



LIGHT

the official

NEWSLETTER

of the **indian society of lighting engineers**

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FROM THE PRESIDENT'S DESK

As the term of the new Governing Body begins, I would like to express my thanks to members for having entrusted me with the task of guiding your Society through the next four years.

As a founder member, I have seen ISLE grow over the last twenty four years under the leadership of M.L. Dongre, H.S. Mamak, P.K. Bandyopadhyay and S. Venkataramani and will try to ensure that, with the team of professionals that we have in the current GB, we take ISLE forward into a brighter future.

Like my predecessors, I also believe that with the great abundance of specialized expertise in lighting in our country, we should be more involved in the technical activity taking place internationally in CIE and in the Illuminating Engineering Society of North America (IESNA). I hope that my experience and involvement in IESNA (30 years of membership, attending ten of their annual conferences and presenting technical papers in them) will help catalyse a greater involvement among our membership in technical work, which in any case is the purpose for which our Society was set up.

I attended the last two Light Sources conferences (held once in three years) in Toulouse, France (LS-10: 2004) and in Shanghai (LS-11: 2007). A brief review of the recent Shanghai event appears elsewhere in this Newsletter. For anyone with involvement in Lamp development, these LS conferences are must-attend events. The next one, LS-12, will be in the Netherlands. While in Shanghai, I did make a pitch to the LS organizing committee to consider holding LS-13 in India.

A positive trend I see in ISLE is the effort being made to set up Local Centres and the organizing of technical training programmes outside the main metropolitan cities. This, I feel, will build the lighting community at the grassroots level.

Of course, we must also continue to reinforce the image that ISLE has established in National and

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International circles through the periodic international events that we have organised over the last 17 years since Prakash'91. Lii2008 is just a few months away in February next year and I look forward to the support of all ISLE members in making it a success.

Since the time ISLE was set up, the means of communication have grown exponentially and this enables us to have quicker and more frequent exchanges. I would like to encourage members to use the newsletter as a discussion platform on issues that concern us and also to contact GB members to help improve and upgrade ISLE. As a start in this direction, I give below my email address and look forward to hearing from you.

dradk@hotmail.com

A.D. Kulkarni
President

EDITORIAL

Having been the Editor of your newsletter for seven years now, it gives me great pleasure to see that the newsletter continues to be of interest in India among our members and others with an interest in lighting as well as several recipients in the international lighting fraternity. I believe that with the infusion of young blood, new ideas and inputs will further enhance the value and reach of this publication.

We are a little late with this issue, but we were keen to include a report on the CIE Session in Beijing as well as the activity reports of the CIE divisions. We have also got permission to reprint Dr. Janos Schanda's paper on solid state luminescence over the last hundred years that was one of the three invited papers at the CIE Session in Beijing. Mr. Venkataramani and I were both at the Beijing session and a brief report of my views is on page 10.

I feel disappointed that in spite of our association with CIE for two decades, we have not been able to make a bigger contribution to the technical activities of the World Lighting Body. After having served for two terms (8 years) on the CIE Board of Administration I am happy to report that Mr. Venkataramani will now replace me as the voice of developing countries in the apex international lighting organisation. And the reason I am happy is that he strongly feels the need of greater participation from India in the technical work being done internationally and I do hope that he succeeds in co-opting more of you into this area.

In June we collaborated with USAID to get Dr. Narendran of LRC to give us a comprehensive overview of the current position on LEDs. LEDs are much spoken about and it was opportune that an international expert give us an insight into the reality of this scientific introduction to lighting. Dr. Narendran did just that much to the pleasure of the entire audience at the India Habitat

Centre. A report and the weblink to his talk is on page 9 Together with Dr. Schanda's paper this will give us a lot of food for thought.

The outstanding work by the Karnataka State Centre on the EU Light India project has resulted in a very successful and rewarding collaboration. A report on the concluding part of the project, a visit to Poland and Italy is on page 5. I would like to especially congratulate Mr. M.S.N. Swamy and Mr. Bhawani Prasad for their hard work and imaginative leadership in this project.

It gives me great pleasure to report that we have yet another ISLE member who has got a PhD in lighting. A report on Mrs. Ciji Pearl Kurien of MIT Manipal can be found on page 27.

I would like to thank Dr. V.D.P. Sastri for his insightful and interesting R&D Updates and Mr. Anool Mahidharia for his WebWatch contributions. They have helped enhance the value of the newsletter with their outstanding information sharing. They have helped us not only to be informed on the latest scientific developments and research but also the approach taken by the Lighting fraternity.

Please make a note of our new mailing address given in the box below. For compelling reasons of logistics the Delhi Secretariat has shifted back to Defence Colony in New Delhi.

And finally before I conclude, a word about our next Lii. ISLE has come a long way since its inception and I am happy to have been a part of this interesting and eventful journey. I believe that our international conferences and exhibitions have been instrumental in creating awareness about lighting in the public perception and helped establish ISLE as the voice of lighting in India and in fact in the developing world. To make this happen has needed the active help and support of our membership. You will find a rundown on Lii2008 on page 4.

These events, even now, take place only once in three years. I would urge you to take advantage of this neutral lighting platform and be part of the only serious lighting event in South Asia. I look forward to seeing you there.

H.S. Mamak
Editor

NEW MAILING ADDRESS

We have moved back to :

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ISLE ACTIVITY



February 22-25, 2008

Once again we are preparing for the Light India International Exhibition and Conference. In response to a strong request from the industry, this time the event will take place in the month of February. This will ensure that there is no clash with other international events and the pleasant weather will facilitate extended visits to the exhibition.

Recognising the importance of Lii2008 and the crucial role that the ISLE exhibitions and conferences play in enhancing public awareness of good lighting practice and energy saving, the Bureau of Energy Efficiency of the Ministry of Power is supporting the event.

Exhibition

The floor plan given below reflects the enthusiastic response and the space available is filling up very rapidly. Those of you who wish to exhibit should make their booking quickly to avoid disappointment.

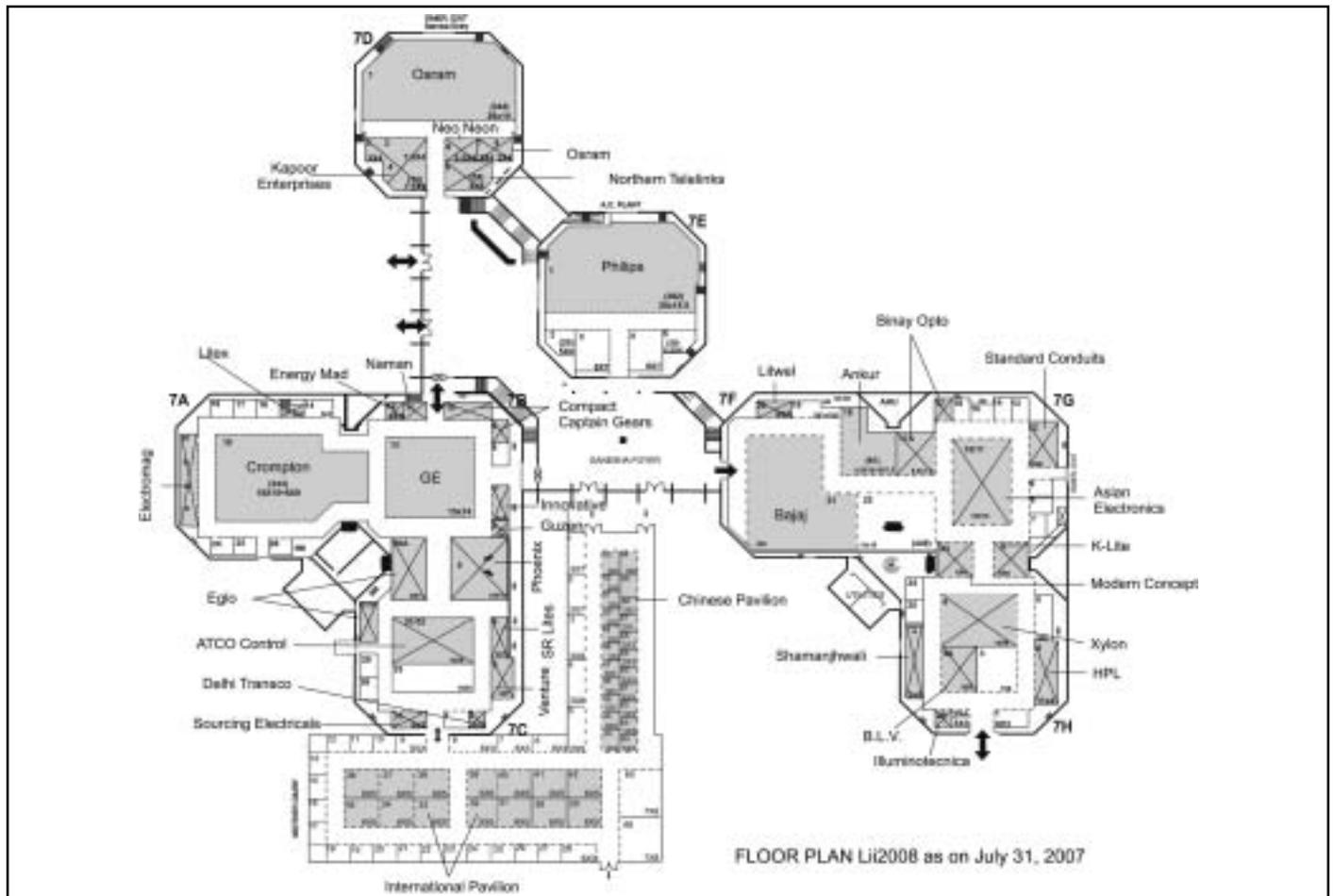
As always there will be a focussed effort in getting the large users, specifiers, decision makers and industry associations to visit the exhibition. The figure of 7733 business visitors attracted by the last exhibition is certainly going to be enhanced and the fact that we have a more informed and interested general public will also translate into an increase in the 200,000 visitors we got last time.

This is the only international exhibition on Lighting in South Asia and is the ideal platform for anyone that wants to project their products and services to the national and international market.

To facilitate international participation we have initiated a collaboration with the Expomedia Group. They will do the international marketing and we can look forward to seeing upto 1000 square metres of space with lighting companies from Eastern and Western Europe and the US. For China, Hong Kong and Taiwan we have appointed CGIE (China Globe International Exhibition Company Limited) as the agent and we can expect around 200 square metres of space from this collaboration.

Conference

In recognition of the increasing pressure on time, the format of the conference has been redesigned to enable



delegates to choose those areas that are of primary interest and register for only those sessions. Others with an interest in the whole range of lighting issues can register for the whole conference.

The conference will consist of interactive workshops covering a wide range of topics. Whereas the exact programme and faculty is still in progress, the conference will cover the following areas:

Energy Conservation (Sustainability)
Outdoor Lighting and City Beautification
Infrastructure Lighting (Airport, Highways, Railways etc.)
Retail and Hospitality Lighting
LEDs
Electronics and Controls

Also, in the interest of enabling those delegates who need to be present at the exhibition to attend the workshops, this time the venue of the conference will be at Pragati Maidan.

The fee for each half day workshop session will be Rs.2000 and the fee for the whole conference will be Rs.7000. ISLE members (fully paid up and on the rolls before March 31, 2007) will qualify for a 10% discount.

Directory

The sixth edition of the Directory of the Lighting Industry will be published and released at Lii2008.

This publication has proved its usefulness over the last 16 years and continues to be in demand. We are still getting orders for the 2005 edition from both Indian and international sources!

As in the past, the Directory will continue to provide comprehensive information on Lighting in India as well as editorial inputs on international developments and future directions in this field.

The success of the Directory is really the outcome of efforts made by members. Let us work to enhance the effectiveness of this publication by making it even more comprehensive and representative than earlier issues.

