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LIGHT the official NEWSLETTER

of the **indian society of lighting engineers**

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FROM THE PRESIDENT'S DESK

Recently someone drew my attention to the newsletter of an international logistics association. In it there was an interview with the chairman. When asked why his company was a member of the association, he responded by saying that even though his company had access to a large corporate network, it was great to have access to a specialized network of experts which he felt was good for the company's bottom line as well. He also felt that in his position as Chairman, the time he spent on association matters covered a range of topics that he would not have need to deal with in his "day job" and therefore he was broadening his experience and knowledge base. When asked what advice he would give others, he responded by saying "you only get out what you put in".

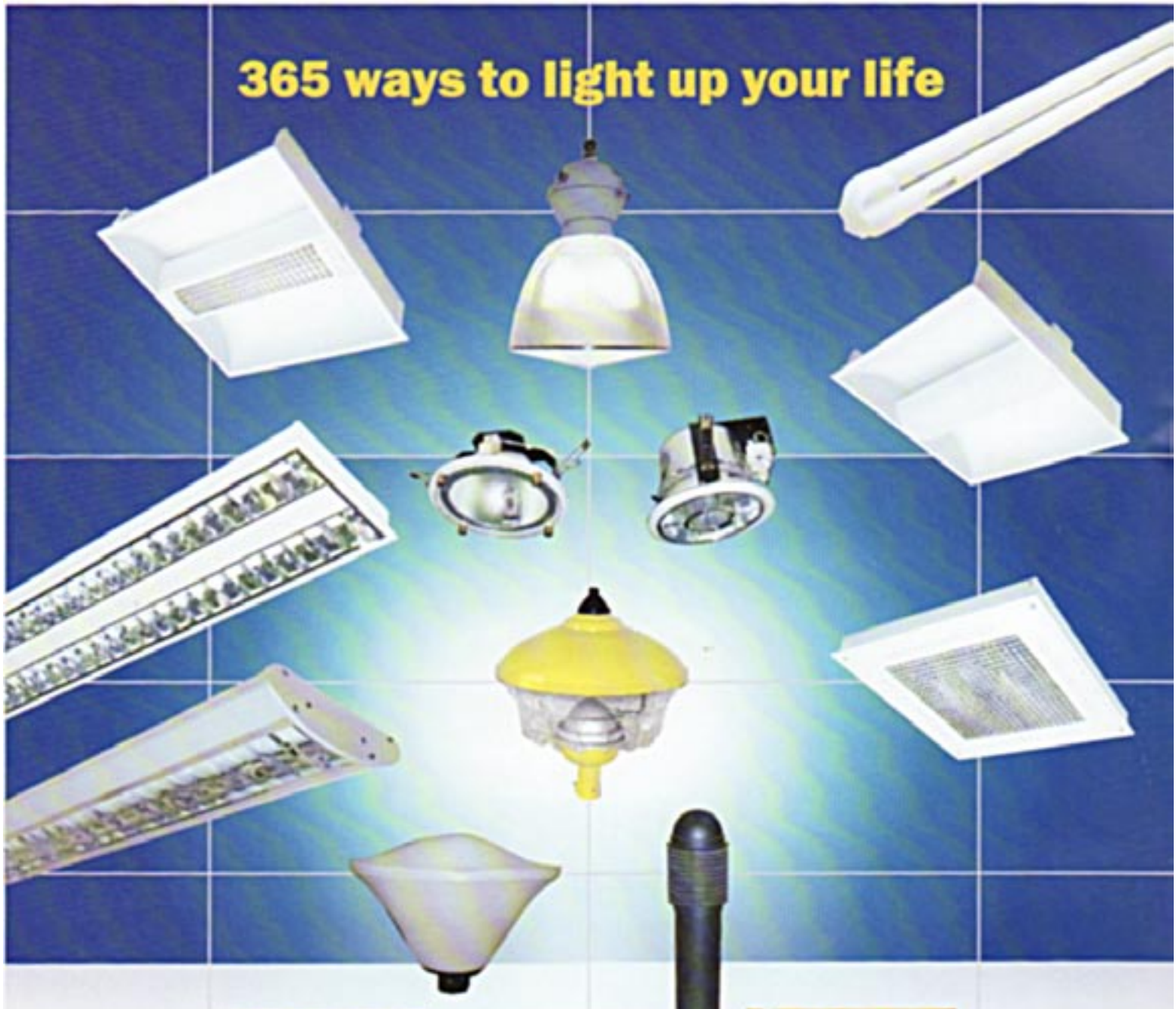
This got me thinking about what ISLE members feel about their involvement in our Society. Can the ISLE platform help those in the business to improve their bottom line; or to help improve their effectiveness as professionals? And are members broadening their experience and knowledge base as a result of ISLE activity?

Even in this age of SMS where we are urged every night by TV presenters to make instant responses to matters of national importance, I do not think that these are really "yes/no" questions, but the short answer in both cases would probably be "yes".

Over the last 25 years the leaders in the industry (and this includes smaller companies as well) have come forward to give financial support to the Society's technical programmes because they felt that there was a long term commercial benefit in developing discussion on technical issues and having better informed users and specifiers. Some lighting companies have supported the education initiatives of ISLE while others have supported research programmes.

And on the question of whether members are broadening their experience and knowledge base, even

365 ways to light up your life



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though many would answer in the affirmative, there is probably less certainty in this matter. It seems that some part of our membership really does not share this perception, or how else can we explain the large percentage of members that have fallen by the wayside over these 25 years and allowed their memberships to lapse. Or for that matter how do we explain the reducing attendance of ISLE members at ISLE conferences?

Thanks to the well conducted trade shows in the past, ISLE has a decent corpus. The Membership fees of ISLE are quite nominal. A Life time membership of ISLE is about one third of what I pay the Illuminating Engineering Society of North America (IESNA) as annual dues! The process of inducting new members has been streamlined to a point that membership certificates are issued within 4 weeks of acceptance of the cheque. There is no reason now for anyone interested in the Art and Science of Lighting not to be a member of ISLE; even more important is to be an active member.

Lighting is not a limited topic, it really encompasses all of human activity. The wide interest has resulted in a multi-functional and multi-dimensional scope with both national and international participation. In ISLE we are fortunate to have a membership profile that is not restricted only to lighting engineers, but a wide variety of professionals whose inputs and interests enrich our Society. ISLE is an active member and is represented on the Board of CIE and Lux Pacifica, and has MOUs with IESNA, ILE and IEANZ.

In this our Silver Jubilee year I think this calls for some rigorous thinking on these matters and how our Society needs to develop and evolve in the coming years. If, as the gentleman who started this thought process is right that "you only get out what you put in", I think perhaps the time has come to put in more. I would be very happy to have your thoughts on these and other issues. As always, my personal email address is appended and I look forward to hearing from you.

On a positive note, the partnership with IIID in organising Lii2009 in Mumbai was successful with 500 plus delegates in attendance at the excellent conference. And the partnership with Expomedia in the LSA exhibition was also good in the light of the economic downturn and the resultant absence of a few regulars. You will find reports on these events in this issue.

With the successful holding of a two day lighting course in Kolkata recently, we can look forward to more such courses at other locations across the country.

It looks like we are going to have a busy year and I wish you all the best.

Avinash D. Kulkarni
President
dradk@hotmail.com

EDITORIAL

The Lii2009 Conference in Mumbai was a resounding success with an excellent programme. What was heartening was the positive response with around 500 registered delegates. You will find the report on page 5.

