rl8ud

or

http://www.photonics.com/Content/ReadArticle.aspx?ArticleID=39231&refer=spectraNewsletter&utm_source=spectraNewsletter_2009_August&utm_medium=email&utm_campaign=spectraNewsletter

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Slide Show of Antique Lamps

Some of the finest lamps in the world were made in the turn of the 20th century. Electric lighting was becoming commonplace in America, and designers like Tiffany and Handel took it to an art form.

Take a look at the slide show for valuations and explanations of some of the best examples which were sold at the Fontaine's Auction Gallery

Link:

http://www.examiner.com/examinerslideshow.html?entryid=431718

http://www.examiner.com/x-312-Auctions-and-Antiques-Examiner~y2009m8d4-Slide-show-presentation-of-antique-lighting-with-auction-prices

Ultrathin Light-Emitting Diodes Create New Classes of Lighting and Display Systems

A new process for creating ultrathin, ultrasmall inorganic light-emitting diodes (LEDs) and assembling them into large arrays offers new classes of lighting and display systems with interesting properties, such as see-through construction and mechanical flexibility, that would be impossible to achieve with existing technologies.

Applications for the arrays, which can be printed onto flat or flexible substrates ranging from glass to plastic and rubber, include general illumination, high-resolution home theater displays, wearable health monitors, and biomedical imaging devices.

Link:

http://www.physorg.com/news169997059.html

Solid State Lighting Design Website

To help push LED and solid state lighting into the mainstream. We have a vision of the impact the solid state lighting industry can bring to world, and look forward to doing our part to make it happen as quickly as possible.

Link:

http://www.solidstatelightingdesign.com/

Preliminary Evidence that Both Blue and Red Light can Induce Alertness at Night

A variety of studies have demonstrated that retinal light exposure can increase alertness at night. It is now well accepted that the circadian system is maximally sensitive to short-wavelength (blue) light and is quite insensitive to long-wavelength (red) light.

Retinal exposures to blue light at night have been recently shown to impact alertness, implicating participation by the circadian system. The present experiment was conducted to look at the impact of both blue and red light at two different levels on nocturnal alertness.

Visually effective but moderate levels of red light are ineffective for stimulating the circadian system. If it were shown that a moderate level of red light impacts alertness, it would have had to occur via a pathway other than through the circadian system.

Link:

http://7thspace.com/headlines/318196/preliminary_evidence_that_both_blue_and_red_light_can_induce_alertness_at_night.html

SSL Videos

LED Bulb Replacement - with National LED Driver and Nuventix Synjet solid state cooler

Quantum Dot LEDs

Retrofit LED Bulb

Link:

http://www.ledsmagazine.com/video

Provided by Anool Mahidharia

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M(L)1471	Mr. Subrata Biswas Sundarpur Bylane No.1 Left House No. 18, Gr. Floor "Prasun Nilay" Guwahati 781 005	Member	Kolkata
M(L)1472	Mr. Sanjive Jain B-115, Sector 51 Noida 201 301	Member	Delhi
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