EU Light India

The first stage of the EU Light India project being coordinated by Karnataka State Centre consisted of training programmes at Mumbai, Delhi and Bangalore. Reports on these have been published in earlier issues of the newsletter.

The next stage of the project was an exchange programme under which selected participants visited Warsaw and Milan for interaction and field visits to installations in those cities and to study their practices.

Originally the exchange Programme provided for the visit of 10 participants to Warsaw and another 10 participants to Italy with the final seminar being held in Milan.

ISLE in consultation with the selected participants and the partners considered that by suitably rescheduling the Programme at Warsaw and Milan, it would be possible to enable all the 20 participants to visit both cities at a very marginal additional cost. This would also enable all the exchange Programme participants to take part in the concluding Final Seminar.

It was decided that ISLE and the participants would meet the additional cost and a request would be made to EC to allow the marginal excess in the expenditure, the extra outlay being insignificant in comparison to the enhanced success of the exchange programme, by the participation of all in Warsaw and in Milan, as well as in the concluding Final Seminar. The Programme was accordingly rescheduled.

A high level delegation comprising of ISLE members from Lighting Companies, Government Organizations, Municipalities, Consultants, Lighting Engineers led by Mr. M.S.N. Swamy, Coordinator EU-Project and Hon. Secretary, ISLE Karnataka State Centre visited Warsaw from April 11 to 14 and Milan from April 16 to 19 under the exchange programme.

The added advantage of this revised programme was that the visit to the Electroluce International Lighting Fair at Milan was included as part of the technical visits which proved to be highly beneficial as it gave wide exposure to the industry and products, (something that would not have been possible by individual visits to factories).

The programme in Warsaw covered discussions, a visit and demonstration at the Institute of Energy, visit to the Palace of Science and Culture, technical seminar on Street Lighting practice and efforts on energy conservation as well as on case studies of Monument Lighting.

An exhibition and display of lighting and lighting control products was also arranged. About 20 manufacturers and product developers from Poland participated, resulting in good Techno Commercial interaction. The highlight of the Programme was the development of controls with suitable signals for the blind while crossing roads.

The Programme in Milan covered detailed case studies of the Street Lighting system of Sesto Giovanni, maintenance schemes, practices developed for life increase of poles, etc., and a case study of the monument lighting of the Duomo Cathedral including a follow up site visit up the monument. There were technical visits to IGQ,

regarding the testing and certification of products to standards. The demonstrations covered the product testing and also the procedural aspects with particular reference to import-export between EU areas and others including Landhini, a manufacturing unit of poles and high masts.

A technical visit with the assistance of ASSIL to the trade fair was the concluding part of the programme in Milan.

Participants Comments

We give below the comments of two of the participants of the exchange programme, Mr. Pradeep Nettur and Mr. D. Krishna Sastry.

Pradeep Nettur

At the outset let me thank all the partners of the EU - Light India Project for the successful conduct of the exchange programme in Warsaw and Milan from 11.04.07 to 19.04.07. The programme was highly rewarding to me, both professionally and personally.

As a member of 21 member team, I thoroughly enjoyed the trip and am extremely grateful to M/s Swamy and Bhavani Prasad of ISLE, Thomasiok, Karwacki & Reshab of IRSEP, Maurizio Estini of Assistal for the excellent training programme, and other connected arrangements. Though I could sense many anxious moments, rather days, that were undergone by MSN & JNB, the tour turned out to be highly successful mainly due to the behind the scene manoeuvres by both of them with timely help from both Italy and India. It is a great tribute to their sagacity, perseverance, patience and timely action that none of these hiccups did affect any of the programmes even a wee bit. Hats off to both the stalwarts!

The down to earth approach and sincerity of purpose of the entire team in Warsaw did strike me a lot. Right from our touching down in Warsaw, things were made to unfold to make our visit very productive and meaningful. The arrangement and demonstrations made at the Energy Institute gave us the first hand information about the strides made by this great country, after badly suffering in World War II, in the field of energy. The trip to the Warsaw Palace in the evening and the long walk through the vibrant and resurgent Warsaw streets in the night was most enthralling.

The simplicity and great regard for the purpose of our visit were amply demonstrated by our hosts by walking along with us all the way from Royal Palace to Royal Castle, and even venturing to walk down to the Warsaw river. Though a bit tiring, this trip was very educative and highly interesting as it provided the team with a rare opportunity to have a close look at the progress made by the country in external lighting, particularly lighting of historical monuments. Their experimentations, successes,

setbacks and the determination to go forward came across during the long walk. I could see a gulf of difference between our approach and their approach towards street and external lighting and it was a real eye opener. How concerned they are about light pollution is to be seen to be believed. This we did. The theme of the presentations and deliberations in the subsequent days in Warsaw also revolved around optimum design, public safety, security, cutting out wastage and conserving energy. All the presenters did their job very well. Sharing their experiences and thoughts were very refreshing and that could be extremely useful in our scheme of things to every participant one way or another.

One important aspect that I noticed in the external lighting scheme was that good use is made of public utilities, some times even private structures, to support the luminaires delicately placing them totally hidden or with very little visibility. This is in stark contrast to our scheme of things where the total lighting scheme is done in isolation, independent of neighbouring structures, poles or utilities. This is also a reflection of the peoples' mindset, who act in unison. This attitude was again witnessed by us when we went to Royal Castle square on the last day, where we could see the huge flower bowls being planted with fresh flowering plants by the housewives of the area as a part of their civic duty. Great country and great people!

Polish designers attach great importance to public safety, be it street lighting, public lighting or monumental lighting. The political change after 1990 provided them with great opportunities. The change over to finer and economic designs, change of ownership from state to private hands, replacement of old and inefficient luminaires etc happened smoothly and efficiently. Some of the monumental religious structures are lighted and maintained as a public duty. Again a far cry from our scheme of things.

The special design of street light poles to have less impact during collision of vehicles, always providing twin lamps (one working at a time) at crossings are very good examples to be emulated from a public safety point of view. I wish our team had consisted of more decision-making authorities from major and minor municipalities apart from the strong contingent from NDMC.

The Polish designers' approach to monumental lighting, taking into account the shape, architectural style, and public function of the building, its surrounding etc. was a revelation. Accent method (getting a three dimensional view), keeping the principles of coherence, order and intensification of 3D impression could be easily understood by witnessing the lighting of different buildings during the long walk and the excellent presentations made.

Making use of the tree maps and the contours of their roots, while laying cables in public parks etc. to avoid any damage to the tree is an important point our team members should carry home. The very successful attempt at energy conservation made by the Warsaw team, near the Aviation Medicine Institute, could be witnessed and understood by us. We were told the system was functional for the last 4 years and it is working fine with considerable energy saving - another scheme that can be emulated in the energy guzzling streets of various municipalities in our land.

The experience in Milan was altogether different. The design prowess and the advancements made in the application of best designs could be seen during our stay in Milan, interactive sessions, field visits to the municipality, steel manufacturing unit memorial, the Duomo Cathedral and the exhibition 'Electro Luce'. The emerging designs and lighting trends put on show at the exhibition were awe-inspiring. The visit to the manufacturing unit of Landhini was a very good experience. The variety of designs in the manufacturing range and the usefulness of high masts for Telecom applications, in addition to lighting, interested me very much. The facilities and models available at the manufacturing unit gave a very good idea of the possibilities of more interactions in future for mutual benefit. I think Indian manufacturers must get closer to their counterparts in Italy to take full advantage of their design prowess and wealth of knowledge in the field. The members of the team from public utilities and the Government sector should think aloud about evaluating products and schemes on a life cycle cost basis for a period of 10 to 15 years.

The hospitality that we enjoyed at Milan, particularly at Landhini's, was unforgettable. The opportunity of having a peep into the IMQ and exposure to the facilities, equipment and instruments put into use for the certifications at the center is considered unique and rewarding.

Our sojourn to the vivacious city of Venice on Sunday, the 15th of April, is considered the icing on the cake which shall remain as vivid memories. Memories of canals, wonderful lanes, bylanes dotted with imposing and architecturally superb churches, and exquisite shops. Places where great men, like Marco Polo, Napoleon Bonaparte, Goethe, Vivaldi, who made history in the past several centuries lived once, made us feel extremely fortunate to have at least passed by, sailing in wonderfully maintained and delicately driven boats. Last but not the least, our stay at Stresa was a wonderful and enchanting experience, raising the spirit of the whole team towards the end of the tour. Million thanks to M/s Landhini and Assistal for using their influence and facilitating our comfortable stay at Stresa, during the heavily crowded and overbooked situation in Milan.


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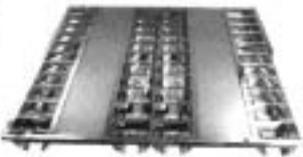
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Thanks once again to all the partners and men and women, who worked behind the exchange programme.

D. Krishna Sastry

Four days between 11th to 14th were spent at Warsaw. The Warsaw visit was a highly packed itinerary with visits to Monument lighting sites, Electrical Engineering Institutes, Municipal Public Lighting control demonstration, presentation by various lighting product companies on innovative products and product exhibitions by various manufacturers. The technical presentations by various product manufacturers on their innovative products was an extremely educative proposition with new business opportunities for such products. The presentation on Monument Lighting, Street Lighting, Energy Saving and Remote Monitoring Solutions were extremely educative. The product exhibitions by AWEX lighting and ART Metal were one of the best. The presence of light sources and illumination measurement instruments by the respective manufacturers demonstrated the availability of technically advanced illumination technology within Poland.

The visit to the Palace of Science and Culture 37th floor was a rare occasion to see the illumination of Warsaw by night. The palace itself was a demonstration of international class of monument lighting. The technical demonstration of Monument and Public Lighting in the main streets of Warsaw and at the rebuilt old Town of Warsaw which was completely destroyed during the second world war was an example of the hidden skills, perseverance and a desire to preserve the heritage and culture of the Polish people. The contrast illuminations on buildings and some valuable innovative concepts adopted in monument lighting was a learning experience. The road illumination on some of the main streets was a viewing pleasure with the presence of a wide variety of designer poles. The effort to illuminate both the walkways and the motorists' road especially by predefined planning to give the pedestrians a higher level of lux on the housing side and direct and indirect illumination on the motorists' pathway was interesting to note. There has been a continuous effort to improve illumination levels on streets and simultaneously reduce energy consumption by using energy efficient light sources. The illumination of important churches, statues and the Presidential Palace were very good examples of monument lighting.

The demonstration given by various product manufacturers like AWEX Emergency lighting solutions, Art Metal Poles and Public Lighting products, Nova Light stall for innovative energy saving ballasts, Spectro Color Professional Light measuring devices, RAR Street Light Energy Saving solutions, Imperial Downlights and many other light source manufacturers was a good opportunity for business interaction. The demonstration by RAR on

proven usage of remote monitoring and control of street lighting for energy saving by using telemetry and also energy saving by voltage regulation was a testimonial to availability of such solutions from the past few years, to the advantage of the Municipalities. It was an educative experience of learning on street light energy savings. In all, the entire visit was summarised with a visit to the Warsaw Castle and the Old City on the final day.

I am extremely happy to conclude that the power packed visit to Warsaw was an electrifying experience and a busy schedule for three days. In between, the teams had taken a little time out to visit and learn about the city. Warsaw is a city symbolizing and adapting to changing modern times and a rapidly growing economy. With lots of knowledge added we left Warsaw with the intention of returning, for another important destination, Milano, Italy.

Evaluation Seminar in India:

Following the third training programme in Bangalore an evaluation seminar was held on February 16, 2007 and was well attended, by distinguished dignitaries in addition to the participants and the partners.

The Chief Secretary to the Government of Karnataka, Mr. P.B. Mahishi participated in the Programme Evaluation Seminar on February 16 and also inaugurated and dedicated the Lighting Knowledge Bank website. All the Programme partners were impressed with the programmes held.

The Government of Karnataka has shown keen interest in the energy conservation and remote lighting controls and it is anticipated that ISLE will rise to the expectations of the Government and bring out appropriate field training modules for relevant sections of the municipal and electricity distribution divisions.