Mr. Behr Champana, who many of you will remember from Lii2005, made another outstanding presentation. Because of its importance we have reproduced his presentation in this issue so that more people have access to it.

The Lighting South Asia 2009 organised by Expomedia also found a good response in spite of some absences from the Indian lighting industry, partly due to the current economic recession and partly because of the perception that it followed too soon after Lii2008. Or, could it have been because this was not an ISLE event? However, whatever the real reasons, there were 60 Indian and 26 international companies present and attracted 8500 visitors over the 4 days.

The next international event will be an ISLE organised event, Lii2011 in Chennai in March 2011. Details will be published in future issues.

The 6th Lux Pacifica conference scheduled to be held in Khabarovsk has now been relocated on the same dates to Bangkok. This is due to the withdrawal of the main Russian sponsor as a result of the international economic meltdown. The successful relocation has been possible only due to the untiring efforts of Dr. Warren Julian and his wife Stephanie who have had to make this happen on their own without the support of the local Society. Our President will be attending the conference and we will publish a report in our next issue

The President has suggested that we use the newsletter to promote discussion on current lighting topics of interest. I am using my privilege as Editor to launch the first topic for discussion. I invite you to send in your views on "LEDs for Streetlighting Applications".

LEDs are accepted the world over as the light source of the future and expectations of its success are high because of its strong energy saving characteristics and long life. We have noticed that there is a lot of interest presently in the utilisation of LEDs in street lighting and it would be very worthwhile to open a discussion on this subject. Responses will be reviewed and published in the next issue as well as on the website.

We look forward to hearing from you.

H.S. Mamak
Editor

OBITUARY

Gennady Shakhparunyants
1938-2008

We were sorry to hear that Mr. Gennady Shakhparunyants, Director General of the Russian Lighting Research Institute, Vice-President of the CIE, President of the Illuminating Engineering Society of Russia and President of the Lighting Trade Association, passed away after having suffered from serious illness on the 30th of December 2008.

ISLE members who were at the CIE Session in Delhi will remember him. He was also a Board member of Lux Pacifica which was an additional reason for him to be in touch with ISLE over the years.

Both Mr. P.K. Bandyopadhyay and I had many interesting exchanges and discussions with him at various CIE meeings.

He was a lighting enthusiast who never lost an opportunity to promote good lighting practices. He will be missed by the international fraternity.

H. S. Mamak

ISLE ACTIVITY

Course on Basics of Energy Efficient Lighting Systems
February 13-14, Kolkata

The School of Illumination Science Engineering and Design (SISED), Jadavpur University and ISLE organised a two day Lighting Course at Jadavpur University in February.

Targeted at Architects, Consultants, Project Managers and Engineers, Interior Designers, Lighting Practitioners, Builders and Developers, Traders, Contractors, University Teachers and Students, the course consisted of both theoretical classes at the KP Basu Memorial Hall as well as practical demonstrations at the Illumination Engineering Laboratory at Jadavpur University. After the theoretical classes on February 14, a test was given to the course participants.

The course attracted a total of 55 participants. The course fee was Rs. 500 for Students, Rs. 1500 for ISLE Members and Rs. 2000 for non Members.

The programme is given below.

13th February 2009

Coffee sponsored by Binay Opto Electronics Ltd

Inaugural Session

Theoretical Classes

Lighting Fundamentals by Prof. K. Goswami, JU
Light Sources & Luminaires by A. Mukherjee, CSET
Lighting Control Gear by Dr. S. Mazumdar, JU

Lunch sponsored by Bajaj Electricals

Theoretical Classes

Indoor Lighting by Suddhasatwa Chakraborty, JU
Application of Energy Efficient Lighting by K Naveen, Bajaj Electricals Ltd
Lighting System Management by Sisir Ganguly – Former Chief Engineer, PWD

Tea

Practical Classes

Laboratory on Lighting and Electrical Measuring Instruments/ Demonstration of Lamp and Luminaire Circuits

14TH FEB'09

Theoretical Classes

Outdoor Lighting by Dr. Biswanath Roy, JU
Energy & Lighting Economics by Mrs. Kamalika Ghosh, JU
Lighting Project Engineering by Onkar Mitra, Consultant

Test

Lunch Sponsored by WBREDA

Practical Classes

Laboratory on Photometry

Valedictory Session

High Tea sponsored by Marc Signage

The course received support from the industry through sponsorships. The lunches were sponsored by Bajaj Electricals and WBREDA, the first coffee break by Binay Opto Electronics and the closing high tea by Marc Signage.

Prof. Goswami covered the first principles of the Radiation laws (Planck, Wien and Stefan-Boltzmann laws), characteristic temperatures and wavelengths for different spectral domains, photometric units and their terminologies, human eye sensitivity, luminous efficacy and efficiency.

Mr. Mukherjee gave an overview of light sources covering the different incandescent lamps, discharge lamps as well as solid state light sources. His presentation of luminaires covered luminaire classification, luminaire functions, safety and light control and IP classifications.

Prof. Mazumdar's presentation on Lighting Control Gears gave a comprehensive look at this important area covering the following components: starting and over

current protection, power quality improvement, light level control, light sensing and control and on/off control.

Mr. Chakraborty's coverage of indoor lighting examined the main lighting design criteria for indoor lighting design. This included Illuminance, uniformity of lighting levels, shadow and modeling, colour appearance, colour rendition and coefficient of utilization.

Mr. Ganguly detailed the importance of a conscious culture of maintenance management for a cost effective lighting system covering the issues of basic requirements, schedule planning, checking of specifications and safety aspects.

Dr. Roy, in the first part of his presentation covered the photometric specifications for indoor, road lighting and flood lighting luminaries through graphical methods. The second part focused on the design approach to road lighting and industrial area lighting including design objectives and parameters, selection of lamp and luminaires and pole layout, manual computation of average illuminance and point specific illuminance.

Mrs. Ghosh's presentation on energy and lighting economics covered the impact of energy production both on the Human Development Index as well as on the environment. Highlighting the need for growing awareness she explained terms such as carbon credit, carbon tax, green building concepts, ECBC codes, utilization of daylight and areas for further study and adoption.

Mr. Mitra first discussed issues of professional project management such as site survey, planning, design, specification, execution, finishing and maintenance. The engineering part covered technical aspects and phenomena such as lighting transformer, prospective fault levels, voltage fluctuations, lighting loads, harmonics, condition monitoring, power factor correction, line drop and line loss, surge protection, energy conservation and environment protection.

(***Note:*** *abstracts of presentations are available at* www.isleind.org *under "recent activities"*)

Light India International 2009 (Lii 2009)

Lighting is the single most important element in the visual environment. Over the last few years, the Indian Lighting Industry has seen phenomenal growth, upgradation in technology, products, product design and most importantly, a huge growth and diversification in application.

Effective lighting improves productivity and strengthens security. Lighting can consume up to 40 percent of the energy used in our buildings. A well designed lighting system reduces energy, maintenance, and potential liability costs. Both public and private interests are served by more effective lighting and reduced operating costs. Rapid improvements in lighting systems and equipment offer potential solutions, yet they have also made lighting practice more complex. On the other hand, the use of inefficient light sources and controls, and the wasteful usage of lighting results in polluting the environment leading to global warming. The need was therefore being felt for more interaction between the manufacturers and suppliers of lighting, and the user / specifier community, more specifically architects and interior designers.