In the aftermath of the Delhi and Bangalore programmes some specific requests have been made.

Delhi will be hosting the Commonwealth Games in 2010 and work on various sports stadia and on lighting the monuments (or upgrading them) has already started. In this context a lot of discussion took place. A request was made for arranging a dedicated session focused on Sports Lighting and also for a session on Monument Lighting.

Bangalore has desired tailor made programmes to train the municipal and electricity distribution authorities.

The leader of the European Delegation Mr. Maurizio Esitini agreed to take up the matter with the European Commission either as an extension of this programme or as a separate programme immediately on conclusion of the present programme. He explained that the budget does not provide for an automatic extension of the present programme.

Final Concluding Seminar

The seminar covered the various aspects of interaction, that had taken place in the course of the three training sessions and the exchange programme and the needs and capabilities of India, Italy and Poland are now better known to each other. The scope of collaboration between the countries is immense and the details will be in the report to be filed by the leader of the Programme, ASSISTAL.

This seminar was also attended by the Trade Commissioner of India in Milan, who delivered the address on behalf of the Consul General of India, who was unable to attend due to an unforeseen engagement.

The media coverage was excellent. Both TV and the leading newspapers covered the event in detail.

Lecture by Dr. Narendran

June 8, 2007, New Delhi

USAID joined hands with ISLE to organise a lecture by Dr. N. Narendran, one of the world's leading experts on LEDs. He is the Director of Research and Head of the Graduate Research Program at the Lighting Research Centre (LRC), Rensselaer Polytechnic Institute in the US.



Mr. Mamak introducing Dr. Narendran

Dr. Narendran has been responsible for helping to bridge the science of solid state LED technology with mainstream lighting applications.

The lecture was held at the India Habitat Centre and was attended by nearly 70 people with an interest in LEDs from diverse backgrounds; lighting industry, architects, consultants, government officials and academicians.

Mr S.Venkataramani, President ISLE welcomed the gathering. The speaker was introduced by Mr. H.S. Mamak, former President of ISLE and the lecture was chaired by Dr. Ajay Mathur, Director General of the Bureau of Energy Efficiency, Ministry of Power, Government of India.



Dr Mathur expressed his department's very keen interest in the development of solid state lighting.

Dr. Narendran's lecture gave an insight into the exciting possibilities of what could be expected from solid state lighting in the near future. But as his lecture was entitled Promises and Challenges of LEDs, he also pointed out the limitations and challenges that this new and rapidly changing technology presented.

His presentation can be accessed at the following weblink -

<http://www.lrc.rpi.edu/programs/solidstate/pdf/NewDelhi2007.pdf>

Mr. S. Padmanabhan, Senior Energy Advisor at USAID gave the vote of thanks. The meeting was followed by dinner.

New Governing Body

As announced in the last issue of the newsletter, a new Governing Body with the following members has been elected.

Dr. Avinash Kulkarni
Dr. Saswati Mazumdar
Mr. Gulshan Aghi
Mr. R. Nagarajan
Mr. I.M. Asthana
Mr. Rajat Roy
Ar. Rohini Mani
Mr. C.R. Datta
Mr. Pradip Kumar Majumdar

In addition to these elected members, the following are also members of the Governing Body.

Mr. S. Venkataramani, Immediate Past President,
Mr. N. Nagarajan, Chairman, Delhi State Centre
Mr. P.C. Barjatia, Chairman, Mumbai State Centre
Mr. Dilip Kumbhat, Chairman, Chennai State Centre
Mr. Sanjay Jadhav, Chairman, Karnataka State Centre

Since the Chairman of the Calcutta State Centre has been elected to the Governing Body, the State Centre has nominated Mr. Prakash Chatterjee to the GB.

The President of Elcoma is an ex-officio member of the GB.

Following the 15th and last meeting of the outgoing GB, the new GB held its first meeting on July 24. The following office bearers were elected:

Dr. Avinash Kulkarni, President
Mr. Gulshan Aghi, Vice President
Mr. P.K. Majumdar, Hon. Gen. Secretary
Mr. N. Nagarajan, Treasurer

The Governing Body co-opted Mr. H.S. Mamak as a Permanent Invitee to the GB.

The Board of Nomination, comprising the incoming President, Dr. A.D. Kulkarni, the outgoing President, Mr. S. Venkataramani, and Past Presidents, Mr. P.K. Bandyopadhyay and Mr. H.S. Mamak met to make recommendations for the Directors of the Committees. The following recommendations were approved unanimously by the GB.

<i>Committee</i>	<i>Director</i>
CIE India	Mr. S. Venkataramani
Conference & Exhibition	Mr. H.S. Mamak
Education & Training	Dr. Saswati Mazumdar
Membership	Mr. Gulshan Aghi
Publication & Publicity	Ms Rohini Mani
Standardisation	Mr. N. Nagarajan

Directors of the Finance and General Administration Committees are yet to be finalised as also the Editorial Board.

21st Annual General Meeting

July 24, 2007, New Delhi

Following the 15th and last meeting of the outgoing Governing Body and the first meeting of the new Governing Body, the 21st AGM of ISLE was held at the India Habitat Centre, New Delhi,

Mr. S Venkataramani the outgoing President thanked ISLE members and GB members in particular for helping to make the term of the GB successful. He pointed out that one of their successes was that ISLE was now in good financial health. This was due in large measure to the success of Lii2005. He expressed his confidence that ISLE would improve its functioning in the coming years.

Dr. A.D. Kulkarni, the incoming President thanked the members for their confidence in him and hoped that with his experience in ISLE, IESNA and his term as President of ELCOMA, with his fellow members in the New GB he could make a contribution to further strengthening ISLE.

In an exchange of views on several aspects of ISLE, members made suggestions which the new GB will take into consideration.

Mr. Mamak Reports on the CIE Session

The Beijing Session was one of the best I have attended. There were 3 Invited Papers:

- Dr. K. Sagawa (Japan) on Vision of the Elderly and Visually Impaired - For accessible design in light and lighting.
- Mr. J. Schanda (Hungary) 100 years of Solid State Electroluminescence - A challenge for the CIE.
- Dr. Q.Zhan (China) on A Brighter China and a More Colourful Life.

There were 108 Presented Technical Papers, 213 Poster Papers and 4 Workshops.

The message and concerns of the world lighting experts can be divided into the following areas: -

1. The whole area relating to LEDs
2. Lighting and health
3. Lighting and environment
4. Energy saving

LEDs : Technical Papers on a variety of subjects were delivered as follows:-

- LEDs and distance of illuminance
- Luminance contrast measurement under daylight conditions
- Spectroradiometric measurements of pulsed high power LEDs
- Measurement of Solid State Lighting Products
- LEDs and Luminaires
- Total luminous flux measurement of LEDs and uncertainties
- Photometry measurements
- Luminaire photometry for temperature sensitivity
- Grading LED illumination from colour rendering to light quality indices
- Comparative study of new solid state light sources
- New method of quantifying colour rendering in LEDs

Remarks: It was clear that whereas LEDs are the undoubted front-runner technology in lighting for the future, there is a lot yet to be researched and established. We are still a good distance away from standard formation and acceptable testing procedures. Till this is achieved LEDs will continue to be a 'Promise' whose exact and measured contributions are yet to be established and accepted. Heat, colour rendering, life, light output etc. are still problems to be solved.

Lighting And Health: Technical Papers of a serious nature were delivered on the following subject: -

- Light and Health - Photoreception for biological, behavior and responses in humans

- Benefits of photobiological light exposure to night shift workers
- Background luminance and colour temperatures influence alertness and health
- A way of lighting to maintain health, sleep habits
- Light sources and their health benefits and risks
- Risks and benefits of solar UV exposure
- Measurement of ultraviolet irradiation of artificial light sources in daily life.
- Health and colour

Besides the above there was a combined workshop of Div. 3 and Div.6 on Application of photobiology headed by Dr. Brainard which had the maximum attendance.

Remarks : There is an increasing interest by lighting experts in the subject of light and health and well being. Lighting for relaxation, lighting for better sleep, lighting to enhance alertness, lighting to overcome depression were discussion points and reflect the preoccupation of lighting people to make lighting more aligned to human comfort needs with an eye to making it health oriented.

Lighting And Environment: Some of the interesting Technical Papers were:

- Residential area lighting

- Luminance for pedestrian crossing
- Town lighting planning and sky glow
- Lighting ecology study of the Beijing Summer Palace
- Zoning of daylight climate in China
- Daylight quality and usage
- Glare free lighting environment

Remarks : Natural light continues to hold an important position in lighting and in this Session I noticed that specific applications and planning held centre stage rather than abstract theories.

Energy Saving

There were several technical papers on this subject as can be expected:

- Daylighting had 9 technical papers from zoning to evaluation, to quality, to visual comfort
- Intelligent road lighting to save energy
- New lighting solutions to office lighting
- Residential energy efficient lighting
- Energy saving with CFLs in residential lighting

Remarks : Energy saving continues to be a very important subject, judging from the number of Technical Papers that were delivered on the subject on light sources, applications, measurements and natural light.

 <p>MAEER's MIT-LRA MIT LIGHTING RESEARCH ACADEMY</p>	<p>MAEER's MIT LIGHTING RESEARCH ACADEMY PUNE INDIA</p> <p>(A Unit of Invention & Research Academy, MIT Pune)</p> <p>S. No. 124, Paud Road Pune-411038. India. Tel.: 91-20-25432767, 25431795 Ext.: 151 Fax: 91-20-25442770. E_mail: lra@mitpune.com Website: www.mitpune.com</p>
<p>LIGHTING TEACHING FACULTY</p>	
<p>MAEER's MIT Group of Institutes have got more than 58 Institutes with more than 50,000 Students in different disciplines of Engineering, Medicine and Management. Now with the aim of promoting Lighting Education in the country, MAEER's MIT Group of Institutes has established the MIT Lighting Research Academy at Pune. The first ever Post Graduate Program (Equivalent to MBA) in Lighting Technology Management has been started from this academic year. Many more Programs at Graduate, Undergraduate, Diploma, Certificate Level are planned to be started. We are therefore looking for full time/visiting faculty members.</p>	
<p>The candidates shall be Graduate in Engineering/Technology with adequate experience in the field of Lighting/Illumination, and shall have flare for teaching. Persons with PG in Lighting/Illumination will be preferred. Selected candidates will be placed in the Grades of Lecturers/Asst. Professors/Professors.</p>	
<p>Interested individuals may contact Mr. Prakash Barjatia (Cell : 9370144389), and forward their CV by E-mail to roopagunjal@mitpune.com</p>	
<p style="text-align: right;">Prof.(Dr.) Vishwanath D. Karad Founder & Executive President of MAEER</p>	
<p>MAEER's MIT Group of Institutes, Pune Celebrating 25 th Year of Academic Excellence</p>	

CALCUTTA STATE CENTRE

One-day Lighting Course

June 29, 2007, Kolkata

ISLE Calcutta State Centre organized a One day Course on Fundamentals of Lighting Methods and Applications on Friday, June 29, 2007 at the Seminar Hall of the Electrical Engineering Department, Jadavpur University. Participants were from diverse areas of profession varying from architects, engineers, interior designers, entrepreneurs to students and faculty members of Institutes of repute. MECON- Ranchi and Kolkata,



Ms Suchandra Bardhan addressing the participants

CPWD, CGCRI, C & S Gewiss India and Realtors like Merlin Group and Bengal Ambuja Housing Development were among the participants. Speakers were eminent personalities belonging to academics, profession and industry. WIPRO Lighting and Ladhuram Toshniwal & Sons sponsored the Course.

Mr. I. M. Asthana, Chairman ISLE Calcutta State Centre along with Prof. M.K. Mitra, Dean, Faculty of Engineering & Technology, Jadavpur University - The Chief Guest, inaugurated the Course. Prof. M.K. Mitra enthused the participants by sharing some ideas for the generations to come. He speculated whether different forms of energy could be packed into one gadget and whether bio-chips could be used for self illumination.

The Technical Session was commenced by Prof. Somen Chakraborty, Professor, Department of Architecture, Jadavpur University and himself a lighting consultant. He focused his talk on the Basics and Physics of Lighting Phenomenon. And the talk ended on a very interesting observation as to how the placement of the lamp source for lighting an object attributes different moods to the lighting scheme. He cited the example of the Elephanta Caves depicting *Shristi*, *Stithi* and *Proloy* incorporating this lighting strategy.

Philips Electronics India, one of the pioneers in lighting expertise and also in lighting education took up

Technical Session 2 with the topic "GLS to LEDs"- General Lighting Services to Light Emitting Diodes. Mr. Kalyan Ray Chaudhuri, a bright and young expert on lighting design covered the gamut of light sources that are available in the market both Indian and global. There were some perky questions from interior designers as to how the halogen lamps acting as down-lighters, affect paintings by their Infra Red Radiation.

The post lunch session was invigorating with a blitzkrieg of ideas from Mr. Raja Mukherjee, DGM, Sales & Design, GE Consumer & Industrial with "Modern Trends in Luminaire Technology" and Mr. Gurpreet Singh Sethi, Manager-Technical-BL, OSRAM India with "Lighting Control Systems". Both highlighted the issue of energy efficient lighting and how to optimize choice keeping in view the Total Harmonic Distortion (THD) induced by each device. This was interesting as again optimization means incorporating intelligent software in lighting design and applications, Environmental Lighting, Green Buildings and consequently LEED Certification i.e. Energy consumption should not be greater than 0.8W/sq.ft and Mercury content should not be more than 5 mg. This is the present global standard for being energy and environment savvy. The last session by Er. Onkar Mitra on Energy Management in Electrical Lighting stressed this point to strongly convey the message of energy consciousness and conservation for the benefit of future generations.

However, each technical session was followed by an interactive period and the program concluded with giving out certificates to the participants. The response of the participants was very positive as evident from the feedback received from them in the given format. Lunch and Tea were provided to the participants on the occasion.

Ms Suchandra Bardhan, Sr. Lecturer, Dept. of Architecture, Jadavpur University and presently Convenor, Education Sub-committee, ISLE CSC jointly coordinated the Course with Dr. Biswanath Roy, Reader, Electrical Engineering Department, Jadavpur University.



Session in progress

Seminar on Lighting and Applied Electronics

April 4, 2007

The subject Seminar was conducted April 4, 2007 at Plato Hall of MIT Engineering College, Kothrud, Pune. The Seminar was organized by the Student Chapter of MIT-ISLE in association with the Pune Local Centre of ISLE.

Prof. Saket Yeolekar, Coordinator of the ISLE Student Chapter welcomed the Guests, Speakers and Student Members of ISLE. Mr. P.C. Barjatia, Chairman of the Mumbai State Centre appreciated the efforts made by the Student Chapter and the Pune Local Centre of ISLE for arranging the Seminar. He gave an assurance that MSC would provide all necessary assistance for arranging such events.

Speaking on the topic of Control Gear for Fluorescent Lamps Mr. M.D. Adoni, Business Advisor of Intelux Electronics, Pune gave a detailed explanation of the role of control gears in the operation of fluorescent lamps and enumerated the benefits of using electronic ballasts. The appropriate combination of control gear and the lamp could result in the saving of electrical energy upto 30-40 %. He emphasized the need of awareness amongst the masses to save precious energy.

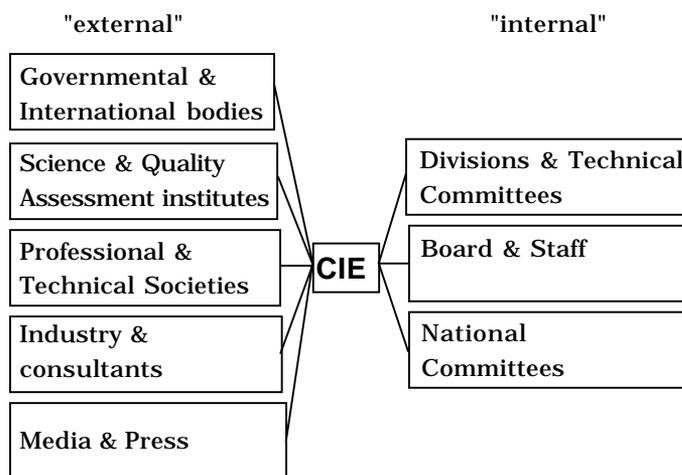
Dr. S. V. Rajarshi, Sr. Manager - Business Development, Litex Electricals, Pune made an interesting presentation on Infrared Halogen Lamps and Laser Pumping Lamps. He explained in detail the design features and process for the manufacture of IR Lamps. Elaborating the field requirement, he gave details about the use of different designs and sizes for different industrial and medical applications. Considering the newness of technology, there were a number of questions and queries from the audience, which were responded to by Dr.Rajarshi.

The Seminar was attended by 42 Students, ISLE - PLC Officials and Faculty Members of the College. Giving the Vote of Thanks, Mr. C.V. Havyas, Student Representative of the ISLE Student Chapter hoped that they would get similar encouragement from the College, Industry and ISLE, MSC. He appealed to all students to become Members and thus strengthen the hand of the ISLE Student Chapter. He also thanked the Management of MIT College for encouraging and supporting such activities. Students were presented with Certificates of Participation.

Prof. Saket Yeolekar
Co-ordinator
ISLE - MIT Student Chapter

President's Report for the General Assembly Meeting, Beijing, July 4, 2007

As in my earlier reports I use the figure below about our Stakeholders as outline for my report. The different stakeholder groups in CIE can be divided in, on the one hand, "internal stakeholders ": Division & Technical Committees, Board & Staff and National Committees, and on the other hand into: "external stakeholders" like governmental & international bodies, universities, research & quality assessment institutes, professional and technical societies, industry & consultants, and the media & press.



Stakeholders in CIE

The "Internal" Part

Divisions and Technical Committees

The backbone of CIE is formed by the 1000-plus top-experts from all over the world working together in our 7 divisions and some 130 Technical Committees. In order to "use" our volunteers as efficiently as possible the Board has become more critical in accepting new TCs. Only if it is sure that enough active volunteers are prepared to work on an important new item a new TC is established. This also has the advantage that the many active volunteers are not slowed down by inactive members who cost time and needless administrative and paperwork. We all know about very active and efficient CIE volunteers who have given and are giving their exceptional knowledge to CIE and thus to the lighting and image technology world. To honor and recognize outstanding contributions of CIE volunteers we have created three Distinguished Services Awards (the Wyszeccki, Waldram and de Boer award). It will be my pleasure to hand out for the first time these Awards to three expert volunteers at the Beijing opening session.

Being more critical about accepting new TCs has not led to a reduction in our CIE publications. I have experienced this personally because I have to send an acknowledgement letter to each TC member who has actively participated in the work of a publication published during this quadrennium. In total I have sent out 452 of these letters: a good illustration of the high number of active TC members. It remains however important to interest young people to become active as expert volunteers. This requires the attention of the Board, of the National Committees and of today's expert volunteers.

We continue trying to get a wider use of CIE publications. This is important because a wide use of Publications is a reward for the experts who contributed to them and it is important for the image of CIE as the world recognized authority in our field. Our Web Shop, that is online since 2005, is an important step in this respect. CIE's Internet Web will get an updated and more modern "feel and look" also in line with our Webshop. Those who are members of a NC get the Publications for half the price. Not only is this good for a better "spread" of our publications but it is also an extra argument for persons and organizations to join a National Committee (thus improving NC membership and finances). The Webshop registers from which country the purchase originates and the relevant NC is credited for the NC part of the publication price.

This quadrennium again many Divisions organized Symposia and Expert Workshops. These Symposia and Workshops are important input for the expert volunteers for their own daily work and for their CIE work. At the same moment they inform the "external" world about latest findings of top experts in the world. Sometimes they are even beneficial for CIE from the financial point of view.

The Board and Staff

In order to make the transition from old to new Division Directors more smoothly we decided to finalize the selection process not at the session itself, as was customary, but at the Board meeting one year before the session. This also means that a new director does not have to decide, perhaps a bit unexpectedly, about accepting the position in only one or two days during the session. It also permits the Vice-President Technical to prepare together with the new team of directors the way of working already in advance of, or during the Session.

After 17 years in the Central Bureau in Vienna, our General Secretary, Christine Hermann wants to give a totally new direction to her professional career by becoming a scientist at the literature department (Dutch studies) of the University of Vienna. It is with great mutual regret that we therefore have to part from each other after the Beijing Session. Mrs. Hermann has been instrumental in

the good running of CIE and we are very thankful for that. Mrs. Hermann and her successor Mrs. Martine Paul will both be present at the Beijing session.

National Committees

The National Committees of CIE are controlling the affairs of CIE and provide legitimation for the work results of CIE as true international state of the art products. Our NC base during this quadrennium has remained more or less constant with NCs in 37 countries today, with Slovakia having joined as NC. This is a bit disappointing, we had hoped at the start of this quadrennium to raise the number of countries participating in CIE. I succeeded in visiting during my term as President exactly 25 of our member countries. Everywhere I received a warm welcome and impressive programs were organized for which I want to thank once again all persons involved. I learned that it is really difficult to widen our NC base especially because it is difficult for many NCs and would-be NCs to get the required financial funding. Interesting to note that where an NC is incorporated in the national lighting society the financial situation is often more "relaxed". CIE has not raised the total sum of dues for NCs since 2001. I am happy to report that we propose to lower the total sum of NC dues for 2008 with 3 % and in 2009 on top of that again with 3 %. This must also be seen in the context of the growing number of supportive members and the expected development of publication sales via the webshop. Your continued support in this respect is needed to be able to keep the lower fees for a longer period.

Above I mentioned already that our Webshop functions so that NCs get their part of the publication sales originating from their country. As mentioned above as well also the 50 % reduction in publication price for all NC members can mean a financial advantage for a NC. Further in this report details are given of the financial credits a NC gets for each supportive member originating from the country of a NC. All these measures together should lighten the financial "burden" for NCs.

The "External" Part

Governmental, International, Science and Quality Assessment Bodies & Institutions and Professional and Technical Societies

CIE signed already a long time ago memoranda of understandings with ISO, IEC and CEN. In order to ensure the maximum benefits out of these agreements the new Board will have for the first time a specific Vice-President Standards.

A further step in international cooperation was made in April of this year when Prof. Andrew Wallard, the director of BIPM and I signed in Sèvres a cooperation agreement. The task of BIPM (Bureau International de

Points et Mesures, the International Bureau for Weights and Measures) is to ensure world-wide uniformity of measurements and their traceability to the International System of Units (SI). It does this with the authority of the Convention of the Metre, a diplomatic treaty between fifty-one nations, and it operates through a series of committees, whose members are the national metrology laboratories. The Agreement recognizes the responsibilities and roles of CIE and BIPM and emphasizes the need to consult together to ensure that data related to measurements of light, optical radiation, colour, optical properties of materials, and photobiological and photochemical quantities are based on units traceable to the International System of Units (SI). Especially Division 1, 2 and 6 are involved in this type of work.

Industry and Consultants

The supportive membership system introduced in 1999 has made it possible for companies (industry, consultants) and international institutions to join CIE. As reported already above, the number of supportive members, especially during the last 2 years is gradually increasing. We need however your continuous attention and support for this. In this context it is important to recall the Board decision of 2004 where it was decided that NCs will receive from the CIE Central Bureau the following annual financial credits for Supportive Members in their country:

- 200 Euro/year for each Supportive Member (total membership fee: 500 Eur)
- 400 Euro/year for each Silver Supportive Member (total membership fee 3000 Eur)
- 800 Euro/year for each Gold Supportive Member (total membership fee 8000 Eur)

Because only NC members can become, in addition to their NC-membership, CIE Supportive Member there is now a considerable financial profit for the NC. The benefits for the supportive member itself have been discussed in detail at earlier occasions and are described in the "image brochure" of CIE that is available from the Central Bureau.