With the above objective, the Light India International 2009 Conference was organised jointly by the Indian Society of Lighting Engineers (ISLE) and the Institute of Indian Interior Designers (IIID) to ensure a holistic coverage of lighting and design which together deliver a complete and efficient visual system. The Conference was held at the Bombay Exhibition Centre, Mumbai on 20th February, 2009. Over 500 delegates participated a most informative and interactive conference.

The event was inaugurated by **Mr. Shrikant Nivsarkar,** the first Indian to be elected as President of the International Federation of Interior Architects/Designers, a global apex body of the interior design profession, with 74 member countries and reaching out to about 65,000 members. He is also on the Board of the International Design Alliance (IDA) headquartered in Montreal, Canada. In his inaugural address, Mr. Nivsarkar mentioned that this Conference was due to the collaborative efforts of two leading professional organizations viz. IIID and ISLE. He felt that there was a need for bringing awareness amongst the users about the availability and use of appropriate light sources.

Dr. Ajay Mathur, Director General, Bureau of Energy Efficiency, Government of India who was the Chief Guest, in his address stressed the need of Public Private Partnership for promoting the use of energy efficient lighting. **Prof. Christopher Benninger** - a well known Architect, in his Keynote Address, made an interesting presentation on the Effective Use of Lighting.

This application oriented Conference had three sessions, each of about 2 hour's duration.

Session 1:
LEDs - Present and Future Environments -
Mr. Nigel D'Acre of Colour Kinetics, USA.

Mr. D'Acre presented an international picture of applications with LEDs both in the interior as well as outdoors.

While LEDs are undoubtedly the most promising light source of the future, there is a need to understand that this technology is still in the development stages and almost every

month changes and improvements can be seen. He pointed out that LEDs are not a light source in a traditional sense but a "system" contained in which is the mounting, a driver, heat sink, optic and a cover lens each contributing to an end result which of course is light output.

The efficiency of LEDs is eclipsing that of incandescent and halogens light sources and are already a preferred product in several applications. However, there is a need to fully understand the capabilities of light emitting solid state diodes since there are several myths surrounding it.

While LEDs may rarely fail, the encapsulant, the wire bonds and the die attachment may have assembly problems causing failures. The latest technical standards show that there could be 40% light depreciation within 9000 hours. Sometimes LEDs do not last forever because of incorrect choice of luminaires, improper fixture installation, wiring faults, power supply faults or incorrect cable connections. Quality not only of the LEDs but also the installation is very essential to get the best results.

LEDS do generate heat but do not radiate heat. There is therefore little heat in the beam of light in LEDs, however the biggest enemy of LED light output and life is the heat that is generated by the source and needs to be very efficiently dissipated. It is necessary to ensure that the data sheets are carefully studied before deciding on the correctness of the results proposed to be achieved.

Mr. D'Acre suggested that designers should of course keep in mind the long life and energy saving features of LEDs, but more important they must emphasise the aesthetic and dynamic possibilities that this light source offers to any lighting project. He took the delegates on a pictorial travel from Japan to USA and from China via India and the Far East to Europe showing landmark installations of LED lighting.

Session 2:

Lighting Infrastructure Projects - A case study of the DIAL - Delhi Airport Project ;
Mr. S.D. Saha, Mr. Surj Mangat and Mr. Sanjiv Sabharwal of Larsen & Toubro - *the main contractor of the project*

An excellent presentation was made of the multi dimensional and multi discipline nature of the project and the several new challenges that were faced for the first time in India. Thousands of kilometers of cabling, the largest air conditioning plant ever installed in India, thousands of lighting fixtures of various types, kilometers of moving platforms, etc. called for innovations in approach by architects, lighting designers, maintenance engineers, and installers.

The facility will cater for all requirements of passengers, visitors, and those working at the location. The equipment required for the airport had to be the best in the world and fully meeting the required technical and operational specifications.

World renowned consultants were employed to ensure sectorwise descriptions and drawings to enable proper construction and subsequent installation of equipment.

Prequalification international tenders were issued on the basis of predetermined lighting requirements. Based on the responses a careful selection was made of qualifying companies.

Lighting levels were worked out for each segment of the airport in keeping with world standard requirements based on the nature of activity/applications in the concerned segment.

Energy saving is a priority and the selection of luminaires and light resources were based on this overall consideration, not only on their direct energy saving but also on the contribution to ambient heat by the lighting installation which could effect the cooling load.

A large variety of light sources and efficient luminaires had been incorporated into the design to give direct and indirect lighting effects.

The schedule of work in keeping with the completion stages was explained to show at what stage lighting is installed. This was important in order to ensure that lighting was put up at the most opportune moment to ensure that all ancillary work did not hamper the working and the dusty environment did not affect the lighting luminaires.

Very careful lighting designs and luminaire asthetics had to be decided for shopping areas, passenger rest areas, hotels, restaurants etc.

The lighting levels varied in terms of occupancy from 50 lux to 500 lux. Intensive use of lighting controllers has been incorporated to ensure that there is no wasteful energy usage.

The airport is opening segment wise and already the plan and reality are matching in most of the areas that have been released so far. Whereas the total airport is far from ready yet, it can be confidently expected to be a landmark airport with international infrastructure and facilities.

Session 3:
Future Shock, Bright Lights, Big City
Mr. Behr Champana, Senior Vice President of TVS, USA - one of the largest firms of architects in the world

In a most original presentation Mr. Behr Champana spoke about the dangers that lie ahead for most cities. He warned that architects and town planners must devote attention to the growing urbanization, the increasing

population and with it the increase in pollution levels. He gave several examples of large cities in the so called developed world and showed how the shortage of water, electricity, hygienic living conditions and poor infrastructure lived side by side. This was even truer of the developing countries. He strongly advocated that China and India must lead the world with a new approach to town and rural planning. He gave several excellent ideas on how urban cities and rural developments can coexist and support each other. For instance, water wastage in cities could be of help to a rural set up, sewage disposal can also be of interest to farms, the green farms would certainly be a strong feature for the development of urban cities. Planned infrastructure development would benefit both rural and urban areas. This would create goodwill and wellbeing in a society rather than the present conflict that exists between rural interests and urbanization.

As Chairman, Organizing Committee of the Conference, Mr. Manoj Verma, President ELCOMA and Vice-President, Crompton Greaves mentioned that this conference is the outcome of joint efforts of IIID and ISLE. Mr. Hari Mamak, Director, Exhibition & Conference - ISLE made all out efforts to get the speakers for the conference, whereas Mr. Rashmi Bhuta coordinated all the activities to make sure that the Conference was successful. On this occasion, a Hand Book containing useful articles and information was also published. This could be made possible with the coordination of Mr. Anil Valia, well known Lighting Educator and Mr. Conrad Gonsalves of IIID. The conference arrangements were made by Expo Media Events, Noida, Ar. Nitin Kilawalla of IIID and Ar. Ashok Butala – President, IIID and Ar. Rohini Mani of IIID & ISLE. Of course, the person behind the curtain for implementation was Mr. Stan Alvares, Member, ISLE Mumbai State Centre Managing Committee. Expressing his gratitude to all the individuals and organisations for their support for the Conference, in his Vote of Thanks Dr. Prakash Barjatia, Chairman, Mumbai State Centre of ISLE specifically thanked Mr. Shekhar Bajaj, Chairman & MD, Bajaj Electricals, Mr. Ashok Butala, President - IIID and Dr. Avinash Kulkarni, President - ISLE. He thanked all speakers, delegates and their organisations for their support to make this Conference a great success.