Media and Press

For "insiders" in CIE (expert volunteers, NC members etc.) it is sometimes difficult to get a basic insight in the more important annual activities and achievements of CIE. For our global image it is also important to give such information to the outside world including media and press. We therefore decided to prepare from 2007 onwards an Annual Report detailing the more important activities and achievements. The first Annual Report gives the overview of the year 2006 and is available at the Session in Beijing.

There are a number of lighting journals not enumerated at present in the Citation Index, whose publication policy

is however at least as strict as of many journals of wider circulation and thus enumerated in the Index. To help in selecting lighting journals falling into this high quality category, the CIE has developed a procedure that results in publishing a list of endorsed journals in CIE NEWS. The first three journals have been endorsed and published in CIE NEWS. We hope that with this will encourage young scientists to choose light and lighting as their scientific career, and help their peers to evaluate properly their accomplishments.

Outlook

Security of energy supply is already since the first energy crisis in the seventies of last century an important item. Global climate change makes this issue even more pressing and it is even more important to save on energy and the connected CO₂ emissions than we understood before. Since lighting consumes 19 % of all electricity in the world, lighting professionals have to take their responsibility. New lighting technologies, today already available, offer tremendous saving possibilities and CIE should help in speeding up the changeover to these new lighting technologies. Apart from the use of up to date lighting hardware there is another opportunity to save huge amounts of energy and CO₂ emissions simply by convincing the "external" world that new and renovated lighting installations should be based on the latest international (CIE) Standards and Recommendations. Often up to date versions specify lower lighting levels than earlier versions because with the more detailed knowledge we have today this can now be done without the risk of negative effects. Also adaptable lighting, making use of intelligent controllers, is often specified in newer versions of standards and recommendations. Here lower lighting levels are permitted when certain defined circumstances prevail. This illustrates the important role of CIE in the discussion on global energy and CO₂ emission reduction: it is not just about applying the right products but also about applying the right standards. It of course gives CIE the responsibility to check on a regular basis if our application standards are still up to date seen in the context of new lighting technology and/or new lighting fundamental developments.

On behalf of the Board of CIE I want to thank very much all the many volunteers and especially also the staff of the Central Bureau in Vienna who have put so much effort and work into CIE. And finally I would also like to thank my colleague Board members for their input and support.

Wout van Bommel
CIE President

Activity Reports

Division 1, Vision and Colour

Terms of Reference: To study visual responses to light and to establish standards of response functions, models and procedures of specification relevant to photometry, colorimetry, colour rendering, visual performance and visual assessment of light and lighting.

Highlights

The work of Division 1 is concerned with developing the fundamental knowledge in vision and colour to support the work of the remaining Divisions. Currently, there are 23 active Technical Committees with terms of reference ranging from the development of a new chromaticity diagram based on the cone fundamentals to the measurement of visual appearance. One of the Division's most active areas is the assessment of the colour rendering properties of light sources especially the new solid state light sources such as LEDs. One Technical Committee, TC1-62: Color rendering of LED light sources, has recently completed a report documenting the problem with the current Colour Rendering Index (CRI). A new Technical Committee, TC1-69: Colour rendition by white light sources, was established in 2006 (see below) to investigate a method, or methods, that will accurately describe the colour rendering quality of all light sources. The presence of 2 sessions and a workshop on colour rendering during the 2007 Quadrennial Meeting is indicative of the high level of interest in this topic in the CIE. A second area of considerable interest is the development of a mesopic photo-metric function. Division 1 currently has a very active Technical Committee that is attempting to develop a performance based photometric system in the mesopic range. Such a system is urgently required to allow more precise specification of night lighting that provides good visibility and is energy efficient,

New TCs

TC 1-69 Colour rendition by white light sources
Chair: Wendy Davis, USA

Terms of Reference: To investigate new methods for assessing the colour rendition properties of white-light sources used for illumination, including solid-state light sources, with the goal of recommending new assessment procedures.

New Reporterships

R1-39 Alternative Forms of the CIEDE2000 Color-Difference Equation (M. Pointer, UK)

Terms of Reference : To investigate alternative formulations of the CIEDE2000 equation and to make a recommendation to the Division on any necessary action,

R1-40 Scene Dynamic Range (J. Holm, USA)

Terms of Reference : To investigate the concept of scene dynamic range, the appearance of colors brighter than the adapted white, and adaptation to the dynamic range when viewing, and make recommendations regarding work to be done by the CIE.

New Publications

Fundamental chromaticity diagram with physiological axes - Part 1

CIE 170-1:2006

(See Newsletter Vol. VI No. III, July 2006)

A framework for the measurement of visual appearance

CIE 175:2006

(See Newsletter Vol. VII No. I, January 2007)

CIE Draft Standard DS 014-4.2 E:2006 Colorimetry - Part 4:

CIE 1976 L*a*b* Colour Spaces

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.

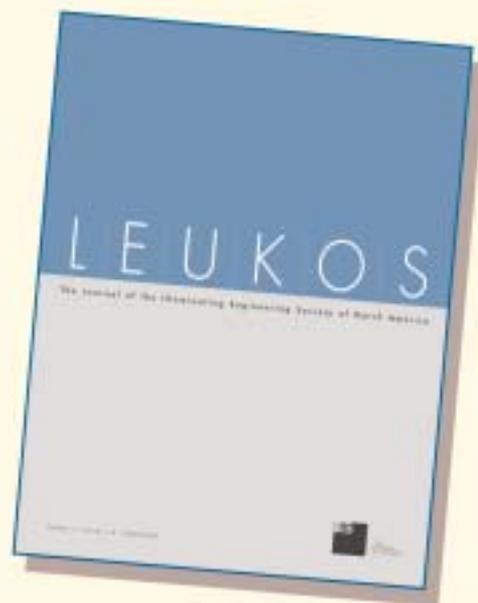
The purpose of this CIE Standard is to define procedures for calculating the coordinates of the CIE 1976 L*a*b* (CIELAB) colour space and the Euclidean colour difference values based on these coordinates. The standard does not cover more sophisticated colour difference formulae based on CIELAB, such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

The draft standard has been sent to CIE National Committees for comments and sales to interested parties. It is still subject to changes and may not yet be referred to as a CIE Standard. When approved by the CIE NCs, it will be published as a CIE Standard and later on as a joint ISO/CIE standard.

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Symposia

ISCC/CIE Expert Symposium on "75 Years of the CIE Standard Colorimetric Observer"
16-17 May 2006 Ottawa, Canada
(See Newsletter Vol. VII No. I January 2007)

CIE Expert Symposium on Visual Appearance
19-20 October 2006 Paris, France
(See Newsletter Vol. VII No. I, January 2007)

Division 2, Physical Measurement of Light and Radiation

Terms of Reference:

1. To study standard procedures for the evaluation of ultraviolet, visible and infrared radiation, global radiation, and optical properties of materials and luminaires.
2. To study optical properties and performance of physical detectors and other devices required for their evaluation.

New Reportership

Spectral and colorimetric electronic data exchange
(Mike Pointer, UK)

New Publications

Geometric tolerances for colour measurements
CIE 176:2006
(See Newsletter Vol. VII No. I, January 2007)

CIE Standard S 014-1/E:2006 Colorimetry - Part 1:
CIE Standard Colorimetric Observers
(See Newsletter Vol. VII No. I, January 2007)

CIE Standard S 014-2/E:2006 Colorimetry - Part 2:
CIE Standard Illuminants
(See Newsletter Vol. VII No. I, January 2007)

Symposium

2nd CIE Expert Symposium on Measurement Uncertainty
12-13 June 2006, Braunschweig, Germany
(See Newsletter Vol. VII No. I, January 2007)

Division 3, Interior Environment and Lighting Design

Terms of Reference:

1. To study and evaluate visual factors which influence the satisfaction of the occupants of a building with their environment, and their interaction with thermal and acoustical aspects, and to provide guidance on relevant design criteria for both natural and man-made lighting.
2. To study design techniques, including relevant calculations, for the interior lighting of buildings,

incorporating the findings and those of other CIE Divisions into lighting guides for interiors in general, for particular types of interiors and for specific problems in interior lighting practice,

New Publications

Test cases to assess the accuracy of lighting computer programs
CIE 171:2006
(See Newsletter Vol. VI No. I, January 2006)

Tubular daylight guidance systems
CIE 173:2006
(See Newsletter Vol. VI No. III, July 2006)

Symposium

2nd CIE Symposium on Lighting and Health Ottawa, Canada organized together with CIE Division 6
(See Newsletter Vol. VII No. II, April 2007)

Division 4, Lighting and Signalling for Transport

Terms of Reference: To study lighting and visual signalling and information requirements of transport and traffic, such as road and vehicle lighting, delineation, signing and signalling for all types of public roads and all kinds of users and vehicles, and visual aids for modes other than road transport.

Technical Committees

Division 4 has especially concentrated on the work in TCs. The number of 16 committees is close to the capacity of the Division. Some of them are highlighted as follows:

The ballot of report "Road Transport Lighting for Developing Countries" has been finished successfully. This document is excellent, but very different from a conventional Technical Report, both in its contents and target audience. This report will be a good planning and design guideline.

"Emergency Lighting in Tunnels". After heavy fires in some tunnels there is demand for international, balanced recommendations.

"Recommendations for the Lighting of Roads for Motor and Pedestrian Traffic". The report will be revised in such a way that the adaptive road lighting is possible. Nowadays politicians and civil servants are dimming or switching off the lighting at random. Considered recommendations are needed for the control of the situation and development.

Division 5, Exterior and Other Lighting Applications

Terms of Reference: To study procedures and prepare guides for the design of lighting for exterior working areas,

365 ways to light up your life



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security lighting, flood lighting, pedestrian and other urban areas without motorized traffic, areas for sports and recreation, and for mine lighting.

Technical Committees

Of the work going on in technical committees, the following progress was made during the year:

TC 5-18 Practical design guidelines for the lighting of exterior work areas

This committee has been re-convened under a new chairman and its remit broadened to take in the topic of security lighting from another former committee that has been closed. A new joint draft will be discussed in Beijing in July 2007.

TC 5-20 Guide for non-TV sports lighting

Good progress is being made on the 6th Draft of this document with some vigorous exchanges being made via Email as to the contents of the next draft to be debated in Beijing in July 2007,

TC 5-21 A Guide to Masterplanning Urban Lighting

Good progress is being made on the 7th Draft of this document, with the hopeful final draft being ready for voting on at the next meeting in Beijing in July 2007.

The Urban Nightscape conference that followed the CIE meeting in Athens in September 2006, was a great success and has given members of the committee much to consider in putting together this final document, as has the global interest in formulating a more sustainable lighting strategy for our growing urban lifestyle.

TC 5-22 Exterior luminaire beam patterns

In order not to duplicate work, the committee has decided to await the outcome of the American IESNA/IDA report into TM15 which is expected in early 2007, This will then form the basis of the next meeting in Beijing in July 2007.

TC 5-23 Guidelines for the use of illuminance parameters in Outdoor Applications

This Committee is new and was originally focused on semi-cylindrical illuminance. However, its remit has been changed so as to compare the different illuminance parameters and propose where each is most useful in application,

New Publications

CIE Draft Standard CIE DS 020.2 E:2006 and CIE Standard S 020 E:2007 Emergency Lighting
(See Newsletter Vol. VI No. II, April 2007)

Division 6, Photobiology and Photochemistry

Terms of Reference : To study and evaluate the effects of optical radiation on biological and photochemical systems [exclusive of vision].

New TC

TC 6-61 Measurement of radiation using the phytometric system for plant application

Chair: Gilberto da Costa, Brazil

Terms of Reference: To prepare a document intended to provide growers, lamp manufacturers, greenhouse and growth-chamber designers, lighting engineers, architects, and plant scientists and engineers with a concise reference for the use of the phytometric system for measuring radiation for plant photosynthesis and related processes.

New Reportership

Occupational UV protection by disposable gloves
(J. O'Hagan, UK)

New Publications

UV protection and clothing
CIE 172:2006, ISBN 3 901 906 48 7
(See Newsletter Vol. VI No. II, April 2007)

Action spectrum for the production of previtamin D₃ in human skin
CIE 174:2006,
(See Newsletter Vol. VI No. IV, October 2006)

CIE Standard S 019/E:2006 Photocarcinogenesis Action Spectrum (Non-Melanoma Skin Cancers)
(See Newsletter Vol. VI No. III, July 2006)

Symposium

2nd CIE Symposium on Lighting and Health
7-8 September 2006 Ottawa, Canada
(See Newsletter Vol. VII No. II, April 2007)

Hot and High

Division 6 had two publications this year that are related to a hotly debated topic within the health community. UV radiation is a known carcinogen (Photocarcinogenesis Action Spectrum), but is also responsible for the beneficial synthesis of vitamin D (Action spectrum for the production of provitamin D₃ in human skin). At present the long-running public health message to stay out of the sun and reduce the risk of skin cancer is under attack since such behaviour prevents or reduces vitamin D synthesis. UV exposure is the main source of vitamin D, which is proposed to have many health benefits beyond the widely accepted influence on calcium metabolism and skeletal health. The division, as represented by its TCs, provides expert opinion on both

the risks and benefits of UV exposure, and in our third publication (UV protection and clothing) details the way in which clothing modifies UV radiation reaching the skin.

The highlight of the year was undoubtedly the symposium on light and health held with Division 3. The topic attracts interest at both a scientific and a personal or lay level, as evidenced by the high level of media interest in the Ottawa meeting. A cross-cutting theme such as this demonstrates the strength of CIE in being able to bring together experts from two different communities to inform each other.

Division 8, Image Technology

Terms of Reference: To study procedures and prepare guides and standards for the optical, visual and metrological aspects of the communication, processing, and reproduction of images, using all types of analogue and digital imaging devices, storage media and imaging media.

New TC's

TC 8-09 Archival colour imaging
Chair: Robert Buckley, USA

Terms of Reference: To recommend a set of techniques for the accurate capture, encoding and long-term preservation of colour descriptions of digital images that are either born digital or the result of digitizing 2D static physical objects including documents, maps, photographic materials and paintings.

TG 8-10 Office lighting for imaging
Chair: Todd Newman, USA

Terms of Reference: To report on the spectral power distribution and illumination levels used to view images in office lighting conditions. The report is to be based on empirical research.

TECHNICAL PAPER

One Hundred Years Of Solid State Electroluminescence - A Challenge For The CIE

János Schanda

Abstract

Solid state electric light is one hundred years old. Round observed light emanating from a SiC crystal in 1907. It took almost sixty years before injection electroluminescence became a practical light source, first for small scale signalling, but now already penetrating into every area of light and lighting.

With the use of light emitting diodes (LEDs) for critical signalling purposes (e.g. traffic signals and self-illuminated

traffic signs) as well as for general lighting applications, it became necessary to properly evaluate their light. This means not only correct photometric measurement, but also that the measurement result should reflect the visual evaluation.

One of the most critical questions today is the colour rendering evaluation of LED light.

The paper will show methods to get better congruence between measured and visually observed colour, and will discuss the question of light source colour quality. Some items related to practical photometry and colorimetry of LEDs will also be touched on.

Keywords: light emitting diode (LED), colour, colour rendering, LED photometry.

1. Introduction

During the present boom of solid state lighting, few people are aware of the fact that the first description of solid state electroluminescence dates back to 1907¹ when Round found that when a carborundum (SiC) crystal is contacted with a needle, a faint - mostly blue - glow can be observed in the vicinity of the point contact. Some fifteen years later Lossev investigated the phenomenon in more detail^{2,3,4}. Using present day terminology one would call the effect injection electroluminescence at a metal-semiconductor junction. The efficiency of light generation was, however, so low that no direct practical application was envisaged.

Some 12 years later, Destriaux described electroluminescence on thin films prepared by embedding ZnS powder in a dielectric matrix and placing this in a high alternating current field⁵. This type of solid state electroluminescence did have practical application, although it did not attain the efficiency and widespread use that was hoped. It is still used in the form of some electroluminescent displays.

The big breakthrough was achieved when injection luminescence became systematically investigated in III-V compounds, i.e. for visible light first in GaAsP⁶. The knowledge obtained by the investigation and practical use of semiconducting materials enabled physicists to build semiconducting p-n junctions, where the bandgap of the material corresponded to electron-energies of visible radiation, and thus when the injected current carriers recombined light was produced.

From the 1960's on knowledge of direct and indirect recombination (with their different emission probabilities), together with other phenomena of non-radiative recombination and the production and doping of higher bandwidth materials, improved. This had as a consequence a continuous increase in efficiency and the production of light emitting diodes (LEDs) of shorter and shorter emission wavelengths. First red, then amber, and finally green light emitting diodes came onto the market and

slowly became the prime sources for signalling applications in household appliances and electronic instruments. They were also used in small, mainly seven segment, displays. This application became the first challenge for photometry and colorimetry, as the visual brightness of these red and green displays differed from their measured luminances⁷. Unfortunately little attention was given by the CIE in those days to these findings.

Real attention to LEDs as light sources occurred when Nakamura succeeded in closing the gap of the hue circle by producing blue emitting LEDs (see e.g.⁸). This opened up the way for many further applications: using red, green and blue LEDs one could produce any shade of light (within the gamut area of the three basic colours), including white light. Thus LEDs became interesting both for full colour displays and eventually general illumination.

The past ten years of technological progress increased the efficacy of both coloured LEDs and a special sort of white light producing LED family using a blue light emitting chip and a yellow phosphor that converts part of the blue light into longer wavelength radiation, so that the mixture of the blue plus yellow light produced the sensation of white light. Thus coloured LEDs became the main light sources for signalling (e.g. traffic lights), as no colour filter that absorbed part of the emitted radiation had to be used; white LEDs found their use in niche application, where they could compete with traditional sources, as e.g. in refrigerated surroundings (as their efficiency rises with temperature decrease, just opposite to that of e.g. fluorescent lamps) or in applications where their high rigidity was of advantage.

Today white light LEDs compete in efficacy with fluorescent lamps; coloured LEDs become the main sources for large area displays, and the colour changing possibilities of red-green-blue LED combinations make them much desired in artistic applications.

For all the above applications, the photometric and colorimetric characteristics of these sources have to be measured. The CIE has not changed the fundamental photometric system since 1924, and its colorimetric system has also seen only slight amendments during the past 76 years. While it was possible to use the same photometric and colorimetric system when lighting changed from incandescent lamps to fluorescent and high-pressure gas discharge lamps, it looks as if some more fundamental considerations will be necessary to cope with LED lighting. In the following some of the issues, where according to the view of the present author new thinking is necessary, are enumerated.

2. Challenges For The CIE Produced By LEDs

2.1 Photometric and colorimetric fundamentals

Photometry is built on the $V(\lambda)$ function. As early as 1951 Judd proposed a modification⁹ of this function, which

was not accepted, as the general opinion of the applied experts was that - for white lights - the difference is too small to be of any practical importance. The CIE published the modified $V(\lambda)$ function in 1990 as the $V_M(\lambda)$ function¹⁰, but the Meter Convention has still not included it as a photometric actinic function into its system; thus no instrument can be calibrated legally to show photometric values based on the $V_M(\lambda)$ function, despite the fact that it would better describe the visual impression we get for the light of a blue emitting LED. The differences are not big, but non-negligible, as show in Table 1 for the example of a red, green and blue LED. The table shows also the effect for a phosphor coated blue LED producing white light.

Table 1. Luminous flux calculated on the basis of the $V(\lambda)$ and $V_M(\lambda)$ functions

LED light source	Lum. flux calculated using the $V(\lambda)$ function	Lum. flux calculated using the $V_M(\lambda)$ function
Red LED	12,7	12,7
Green LED	62,5	62,5
Blue LED	6,71	6,79
White p-LED	99,8	100,21

Due to the fact that the brightness of coloured lights does not correlate with luminance (even if the $V_M(\lambda)$ function were used), and the blue LED will not be used for task illumination, where luminance might be a good measure, this in itself is still not a convincing argument to change the photometric system.

If, however, colorimetric characteristics are considered as well, the situation looks quite different: if one matches e.g. the white light produced by an RGB-LED with that of an incandescent lamp visually and measures the tristimulus values of both lights, one gets considerably different values¹¹. Table 2 shows the measured chromaticity co-ordinates of the two lights matched in colour. For adaptation to the incandescent lamp light the calculated CIELAB colour difference is $\Delta E_{ab}^* = 10,8$.

Table 2. Chromaticity co-ordinates of the light of an RGB-LED and of an incandescent lamp that match in colour visually

Lamp type	x	y
Incandescent	0,4513	0,4100
RGB-LED	0,4431	0,3991

Table 1. In the following a white light emitting LED configuration, if it is produced from three chips emitting in the red, green and blue part of the spectrum, respectively, will be called GRB-LED, and if it is produced from a blue chip plus a yellow phosphor it will be called p-LED.

Table 2. A detailed statistical analysis of these and further measurements will be given in a subsequent paper.

CIE TC 1-36 developed L, M, S cone fundamentals¹² that correlate better with the average human eye spectral sensitivities. Based on these fundamentals Wold calculated colour matching functions¹³ (CMFs), and we tested these not only for a single white colour match, but also for a number of coloured lights and got the result that the CMFs based on the cone fundamentals provide much better agreement with visual matches than the CIE 1931 CMFs¹⁴.

Figure 1 shows the chromaticities of visually matching lights of an RGB-LED cluster and an incandescent light, using the CIE 1931 CMFs (Figure 1 a) and those based on cone fundamentals (Figure 1 b). The red diamond shows the measured chromaticity of the reference incandescent lamp; the yellow points are the averaged chromaticity coordinates of matches performed by our nine observers; their average is shown by the blue rectangle. The yellow ellipse has been drawn to show the average scatter of the many settings of the observers².

Results of a second experiment are shown in Figure 2. Here the incandescent lamp was filtered by a number of colour filters, and visual matches were obtained by adjusting the currents of the LEDs. Again Figure 2 a. shows the measured chromaticities for the visually matched sources, now in the u',v' co-ordinate system, using the CIE 1931 CMFs and Figure 2 b. shows them for the cone fundamental based system.

As can be seen from the figure the matches become quite good in the white, yellow and red part of the diagram, but in the blue part they are still not hundred per cent. Overall, the measured differences between the visually matched light sources become much smaller by using the new proposed CMFs. Further work is needed in this field, and definitely the CIE should address this question not only from the theoretical point of view of the cone fundamentals, but also by suggesting an (alternative or supplementary?) colorimetric system that can be used also for LED lighting.

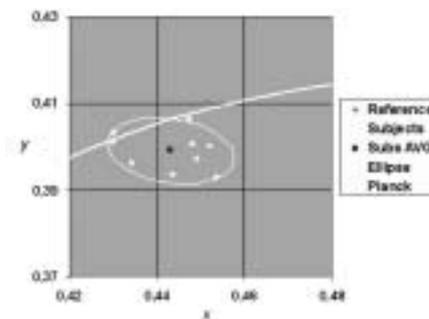
One could continue the enumeration of the open questions, but only two items should be mentioned briefly: mesopic photometry and glare of small sources, as both of them are highly related to the introduction of LED lighting. In mesopic photometry for a considerable time the attention was focused on brightness match under mesopic conditions, as visual acuity decreases with decreasing luminance. Recently the attention was directed towards road lighting applications^{16,17}, where reaction time, threshold contrast and spectral glare sensitivity become important aspects¹⁸.