The Conference coincided with the Lighting South Asia 2009 exhibition at the same venue from February 20 – 24, 2009. Nearly one hundred exhibitors both national and international participated in this largest lighting exhibition ever held in Mumbai. The exbibition attracted 8500 visitors It was interesting to notice that while LEDs held the central stage, electronics and decorative luminaires for homes and hotels gave a colour to the exhibition that made it an aesthetic event.

Ar. Rohini Mani
Director, Publication & Publicity
ISLE GB

DELHI STATE CENTRE

Election of Office Bearers for the Session 2008 - 2010.

The nominations for the post of office bearers of the executive committee of Delhi State Centre for the session 2008 - 2010 were called vide letter dated 11.07.2008 and were to be received by 28.07.2008.

Based on the nominations received and after scrutiny the following members were declared elected unopposed by the election convenor Mr. P. K. Garg.

Mr. A. K. Jain (F.0476)

Mr. Indranil Goswami (M.0981L)

Mr. H. R. Vaish (F.0535L)

Mr. Sudesh Gupta (M.1263)

Mr. C. L. Jindal (F.0606L)

Mr. V. M. Kohli (F.0416L)

Dr. Sushma Goel (F.0584L)

The result of the election was announced by Mr. N. Nagarajan (Chairman, Delhi State Centre) in the Executive Committee meeting held on 11.02.2009 at the office of the ISLE Secretariat in Defence Colony, New Delhi.

The members of the new Executive Committee of Delhi State Centre met on 18.02.2009 at the ISLE Delhi Secretariat office and the following office bearers were elected unopposed.

Mr. A. K. Jain (F.0476)	Chairman
Mr. Sudesh Gupta (M.1263)	Secretary
Mr. H. R. Vaish (F.0535L)	Treasurer

PUNE STUDENT CHAPTER

Technical Program on Lighting Design
April 10, 2009, Pune

A Technical program on Lighting Design for the Students, Architects, Interior Designers, ISLE Members and Lighting Professionals was organised by ISLE-MITSOL Student Chapter on Friday, 10th April, 2009 at MIT Campus.

After the Welcome Address by Mr. Bharat Kalambhe, Coordinator, ISLE-MITSOL Student Chapter, Dr. Prakash Barjatia, Director MIT School of Lighting & Management Studies (MITSOL), Pune and Chairman, ISLE Mumbai State Centre emphasised the need for such Programmes as they bring awareness about the subject of Lighting and also encourage students to take active part in the organisation of such events.

In this half day programme, Mr. K. Naveen, General Manager – Lighting Design, Luminaires BU, Bajaj Electricals, Mumbai gave a detailed presentation on the various aspects of Lighting Design with emphasis on energy conservation and environment protection by the use of energy efficient light sources. The programme was attended by more than 30 students and academicians. Delivering the vote of thanks, Ms Priya Kumari, Student Representative thanked ISLE for encouraging student participation, speaker Mr. K. Naveen for sparing his time and coming all the way from Mumbai, and MITSOL, Pune for sponsoring the Program.

Bharat Kalambhe
Co-ordinator
ISLE-MITSOL Student Chapter

CIE ACTIVITY

CIE Midterm meeting and the Light and Lighting Conference 2009

The CIE 2009 Midterm Meeting, together with a Light and Lighting Conference, will be held in Budapest, Hungary, between 25 and 29 May 2009. The conference will deal with all aspects of light and lighting with a special emphasis on solid state lighting and LEDs. The use of such sources is strengthened by the fact that, in several countries governments have decided to phase out the production of incandescent lamps, and just recently the European Commission has decided to fulfil the requirement to lower the production of CO_2 gases by forbidding the sale of some incandescent lamps starting in 2009.

At the Beijing Session in 2007, the CIE published a statement calling attention to the necessity to preserve light quality and not to reduce lighting power consumption and neglect visual comfort and safety aspects. The 2009 conference should demonstrate progress towards achieving these demands.

The conference will start with a short statement by the CIE Vice-President Technical and some of the

CIE Division Directors, to inform the participants about research in progress in the CIE Divisions related to questions of energy efficient and good quality lighting.

The first Invited Paper will be given by Professor Andrew Stockman, who will report on the newest findings on how the V(λ) function changes with chromatic adaptation. This could lead to a better description of task performance with modern light sources.

The second Invited Paper, by Dr. Mike Pointer, will describe work on the measurement of the appearance of objects and materials beyond classical colour and gloss measurement.

Two further Invited Papers will focus attention on two important aspects of modern illuminating engineering. Professor András Majoros will discuss how light and lighting can help the elderly and those with visual impairments in their everyday tasks and, as 2009 is the International Year of Astronomy, Dr. Constance Walker from the International Astronomical Union will discuss how light and lighting could preserve our view of the night sky.

At the conference, in addition to oral presentations, poster authors will have the opportunity to introduce their results to the entire audience. After the conference, participants will receive a CD-ROM with all submitted and presented papers. CIE Central Bureau may publish an edited version of the papers as part of the Proceedings series.

Light and lighting experts from all over the world are kindly invited to attend this conference and be guests at different divisional and technical committee meetings. Registration and submission of papers should be done electronically. The registration form can be reached via the www.cie-hungary.hu Looking forward to seeing you in Budapest next May!

Dr. János Schanda
Chair of the Organization Committee

New TCs

The following new TCs have been established:

TC 3-47: Climate-Based Daylight Modelling
(Chair: John Mardaljevic, GB)

Terms of Reference:

- To describe the state-of-the-art in CBDM determine levels of research activity.
- To identify themes in ongoing areas of CBDM research and forecasting of future developments.
- To identify key areas of core or supporting research which are either lacking or with insufficient activity.
- To determine key application areas for CBDM and the required data pre-requisites.
- To codify an authoritative workflow for CBDM that is compliant with agreed quality assurance criteria.
- To provide guidance on the application of CBDM to predict emerging daylight metrics.

TC 3-48: CIE Standard Method of UF Table Calculation for Indoor Luminaires
(Chair: Peter Thorns, GB)

Terms of Reference: To produce a CIE standard for the calculation of utilization factor (UF) tables for indoor luminaires.

CIE PUBLICATIONS

Joint ISO/CIE Standard
ISO 11664-4:2008(E)/CIE S 014-4/E:2007

The three-dimensional colour space produced by plotting CIE tristimulus values (X,Y,Z) in rectangular coordinates is not visually uniform, nor is the (x,y,Y) space nor the two-dimensional CIE (x,y) chromaticity diagram. Equal distances in these spaces do not represent equally perceptible differences between colour stimuli. For this reason, in 1976, the CIE introduced and recommended two new spaces (known as CIELAB and CIELUV) whose coordinates are non-linear functions of X, Y and Z. The recommendation was put forward in an attempt to unify the then very diverse practice in uniform colour spaces and associated colour difference formulae. Both these more-nearly uniform colour spaces have become well accepted and widely used. Numerical values representing approximately the magnitude of colour differences can be described by simple Euclidean distances in the spaces or by more sophisticated formulae that improve the correlation with the perceived size of differences.

The purpose of this CIE Standard is to define procedures for calculating the coordinates of the CIE 1976 L*a*b* (CIELAB) colour space and the Euclidean colour difference values based on these coordinates. The standard does not cover more sophisticated colour difference formulae based on CIELAB, such as the CMC formula, the CIE94 formula, the DIN99 formula, and the CIEDE2000 formula nor does it cover the alternative uniform colour space, CIELUV.