2.2 Practical photometry and colorimetry

Both in photometry and colorimetry one is also faced with the problem: what uncertainty one can expect by

using commercial instruments to measure LED lights. While national laboratories agree already to a few per cent in their measurement results when measuring LEDs, the applied engineer lacks adequate guidance if practical measurements are being made, e.g. coloured LED traffic lights have to be evaluated. There are several recommendations about how the spectral mismatch of a photometer should be described in the case of LED measurements^{19,20,21}, but none of these have been accepted by the CIE yet.

a.)



b.)

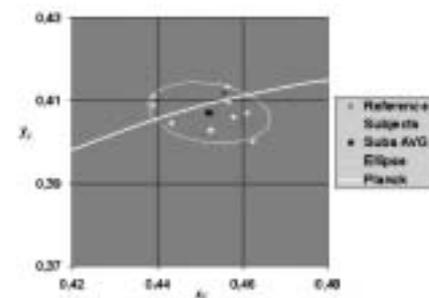


Figure 1: Chromaticities of colour matches between an incandescent lamp and an RGB-LED cluster, a.) using the CIE 1931 CMFs, b.) using the CMFs based on cone fundamentals.

The new draft edition of CIE Publication 127²² introduced a number of new definitions, helping LED users to get more reliable results - and more importantly - results that can be compared in different laboratories. These are restricted, however, to geometric descriptions (partial flux measurement), and do not deal with the very important question of real application: under what electrical and thermal conditions should LEDs be measured. One could argue that these items are outside of the scope of the CIE, but without defining them no meaningful comparisons of the performance of the LEDs can be made. LEDs are highly temperature sensitive devices. With present high intensity LEDs the semiconductor materials are stressed to their limits. Manufacturers like to refer to junction temperature, but the user has access only to the base plate temperature of the LED. Some standardization is urgently needed, as users are presently unable to evaluate the available LEDs

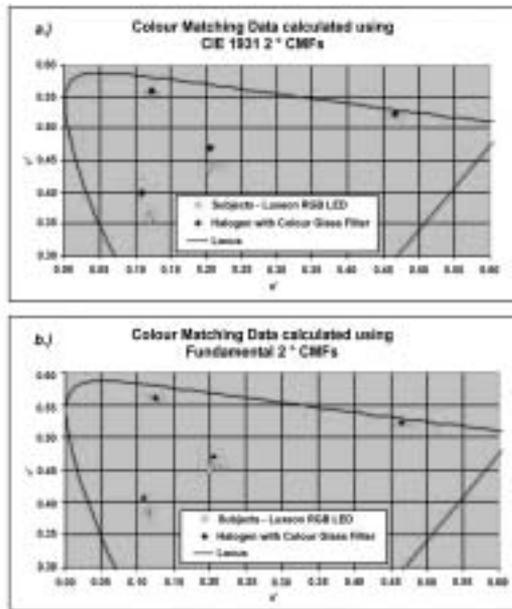


Figure 2: Measured chromaticities of a number of visual colour matches between an RGB-LED cluster and filtered incandescent lights. Figure a shows chromaticities for the CIE 1931 CMFs and Figure b for those based on the cone fundamentals.

according to their need. Just think about a big LED billboard that has to produce a large enough contrast under direct sunlight, at an outside temperatures of 35°C. How can one select the appropriate LED if the temperature dependence of the luminous flux (or intensity) of the LED, and the relationship between the outside temperature and the chip temperature under the given, pulsed condition are not known?

In traditional luminaires only one or a few sources are mounted. In the case of LED luminaires we have a very high number of individual sources. Educators have to preach to the installation managers not to mix fluorescent lamps of different colours in one installation, because this produces undesirable visual impressions. With LEDs the problem is much larger: manufacturers have to bin their products into chromatic and efficacy classes, but what should be the size of the colour bin? How large a colour difference do we perceive across individual elements if say 50 or 100 LEDs are in a luminaire?

For white light applications one will not try to look into the luminaire; for coloured ones - however - if they are signal lamps, one looks directly onto the panel with the LEDs of slightly different colour. What is the physiologically permissible difference among the single LEDs? These are questions that CIE vision research should answer, but where a wrong decision might be connected with large costs. The CIE should probably make it clear to the manufacturers that the support of research in this field was not needed in pre-LED times of lighting, thus no answers are ready, but it is in their interest to support research in such fields.

A further question related to signal lights is the proper evaluation of brightness. It is well known that blue and red lights look brighter than a yellow light if their luminance is the same, but not even the most advanced colour appearance models cope with this problem.

2.3 Colour rendering and LEDs

With white LEDs the CIE test method for colour rendering²³ does not describe the visual colour rendering impression properly. Since the introduction of the CIELUV and CIELAB colour spaces several attempts were made to modernize the CIE test sample method, without a major success²⁴ (for a summary description of colour rendering and similar subjects see²⁵).

CIE TC 1-69²⁶, responsible to develop a new descriptor for the colour quality of light sources, is of the opinion that a new index should not replace the present colour rendering index immediately, but should complement it, and hopefully replace it, when it becomes clear that it gives a better descriptor of the colour quality of the light the lamp emits than the current CIE test method. In the following some thoughts that might help to understand possible requirements for a new metric are presented. These are based partly on literature data, and partly on the experiments conducted in the laboratory of the author and do not reflect any CIE endorsed thinking.

The wish to supplement colour rendering with further quality descriptors is not new. Judd coined the term flattery index already in 1967²⁷. The flattery index was intended to describe whether a light source renders colours in a more pleasant (flattery) way than another source. Jerome discussed the differences between flattery and rendition in detail²⁸. Later the word preference was used instead of flattery²⁹. Thornton's calculation showed that colour rendering and colour preference indices do not have their optimum value at the same spectral distribution³⁰. Some experiments tried to combine the colour preference and colour rendition aspect in such a way that the maximum colour rendition remained if the test source had the same SPD as the reference illuminant, but the worsening of the index was slower if the colour difference between the sample illuminated by the test source compared to the illumination by the reference illuminant deviated in the direction of higher chroma, or e.g. in case of complexion towards redder hues³¹.

Other ideas have looked at developing a colour discrimination index, eventually based on gamut area spanned by the test samples in a uniform chromaticity scale diagram, as there are a number of tasks where the discrimination between small colour differences is important^{32,33}. All these can be supported by simulation experiments³⁴. Other concepts for a colour quality metrics can be found in a recent paper by Davis and Ohno³⁵.

The comfort experience in an interior setting is also influenced by the colour quality of the lighting. Bellchambers investigated visual clarity³⁶ and found correlation between visual clarity, illumination and colour rendering. Other investigations tried to correlate the different aspects of lighting quality as well (see e.g.³⁷).

An interesting new approach is based on the hue shifts of a high number of colours. This would show which hues are highly distorted compared to a reference and which are rendered correctly^{38,39}. Here again gamut area and its distortion might be used as a metric.

2.3.1 Colour quality simulation

Our recent studies go in a similar direction by starting from the supposition that if a designer has carefully chosen the colours of an environment to be pleasant under one light source, i.e. the observer gets a harmonious impression of the environment, then an other light source will be accepted if after chromatic adaptation transformation the colours of the environment stay harmonious⁴⁰. A further paper deals with this subject at this meeting⁴¹. We based our experiments on McCann's observation that when the shift of each colour in a set goes in a systematic order (e.g. all hues shift in the same direction, or all colours get lighter or darker, or all chroma increase or decrease) then the result is more acceptable compared to a colour distortion when the colours move in different directions in colour space.

A second approach was based on visual evaluation of the similarity versus dissimilarity of an image when illuminated with one light source or another⁴². The development of a reasonable colour appearance model⁴³ enables the display of scenes as they would appear under different illuminants, but transformed to the same white point. We have performed such simulated scene comparisons, requesting observers to compare a scene, as it would look under a reference illuminant (CIE D65) and under a test illuminant. With this approach one can test whether it is appropriate to use one single reference illuminant (as supposed by several critics of the present colour rendering test method), or it is more appropriate to define a number of reference illuminants depending on the task for which the lighting is used.

Pilot experiments have shown⁴¹ that if one supposes one perfect reference illuminant (D65) then there will be a number of sources, with different correlated colour temperatures, that will rank higher than the CIE standard illuminant A, which - according to the CIE test method - ranks as high as D65. Experiments are under way with different scene arrangements (living room, office, etc.) to see whether the average observer will select the same or different optimum CCT across the different scenes.

3. Conclusions

Solid state lighting has a hundred years history. Although first observations did not manifest themselves in products, the Destriaux effect is still used in practice. Injection luminescence - now also already 40 years old - produced a major revolution in lighting, the consequences are still not fully absorbed by CIE recommendations:

The introduction of LEDs into different lighting applications produces a number of challenges for the CIE. A better description of the fundamental visual functions seems to be necessary to avoid erroneous chromaticity assessments. This could have an influence also on the luminance evaluation. The still unsolved problem of the proper description of the brightness of coloured lights is a crucial problem in signalling.

Colour rendering - or better said - the colour quality description of light sources, LEDs included, is a hot topic. We think that our simulation experiment provide a good starting point for such investigations. They showed clearly that the method of presenting the images of one scene as it would look under different illuminants - but after chromatic adaptation - is a valid method to investigate lamp-light colour quality. Many visual colour rendering experiments are under way both in our laboratory and in a number of other laboratories, so that one can hope to get some important results in the near future.

Finally one has to mention that further challenges are on the horizon: the next generation of light sources, organic LEDs (OLEDs) are coming onto the market, and will certainly produce new questions the CIE has to answer. These sources - now used already in small displays - could become the sources for large area ceiling lighting (once thought the Destraux effect panels would be used for). Such applications might question the present methods of interior glare evaluation.

In summary we can see that the number of questions the CIE has to answer are not diminishing, and will keep our experts busy for quite some time.

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NEWS ABOUT MEMBERS

Another ISLE Member awarded PhD in Lighting

Yet another ISLE member has been awarded a Doctorate in Lighting.

Mrs. Ciji Pearl Kurian, Professor in the Department of Electrical and Electronics Engineering, Manipal Institute of Technology was awarded the Ph.D. degree by Manipal University on 12th June 2007 for her research work entitled, "Optimization and Robust Control of Energy Consumption in Daylight-Artificial Light Integrated Schemes". The doctoral study was carried out under the guidance of Prof. (Dr.) Jayadev Bhat and Prof. (Dr.) Radhakrishna S. Aithal of MIT, Manipal. She is a life member of ISLE.



In this research work, an effort is made to develop computational models suitable for the optimum integration of visual comfort, thermal comfort and energy consumption in schemes where daylight and artificial light are integrated. This illustrates how adaptive neuro-fuzzy models could be applied to enrich the informational repertoire of systems control operation for daylight artificial light integrated schemes. A highly attractive feature of this model based strategy arose from its prospect for adaptation and high level integration of multiple control agenda. Advanced lighting simulation tools as well as computationally intelligent systems together presented the possibility of using a model based control strategy as a means of controlling lighting on the visual task. Overall, the suggested robust control for the integrated scheme maximizes energy cost savings while optimizing the performance and the quality of the visual environment.

Dr. Ciji Pearl Kurian has published 4 papers in international journals and 2 in national journals and presented 19 research papers at national and international conferences, including the ISLE conferences Lux Pacifica 2002, New Delhi and Vision 2004 Bangalore.

OTHER NEWS

MIT Lighting Research Academy, Pune

MAEER's Maharashtra Institute of Technology (MIT) Pune is celebrating August 07-July 08 as its Silver Jubilee year. As an auspicious start to these celebrations on August 9 the MIT Lighting Research Academy is being inaugurated. Mr. Manoj Verma, Vice President Lighting, Crompton Greaves will be the Chief Guest. The programme will be attended by lighting professionals, academicians, consultants and students. On this occasion some of those who have worked in the cause of promoting good lighting will be felicitated.