This standard has been approved by CIE and ISO.

Indoor Daylight Illuminants
CIE 184:2009

The CIE recommended daylight illuminants in 1967. These daylight illuminants contained ultraviolet radiation

in proportions as found in natural outdoor daylight. Indoors this daylight is filtered by the transmission of the window glass; therefore it became necessary to define spectral power distributions also for the indoor daylight phases.

The TC recommends adoption of two indoor daylight illuminants ID50 and ID65, that correspond to the phases of daylight of about 5000 K and 6500 K correlated colour temperature. Tables of the spectra are provided at 5 nm intervals from 300 nm to 780 nm, along with the rationale for their development and detailed comparison with existing daylight illuminants.

The publication is written in English, with a short summary in French and German. It consists of 22 pages with 5 figures and 2 tables and is readily available via the website of the CIE (www.cie.co.at). The price of this publication is EUR 44 (members of National Commitees of the CIE get 50% discount)

Colorimetry - Part 5: CIE 1976 L*u*v* Colour Space and u', v' Uniform Chromaticity Scale Diagram

CIE Standard S 014-5/E:2009

This CIE Standard specifies the method of calculating the coordinates of the CIE 1976 L*u*v* colour space including correlates of lightness, chroma, saturation and hue. It includes two methods for calculating Euclidean distances in this space to represent the relative perceived magnitude of colour differences. It also specifies the method of calculating the coordinates of the u',v' uniform chromaticity scale diagram.

The Standard is applicable to tristimulus values calculated using the colour-matching functions of the CIE 1931 standard colorimetric system or the CIE 1964 standard colorimetric system. The Standard may be used for the specification of colour stimuli perceived as belonging to a reflecting or transmitting object, where a three-dimensional space more uniform than tristimulus space is required. This includes self-luminous displays, like cathode ray tubes, if they are being used to simulate reflecting or transmitting objects and if the stimuli are appropriately normalized.

The Standard, as a whole, does not apply to colour stimuli perceived as belonging to an area that appears to be emitting light as a primary light source, or that appears to be specularly reflecting such light. Only the u',v' chromaticity diagram defined in Section 4.1 and the correlates of hue and saturation defined in Section 4.3 apply to such colour stimuli.

This standard has been approved by CIE National Committees.

LII 2009
LIGHT INDIA INTERNATIONAL
20 February, 2009 Mumbai

Mr. H.S. Mensik

Inaugural Session

Dr. Avinash Kulkarni, President - ISLE

Ar. Ashok Butala, President - IID

Ar. Shrikant Nivsarkar, Chief Guest

Mr. Manoj Verma, President - ELCOMA, Chairman-Lii09

Dr. Ajay Mathur, Guest of Honour

Keynote Address

Prof. Christopher Benninger

Ar. Nitin Kilawala

LED's: Present and Future Environments:

Mr. Nigel D'Apre

Mr. Anil Valia

Future Shock, Bright Lights Big City:

Mr. Behr Champana

Mr. Prakash Mankar

Ar. Rohini Mani

Concluding Session and Thanks

Ar. P Amberkar

Mr. P.C. Barjatia

Mr. Rashmi Bhuta

Lighting for Infrastructure Project: The L&T Team

Mr. S.D. Saha

Mr. Indranil Goswami

Mr. Suraj Mangat

Mr. Sanjay Sabharwal

lighting
SOUTH ASIA

February 20-23, 2009, Mumbai

60 Indian Exhibitors
25 International Exhibitors
8500 Visitors

For a glow like the Sun,

choose any one...

UNIFORM

VENTURE LIGHTING

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Plot No. A30 & D5, Phase II, Zone B, MEPZ, Tambaram,
Chennai 600 045, India. Tel. : (044) 2262 5567 / 2262 3094,
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MAKHIJA 5364

NEWS ABOUT MEMBERS

R. S. Aithal, Appointed Joint Director MIT

We are pleased to inform you that Dr. Radhakrishana S Aithal, Professor, Department of Electrical & Electronics Engineering and Associate Director, Student Affairs, has taken over as Joint Director of MIT Manipal with effect from April 20, 2009.

We wish him every success in his new responsibility.

FORTHCOMING EVENTS

Experiencing Light 2009
October 26–27, 2009, Eindhoven, The Netherlands

Experiencing Light 2009 is an international two-day scientific conference for those interested in the effects of light and light design on human wellbeing. It approaches wellbeing in its broadest sense, including mood, emotions, subjective and objective health, comfort, atmosphere perception, productivity and performance.

Experiencing Light 2009 is the first international conference that has a major focus on the psychological processes related to the perception of and exposure to both natural and electric lighting. The goal is to bring together a multidisciplinary group of researchers and designers working in this domain so they can meet, share experiences, present research, and exchange ideas. Key themes of the conference include, but are not limited to:

- Daylight and electric lighting
- Intensity, colour, and colour temperature of light
- Direct vs. indirect lighting
- Dynamic vs. static lighting
- Lighting and fixture design

And how these impact on

- Sensation and perception
- Mood and atmosphere
- Vitality and need for restoration
- Productivity and performance
- Health and well being
- Experience of space and architecture.

Academics and practitioners with an interest in research, theory, technologies, design, and applications related to the psychological effects of lighting are invited to submit their work for presentation.

From: Director, Bye Laws Committee under ISLE GB

To:

All members of ISLE

Dear Friends,

In the October 2008 and January 2009 issues of the newsletter I had requested you to send your suggestions related to the amendment of the Bye Laws. I do not know whether you have received the said Newsletters in time or not. So I am requesting you once again to send your suggestions along with the reasoning.

Your suggestions should reach me latest by June 30, 2009 at the address mentioned below.

With kind regards,

Rajat Roy
21B Lansdowne Terrace
Kolkata 700 026
email: rajat.815@gmail.com
Phone: (033) 2464 0867
Mobile: (0) 94330 15396

Experiencing Light 09 will follow a thorough blind peer reviewing process in order to guarantee the quality and relevance of the work presented.

For further information please contact

The Organising Committee
Yvonne de Kort, Wijnand IJsselsteijn,
Ingrid Vogels, Marielle Aarts, Ariadne Tenner.
and Karin Smolders
http://www.experiencinglight.nl and el2009@tue.nl

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PLDC 2009
October 28-31, 2009, Berlin, Germany

As already announced in earlier issues, the second Professional Lighting Design Convention scheduled for October is being supported by ISLE. The response has been positive and the organizers indicate a registration of over a thousand participants.

The programme for the convention can be accessed at www.pldplus.com.

For further information please contact:

Ms. Louise Ritter
Tel: +49 5241 307 26 25
Fax: +49 5241 307 26 40
Email: lritter@via-internet.com

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CIE 2010 Lighting Quality & Energy Efficiency
March 14-17, 2010, Vienna

This is the first announcement of the international conference CIE 2010 "Lighting Quality & Energy Efficiency - Challenges and Opportunities" which will take place in highlighting:

- Surveys of experimental projects
- Lighting techniques & scenarios
- Integrated approaches in Lighting Design
- Lighting quality criteria
- Future possible lighting schemes
- Methods to compare lighting installations
- Case studies of energy-efficient lighting
- Review of energy-efficient lighting controls systems

The Chair of the International Scientific Committee is Dr. Janos Schanda

Deadlines:

- Call for Papers: 1st of May 2009 - 16th of October 2009
- Author's Notification: till 14th of November 2009
- Early Registration: till 30th of October 2009
- Late Registration: till 30th of January 2010
- Afterwards: On-Site Registration

The Conference Website will be online as of 1st of May 2009. If you want to book exhibition space or sponsor, do not hesitate to contact us at vienna2010@cie.co.at or by phone: +43 1 714 31 87.

OTHER NEWS

Workshop on Low Carbon Lighting
April 1-3, 2009, New Delhi

USAID's ECO-Asia Clean Development and Climate Program together with the Australian Department of Environment, Water, Heritage and the Arts, the Bureau of Energy Efficiency of India and the Electric Lamp & Component Manufacturers' Association of India, held a workshop "A Beacon to the Future: India's Path Towards Low Carbon Lighting" from 1-3 April 2009, at the Hyatt Regency, New Delhi, India.

The presentations made at the workshop are now available under "workshops" at: http://www.cleanenergyasia.net/rsrcs.php?menu=3

You will find under "WORKSHOPS" the title of the workshop "International Workshop: A Beacon to the Future: India's Path Towards Low Carbon Lighting". Click on the title and you will find all the presentations, which you can download.

136 representatives from India and 9 other countries participated in the workshop.

The participants agreed on the following key outcomes from the meeting:

1. **Phase-Out of Inefficient Lamps.** Given concerns about climate change and energy security, many countries are developing a strategy and time frames to phase out incandescent lamps. While India has a national market with sales of 800 million incandescent lamps annually, the production of energy-saving compact fluorescent lamps (CFLs) has increased rapidly in recent years – from 25 million CFLs in 2003 to more than 200 million CFLs annually in 2008. There are currently no capacity constraints for the further expansion of CFL production to meet increased requirements. India manufacturers present at the meeting suggested that there was a need for a national decision to eventually phase out incandescent lamps.
2. **Testing Capacity.** There is a need to upgrade the capacity of government-approved, independent test laboratories in order to effectively implement the new IEC CFL test procedure 60969.
3. **Harmonization of Test and Performance Standards.** There is a need to harmonize test procedures to international standards, and in particular the standards of the IEC. It was agreed that the test standards should be adopted in full and not modified at the national level, in order to facilitate mutual recognition of test results across the region. There should be a high level of regional involvement in the IEC drafting processes to ensure that the test standards meet the needs of the region. Asian countries that have observer status on IE Technical Committee 34 are recommended to change status to participating membership and become actively involved in influencing the technical standards for CFLs.
4. **Regional Standard for CFL Quality.** The meeting learned about the progress and plans for the industry-led Asia CFL Quality Charter, which is developing a regional quality standard including performance tiers, a product marking system, and a database of registered products. In general, it was felt that it would be valuable to have a single, regionally recognized performance standard to help improve the quality of CFLs in Asia. For such a standard to be effective, it will be important to work not only with suppliers, but also with national government agencies in order to build broad-based understanding of, and support for, such a regional standard. Such a standard would also potentially facilitate the export of quality Indian products to other countries in the region.
5. **Power Factor.** There is an urgent need to harmonize the Indian standard for CFL power factor before the end of this year. Last year more than 3 billion CFLs were produced globally, of which 200 million were produced in India; however, India is one of the only countries in the world that has decided to establish a mandatory high power factor standard (0.85), effective from 1 October 2009. To determine the

actual impact of normal vs. high power factor CFLs in Indian conditions, it was recommended that BEE and ELCOMA consider jointly carrying out a study in 4 to 5 locations in India to compare the impacts on energy savings and power quality by installing CFLs with high power factor (0.85) and normal power factor (0.5). Similar studies already conducted in the US and Europe during the past 10-15 years have found that widespread application of CFLs with normal power factor did not have a significant impact on overall power factor.

6. **Mercury.** It was agreed that there should be a mandatory maximum limit on the level of mercury in CFLs. It was noted that India for the first time now has equipment and laboratory facilities to reliably measure the level of mercury in lamps. It was felt that the lighting industry should not allow itself to be singled out as the main cause of potential mercury-related health impacts. There is a need for a definitive epidemiological review to highlight sources of human exposure to mercury and the health risks associated with various exposure pathways. There is also a need for industry and non-governmental organizations to provide credible, well-documented information on mercury issues, as they relate to lamps, to government officials, the media, and the broader public.
7. **Compliance.** Harmonization of performance standards for lamps across the Asia region will facilitate the sharing of information on product performance, and therefore improve compliance with standards. However, experience presented at the workshop found low levels of compliance in the absence of effective enforcement mechanisms, and noted that this could result in low levels of energy savings compared to program targets.
8. **Consumer Awareness.** There is a need to share communications materials – both within India, and also across the Asia region -- that have been developed for different government and utility programs to help consumers make decisions about efficient lighting. Better and more effective communications strategies and materials are needed in order to make consumer labels and advertisements more effective.
9. **Reaching Rural Communities.** There is a need to provide poor rural communities in India (and other parts of the region) with affordable, efficient, and appropriate lighting solutions. It was noted that more than 20% of Indian households do not have access to electricity, and it is also important to develop strategies and business models to provide low-cost lighting solutions for these people.
10. **Financing Models.** There was a fruitful discussion about the role of innovative financing models in speeding up the transformation toward efficient lighting options, such as CFLs. Progress is being made in using carbon financing mechanisms to effectively monetize the value of the CO_2 emissions reductions from CFLs. In particular, it was noted that India has recently had the world's first programmatic CDM project approved for lighting. In addition, India's Bureau of Energy Efficiency (BEE) has an emerging national program (Bachat Lamp Yojana, or BLY) that is working with investors, utilities, and state and municipal governments to use carbon finance to deliver up to 400 million good-quality CFLs to households in India.
11. **Platform for Sharing Experience.** Participants felt there was great value in sharing practical experience among Indian stakeholders, and also with experts who attended from nine other international countries. It was suggested that USAID and the Australian Government should consider working with governments in the region to establish a mechanism – perhaps web-based – to facilitate more regular and effective sharing of information and experience. The target groups would include policymakers and regulators who design policies and programs to support efficient lighting; practitioners involved in the manufacture, marketing, and promotion of efficient lighting technologies; and consumer groups involved in education and awareness campaigns.

WEBWATCH

SSL Quality Advocates

The advent of solid-state lighting for homes and businesses ushers in a new era of lighting. As innovative LED lighting products hit the market, now is the time to share the facts of LED lighting performance. Clear labeling on lighting performance is the critical link between innovation and successful market introduction.

Solid-State Lighting Quality Advocates is sponsored by the U.S. Department of Energy (DOE) to assure and improve the quality of LED lighting products. Participation in SSL Quality Advocates is open to those who manufacture, sell, and recommend the best in LED lighting.

Link :
http://lighting-facts.com/

Electron Stimulated Luminescence (ESL) Bulb

Step aside incandescent, fluorescent and LED – there's a new bulb on the block: the Electron Stimulated Luminescence (ESL) from Vu1 Corp. of Seattle.

Based on a whole new technology, it starts with a standard glass bulb that is coated on the outside with a phosphor and then stimulated by accelerated electrons, making the surface glow. According to Vu1, it has several advantages over other lighting technologies. It comes on instantly, does not contain mercury and does not have to be twisted into a funny shape, as do compact fluorescents. It also uses about 75 percent less energy than incandescents. Even at an anticipated price of $12 a bulb, it is cheaper than LED-based lighting, which requires heat dissipation in its housing and still suffers from high manufacturing costs.

The first bulbs released will output about 40 lm/w, with a lifetime rating of about 6000 h – the same as a compact fluorescent. Color can be adjusted, and the company will tune it according to preferences indicated by consumer research.

The ESL bulbs are being manufactured in the Czech Republic and will appear soon on store shelv es. Vu1 plans an official product launch on Earth Day 2009 (April 22).

Link:
http://www.vu1.com/technology/technology.htm

Building a Rainbow with RGB LEDs

In a world that is becoming more and more green-oriented, makers of LEDs are looking at red, green and blue (RGB) devices as energy-saving solutions for illumination applications. LEDs are making their mark in many areas, and one of the most promising – and fastest growing – is illumination.

Thanks to its excellent color saturation and energy savings, the LED is rapidly penetrating this market and promises to meet the demand for longevity and reduced-energy "green" products. In response, many manufacturers of lighting devices are using combinations of red, green and blue LEDs to provide a rainbow of desired colors.

However, using discrete LED packages in these applications is not without its problems, including the space wasted to accommodate the package structures and the extra effort required to provide effective color mixing from widely separated light sources. As a result, the market is beginning to look for three-in-one LEDs, or a combination of red, green and blue chips in a single integrated package.

Link:
http://www.photonics.com/Content/ReadArticle.aspx?ArticleID=35530

State of the Streetlight

Driving down the highway, passing by countless streetlights, we rarely consider the technology behind them, their cost or how much energy they consume. Not much has changed in streetlights in decades.

But change is afoot, as lighting designers test more energy-efficient, lower-maintenance and longer-lasting lighting sources. It's enough to make you slow down and take notice.

In 2005, the Lighting Research Center (LRC) at Rensselaer Polytechnic Institute (RPI) in Troy, N.Y., surveyed utilities and cities and found that high-pressure sodium lamps were used in 83 percent of streetlights, mercury vapor in 11 percent, metal halide in 5 percent, and a mixture of fluorescent, low-pressure sodium, incandescent or LED sources in the remaining 1 percent. In 2000, it was estimated that street lighting consumed 14 billion kWh per year in the US.

Link:
http://www.photonics.com/Content/ReadArticle.aspx?ArticleID=35958

LEDs Light The Way To Energy Savings

LEDs in niche lighting markets now save consumers nearly $1 billion in electricity costs – and if switched over entirely to LEDs, consumers collectively could save more than $20 billion, according to analyses conducted by the US Department of Energy (DoE).

In September of this year, the department released a 98-page report titled "Energy Savings Estimates of Light Emitting Diodes in Niche Lighting Applications," in which the advantages of LEDs over traditional lighting sources in certain applications were examined. The lineup of traditional sources includes incandescent, halogen, fluorescent, neon and high-intensity discharge lights.

Link:
http://www.photonics.com/Content/ReadArticle.aspx?ArticleID=35928&refer=spectra&utm_source=2008_December&utm_medium=email&utm_campaign=spectraNewsletter

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DoE Released New CALiPER Program Results: Round 7 of Product Testing

DoE released CALiPER Program round 7 results. The testing focused on three application areas: outdoor lighting, downlights, and replacement lamps. One series of tests included eight streetlights. The series of tests on nine downlights included a wide range of luminaires that could potentially be used for downlighting. The replacement lamp category included nine different SSL

products, including: MR16s, some larger directional lamps (PAR20, PAR30, and PAR38), and A-lamps.

Round 7 of CALiPER testing reveals a steady increase in efficacy, color quality, power factor, and accurate manufacturer reporting for SSL products. Unfortunately there is still a wide range in performance for products on the market today—as evidenced by outdoor SSL streetlight efficacy results varying from 19 to 71 lm/W, and SSL downlight efficacy results ranging from 9 to 48 lm/W. There also are still many inaccurate or misleading claims regarding SSL performance in all product categories, most frequently for replacement lamps

Link :
http://www1.eere.energy.gov/buildings/ssl/reports.html

LETTERS TO THE EDITOR

Hello Hari,

I just received the January issue of the "Newsletter." It is quite an impressive letter. Congratulations!

I hope you might be making the journey to the USA to attend Lightfair. I am on two panels, one on History of Lighting Design and the other on the Ban of the Incandescent Lamp. I am developing an iron-clad argument that the ban is counterproductive and the basis of it is entirely wrong. I think your members would have an interest in both topics.

I hope all is well with you and that the Indian economy is still flourishing. The American economic situation is quite bleak.

All the best to you.

Howard
Howard M. Brandston
348 Catskill View Road
P.O. Box 28
Hollowville, NY 12530

MEMBERSHIP APPLICATIONS APPROVED BY GOVERNING BODY

Members admitted on 31 March 2009

M. No.	Name & Addresses	Grade	Centre
I.0137	M/s Sunled Technologies Pvt. Ltd 8-2-277/B, Inwinex Towers Road No. 2 Banjara Hills Hyderabad 500 034	Institutional Member	Chennai
IM.0137	Mr. Hari Kiran Chereddi Sunled Technologies Pvt. Ltd 8-2-277/B, Inwinex Towers Road No. 2 Banjara Hills Hyderabad 500 034	Institutional Representative	Chennai
I.0138	M/s Surmount Energy Solutions Pvt Ltd T-251 6th Floor ITC Belapur Station Complex CBD Belapur, Mumbai 400 614	Institutional Member	Mumbai
IM.0138	Mr. Abhishek Vilas Pange Surmount Energy Solutions Pvt Ltd T-251 6th Floor ITC Belapur Station Complex CBD Belapur Mumbai 400 614	Institutional Representative	Mumbai
I.0139	M/s Arya Filaments Pvt Ltd Plot No 20, Rd No 13 Industrial Area, Sector I Pithampur Distt. Dhar MP	Institutional Member Life	Mumbai
IM.0139	Mr. Surendra Kumar Agarwal Arya Filaments Pvt Ltd Plot No 20, Rd No 13 Industrial Area, Sector I Pithampur Distt. Dhar MP	Institutional Representative	Mumbai
F(L).0635	Mr. Prafulla C Sorkar Sorkar Engineering.Inc 5400 Ward Road Bldg. III Ste L -80 Arvada CO 80002 USA	Fellow Life	Kolkata
F(L).0636	Mr. Pulin Chandra Sadhu Flat No. B-7, Mecon Tower 357 Prince Anwar Shah Road Kolkata 700 068	Fellow Life	Kolkata
F(L).0637	Dr. Om Narayan Awasthi B-2/402, Kumar Parisar Kothrud Pune 411 038	Fellow Life	Mumbai
F(L).0638	Mr. Madhukar Adoni H-1/444 MHB Colony Laxminagar Pune 411 009	Fellow Life	Mumbai
F(L).0639	Mr. Suda Mallikarjuna Rao Jesmyn Electronics 107 Rajdeep, 5 Tara Temple Lane Lamington Road Mumbai 400 007	Fellow Life	Mumbai
M.1403	Mr. Shibashis Chakraborty P.O. + Village Kodalia, Battala Sarat Bose Road PS Sonarpur Kolkata 700 146	Member	Kolkata
M.1404	Mr. Ajay Kumar De 379, Mohendra Mitra Road Near Hooghly Fire Station Hooghly 712 103	Member	Kolkata
M.1405	Mr. Satinath Chaudhary 197, Netaji Subhash Road Kolkata 700 034	Member	Kolkata
M.1406	Dr. Sudhakar Milind Pande MIT LRA Ist Floor, WPC Building MIT Kothrud Pune 411 029	Member	Mumbai
M(L).1407	Mr. Suresh Sanjay Harchirkar Arklite Speciality Lamps Ltd. Sr. No. 258/1 & 261/7 Kharabwadi Chakan Talegaon Road Talkhed Distt. Pune	Member Life	Mumbai
M(L).1408	Mr. Deepak Kapur Arklite Speciality Lamps Ltd. Gat No. 2794 & 2797 Kharabwadi Chakan Talegaon Road Talkhed Distt. Pune	Member Life	Mumbai
M(L).1409	Mr. Jitendra S Mehta Arklite Speciality Lamps Ltd. Gat No. 2794 & 2797 Kharabwadi Chakan Talegaon Road Talkhed Distt. Pune	Member Life	Mumbai
M(L).1410	Mr.Satish Mandar Sahasrabudhe Arklite Speciality Lamps Ltd. Gat No. 2794 & 2797 Kharabwadi Chakan Talegaon Road Talkhed Distt. Pune	Member Life	Mumbai

M(L).1411	Mr. Bhaskar Dilip Joshi Prompt Services Plot No.F-55, MIDC Ind. Area Ahmednagar 414 111	Member Life	Mumbai
M(L).1412	Mr.Sudhakar Suren Zambre 19 Mahalaxmi Heights Shivalaya CHS, Sus Road Pashan Pune 411 021	Member Life	Mumbai
M(L).1413	Mr. Shirish Vasant Karkarey Litex Electricals Pvt. Ltd W-134, S Block Bhosari Pune 411 026	Member Life	Mumbai
M(L).1414	Mr. Ulhas Vikram Bapat Arklite Specialty Lamps Ltd. Gat No.2794 & 2797, Kharabwadi Chakan Talegaon Road Talkhed Distt. Pune	Member Life	Mumbai
M(L).1415	Mr. Sunil Rathi ISC Trading Pvt Ltd. TA 327 2nd Floor Tughlakabad Extn. New Delhi 110 019	Member Life	Delhi
M(L).1416	Mr. Anil Rathi ISC Trading Pvt Ltd. TA 327 2nd Floor Tughlakabad Extn. New Delhi 110 019	Member Life	Delhi
M(L).1417	Mr. Pankaj Vasantaray Doshi 206 Amartaru II, Nagardas Cross Road Andheri East Mumbai 400 069	Member Life	Mumbai
M(L).1418	Mr. Sourav Sanyal 12/1, D Center Sinthee Road Kolkata 700 050	Member Life	Kolkata
M.1419	Mr. Ashis Mookherjee H/O late Kamala Kanta Biswas Mahishya Para Khardaha 24 Parganas (N) Pin 700 117	Member	Kolkata
M.1420	Mr. Shibashis Chakraborty P.O.+Vill-Kodalia, Sarat Bose Rd. PS Sonapur, Kodalia, Battala Kolkata 700 146	Member	Kolkata
M.1421	Ms. Kim Eunhee 503, Carnations Road No. 3A Kalyani Nagar Pune 411 006	Member	Mumbai
M(L).1422	Mr. M.V. Surya Rao D.K.3 Plot No 66 Danish Kunj Kolar Road Bhopal	Member Life	Mumbai
M.1423	Mr. Ashok Kumar Sharma F113/46 Ekta Parisar Shivaji Nagar 6 No. Stop Bhopal	Member	Mumbai
M(L).1424	Mr. Quaid Johar Gheewala Luky Electric Stores 42 Siyaganj Indore 452 007	Member Life	Mumbai
M(L)-1425	Mr. Rahul Jain Jain Electric 209/2, Jawahar Marg Indore 452 001	Member Life	Mumbai
M(L)-1426	Mr. Ashwani Khatri Amarnath Kashiram 507, Chetak Centre 12/2 R.N.T. Marg Indore 452 001	Member Life	Mumbai
M(L)-1427	Mr. Virendra Kumar Seksaria E301 Shubh Complex Manishpuri Indore 452 018	Member Life	Mumbai
M(L)-1428	Mr. Kailash Mohta Mohta Cables 10/2 Siyaganj Electric Market Ist Floor Indore 452 001	Member Life	Mumbai
M(L)-1429	Mr. Ajay Trivedi 10/7 Ushaganj, Chhawani Indore	Member Life	Mumbai
M(L)-1430	Mr. Bharath Kumar Doshi Doshi Consultants Pvt Ltd 401 City Centre, 570 MG Road Indore 452 001	Member Life	Mumbai
M(L)-1431	Mr. Nayan Pravin Gada Vikrant Wire Industry F2/A2 Pologround Ind. Est. Indore 452 014	Member Life	Mumbai
M(L)-1432	Mr. Manish Dole Flat No 5 GCIL Colony Chemical Division, Birlagram Nagda 456 331	Member Life	Mumbai
M-1433	Mr. Umesh Bhatia I-591 Jr. HIG, RSS Nagar Indore 452 011	Member	Mumbai
M-1434	Mr. Kalyan Dey Eicher Motors 102+102 A Industrial Area No. 1 Pithampur Distt. Dhar	Member	Mumbai
M.1435	Sangeeta Sinha 265 Pocket I Sector 9 DDA Flats, Dwarka New Delhi 110 015	Member	Delhi
A-0967	Mr. Kingsuk Sarkar Banbania West Habra, North 24 PGS Near Chanditala West Bengal, Pin 743 263	Associate Member	Kolkata
A-0968	Mr.Goutam Sarkar 39/A, Canal North Road Santoshpur Kolkata 700 075	Associate Member	Kolkata
A-0969	Mr.Amit Kumar Das C/o Sunirmal Bose Nangi Chatterjee Para P.O. Batanagar Kolkata 700 140	Associate Member	Kolkata
A(L)-0970	Mr. Manoj Gajanan Morye 4 Zainab Villa Senapati Bapat Marg Mahim (W) Mumbai 400 016	Associate Member Life	Mumbai
A(L)-0971	Mr. Darshan Pankaj Doshi 206 Amartaru II, Nagardas Cross Road Mumbai 400 069	Associate Member Life	Mumbai
A-0972	Mr. Sasanka Paul Nabard Colony Port Blair Andaman & Nicobar	Associate Member	Kolkata
A-0973	Mr. Rakesh Kumar Executive Engineer Work Shop Division Supply Line APWD Pin 744 101	Associate Member	Kolkata
A-0974	Mr. Manash Ghosh 70/5 D.D.Mandal Ghat Road Kolkata 700 076	Associate Member	Member
A(L)-0975	Mr. Puneet Singh Shop No1, Ist Floor Mahaluxmi Market Bhagirath Place Delhi 110 006	Associate Member Life	Delhi
S-0335	Mr. Yash Rajesh Agarwal A/401, Sai Darshan Apt, Garden Lane, Sanghani Estate Ghatkopar Mumbai 400 086	Student	Mumbai
S-0336	Mr. Chintan Pankaj Doshi 206 Amartaru II, Nagardas Cross Road Andheri East Mumbai 400 069	Student	Mumbai
S-0337	Mr. Sulakshan Naha Naha Villa P.O. Ghoshpara Ghospara South Bally, Howrah Pin 711 227	Student	Kolkata


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