The establishment of this Academy is one of the outcomes of the National Workshop on Vision for Lighting Technology, Education and Research in India organized in April last year jointly by ISLE Mumbai State Centre and MIT, Pune.

World Clean Energy Award for S. Padmanabhan

Mr. S. Padmanabhan, Senior Energy Advisor, USAID has been given the World Clean Energy Award for his role in the Green Business Centre, a joint initiative from the government of Andhra Pradesh, CII and



USAID and the Water Energy Nexus Activity in Andhra Pradesh, Karnataka and Maharashtra.

Mr. Padmanabhan is also the prime mover of the Lighting Competence Centre being set up in Bangalore to advance demand side management and end use energy efficiency as well as promote the cooperation and transfer of illumination technology, facilitate lighting technology information sourcing, develop human resources and catalyse policy change for promoting cooperation in energy efficient technology. ISLE is involved in this project.

Mr. Padmanabhan was instrumental in the ISLE USAID collaboration to organise the lecture by Dr. N. Narendran of LRC in Delhi in June this year.

Report on 11th Symposium on Science & Technology of Light Sources (LS-11) May 20-24, 2007, Shanghai, China

The symposium, held at Fudan University, Shanghai China was attended by around 450 delegates from 28 countries.

From the symposium topics listed below it is evident from this list that the emphasis now is on new and energy efficient light sources. There were 19 Invited papers, 28 Landmark papers and 205 posters.

The very first paper, by Chen Yansheng, China Association of Lighting Industries, dealt with the Light Source Industry in China. China has made a remarkable progress in this industry sector in last 10 years. After making the first lamp in 1917 in China, today the production level has reached 4.5 billion per year. Today, China is the number one lamp producing country in the world and last year the value of production was USD 4 billion. The products include incandescent, fluorescent (both conventional and CFL), HID (HPSV, HPMV, MH). In 2005, Chinese exports reached a new height of USD 2.06 billion.

In fluorescent lamps the main emphasis today is to reduce the content of mercury in the lamp as much as possible. As per RoHS the allowed content is 5 mg per lamp. However, the current trend is to reduce the mercury content in the lamp to as low as 1.7 mg mercury in the lamp. There are also efforts to produce these lamps without mercury.

Another way of making such lamps is to produce mercury free lamps. Dielectric Barrier Discharge (DBD).

The progress on LEDs is remarkable and has reached a status of 117 Lumens per watt mark for white LEDs and is increasing day by day. The aim is to touch 200 LPW !!! It was agreed unanimously that this is the future light source. However, there is one fear in this area and that is

the ratio of reserves to production of Indium is only 6.2 years and the price of Indium is increasing year by year.

In Metal Halide lamps the focus is on using ceramic arc tubes which inherently has a capability of achieving higher efficacy.

In Lamp components there were papers on various components such as getter material by Saes Getter, electrodes for HID lamps, emitter materials, emission characteristics of these emitter materials.

OLEDs (Organic Light Emitting Diodes) also show good promise of attaining good luminous efficiency. Today's efficiency is in the range of 130 LPW for green OLEDs and 60 LPW for White OLEDs. The lifetime of these devices is around 100,000 hours.

Overall it was obvious to many of those who are attending most of the earlier LS conferences that LS-11 was extremely well organized and they called it the best of all LS conferences.

To give an idea of the trend of topics of papers, following chart would help.

Distribution of Papers - LS-10 & LS-11

Subject	No of Papers	
	LS-10 Toulouse France (2004)	LS-11 Shanghai China (2007)
Miscellaneous	105	61
Components/Materials	31	27
Metal Halide	30	25
Electrodeless lamps	23	16
Fluorescent	18	26
Mercury free lamps	13	9
Mercury vapour	12	5
LED	10	25
OLED	10	5
Measurements	5	18
Halogen	4	6
Sodium Vapour	4	2
Molecular discharges	3	0
UHP	2	6
Flash lamps	0	5
Incandescent	1	1
UV	0	2
Low pressure	0	7
Electronics	0	7
TOTAL	271	253

Cultural events during LS-11 : Besides technical sessions there were two outstanding cultural events. The first one was a Get together party at one of the best Hotels in Shanghai where there were magnificent performances by Local artists.

Another event was an excursion to a 500-year-old riverside town Zhujiagio around 50 km from Shanghai. It was a very well maintained town and we had an opportunity to see some old roads and bridges and old houses. The excursion was followed by a nice dinner.

In LS-10 Toulouse there were three delegates from India. Besides Dr. Kulkarni and the undersigned Mr. Joshi from CPWD, Karnataka was also present. In LS-11, Shanghai five of us were from Litex and Arklite and three delegates were from Venture Lighting and its affiliate companies, Chennai.

It is unfortunate that such an important event, which takes place once in three years, does not attract sufficient delegates from India. The next LS i.e. LS-12 will be in The Netherlands. To host the next LS-13 in India Dr. Avinash Kulkarni (Now president of ISLE) has made a pitch to the organizing committee. If all goes well we might host LS-13 in 2013 in India.

Dr. S. V. Rajarshi
Sr. Manager - Business Development & HR
Litex Electricals Pvt. Ltd.

FORTHCOMING EVENTS

National Workshop On Energy Efficient Lighting August 11, 2007, Manipal, MIT

The Department of Electrical and Electronics Engineering at the Manipal Institute of Technology is organizing a National Workshop on Innovative Trends in Energy Efficient Building Lighting (IEBL - 2007) as part of the yearlong Golden Jubilee celebrations.

The workshop will be an interaction between Building Architects (Specifiers) and Lighting Industry /Engineers. Leading Architects from different parts of the country and Experts from the Lighting Industry will interact to discuss how the latest lighting products and technology can be applied for energy efficient building lighting.

Efforts will be made to gather as many working engineers, academicians, industrial representatives, lighting designers, building engineers, local consultants, dealers, retailers, interior designers, electrical contractors and the like, as possible for this interactive workshop, for mutual benefits.

The Workshop is being sponsored by Asian Electronics.

For further information Contact:

Dr. Radhakrishna S. Aithal

Convenor, IEBL - 2007

Professor, Dept. of E & E

MIT Manipal 576 104, Karnataka

Tel. No. (0820) 2925125(O), 09964069850

e.mail: iebl2007@yahoo.co.in, Fax. (0820) 2571071

LED Lighting Institute

September 18-20, 2007, Troy NY, USA

The Lighting Research Center is again holding its three-day, hands-on seminar to teach industry professionals about incorporating light-emitting diodes (LEDs) into lighting applications. The LED Lighting Institute includes updated technical content based on the latest industry developments. Participants take part in workshops and hands-on lab sessions highlighting LED technology, lighting design, and optical modeling, while using the newest LED products on the market.

For further information contact :

Dan Frering

Education Manager

(518) 687-7149

frerid@rpi.edu or visit

www.lrc.rpi.edu/education/outreachEducation/ledinstitute.asp

IESNA Street and Area Lighting Conference

September 23-26, 2007, Seattle, USA

The 26th IESNA Street and Area Lighting Conference will be held in Seattle from September 23rd - 26th. Here you will have the opportunity to network with many hundreds of your peers, walk an exhibition hall entirely given over to various aspects of outdoor lighting and attend presentations on many different subjects of interest and concern to all members of the industry. This is the only conference in North America that specializes in meeting the needs of those involved in street and area lighting. It is a conference that grows every year, not only in the number of attendees, but in the variety of subjects that are addressed both formally and informally.

Today's outdoor lighting industry embraces a host of new technologies in many areas including light sources, light controls, energy conservation and computer aids. It is also beset by many considerations that are becoming evermore important in our modern world such as environmental issues, glare, and light trespass.

For more information and online registration :

<http://www.iesna.org/index.cfm>

Symposium on Light, Performance and Quality of Life

November 8, 2007, Eindhoven, the Netherlands

The Light and Health Research Foundation (SOLG) is organising a symposium on Light, Performance and Quality of Life.

SOLG welcomes contributions from researchers in many fields, given the multidisciplinary and collaborative nature of inquiries into the interaction between light and health. Past SOLG meetings have involved researchers working in such areas as medicine, environmental sciences, sports, human resource management and building physics, across such fields as neurology, psychology, psychiatry, sociology, epidemiology, industrial design and architecture. The conference program includes competitively selected, peer-reviewed papers, as well as workshops, tutorials, and a small number of invited speakers.

Topics appropriate for submission to this conference are manifold. Examples of some of the vibrant areas of light and health include, but are not limited to:

- lighting and innovation
- lighting and sleep, (seasonal) depression, fatigue
- lighting and the elderly
- innovative applications of (dynamic) lighting
- healthy lighting and ICT (simulations)
- design methods for healthy lighting
- light, health and economics
- light, health and learning/education

For further information contact :

a.m.c.schoutens@bwk.tue.nl

<http://www.solg.nl>

WEBWATCH

Guidelines to Avoiding Poor Task Visibility

Whether it's a close-up task, like looking through a microscope in a laboratory, or a much broader task, like seeing a stack of boxes in a large warehouse, lighting designers can follow the new "Light + Quality" guidelines that will be released by IESNA soon.

Attendees at a LightFair International seminar on the guide to designing quality lighting for people and buildings heard a preview of the upcoming publication.

One topic covered was task lighting.

When approaching the challenge of lighting for a task, it is important to consider the scope of the task.

Whatever the range of vision required, the guidelines to avoiding poor task visibility are:

- Think about the 3D relationship of source/task/eye.
 - * Will there be a reflection that will mask the target area?
 - * Can you change the location of the light, or shift the reflective surface?
 - * Can you relocate a computer so it doesn't face a bright window?
- Can you increase the task contrast or size, instead of adding more light to the area?
- Follow IESNA recommendations for task illuminance, modifying up or down according to your needs.
- For simple visual tasks, you may not need special lighting.
- For taxing visual tasks, use task lighting.
- Try to keep task and ambient lighting levels within a 3-to-1 ratio, if possible.
- Choose luminaires that distribute light so that the task is visible, without adding glare or making the space gloomy.

Supplementary lighting is a potential solution to glare. You can compensate with supplemental light from a different direction to overcome glare, but the best preference is to avoid glare altogether.

Link :

<http://www.iesna.org/shop/publications.index.cfm>

Field Study Examines Visual Performance for Drivers at Mesopic Light Levels

LRC researchers conducted a field study to extend fundamental findings about visual performance at mesopic light levels in a driving context. Study subjects drove a vehicle along a lighted street while performing a high-order decision-making task. They identified the direction of an off-axis target, toward or away from the street, and either braked or accelerated, accordingly.

The study, conducted by Yukio Akashi, Mark S. Rea, and John D. Bullough, compared two sets of light sources: ceramic metal halide and high-pressure sodium. The same study was also performed during the daytime. The results demonstrated that both braking and acceleration response times decreased monotonically as unified luminance increased, suggesting that unified luminance is a suitable rectifying variable for characterizing light levels for different light sources with respect to a complex visual task.

Link :

<http://www.lrc.rpi.edu/resources/newsroom/enews/Apr07/Research358.html>

<http://lrc.sagepub.com/cgi/content/abstract/39/1/53>

Lamp Industry Initiative Targets Europe CO2 Emissions

Europe's lamp manufacturers recently published details of a highly ambitious initiative that would lead to the phase-out of the least efficient lamps in European homes by 2015.

The upshot?

A 60% reduction of carbon dioxide emissions - or 23 megatons annually - from domestic lighting, and 7 billion euros gained from European consumers saving 63,000 GWh of electricity.

The joint initiative by Philips, GE, Havells Sylvania, Osram, and other members of the European Lamp Companies Federation comes on the eve of the G8 summit in Heiligendamm Germany, where International Heads of State are examining how best to tackle climate change and promote energy efficiency internationally.

As part of the lamp industry's efforts to promote the switch to more efficient lamps, the initiative calls on the EU to apply binding minimum energy efficiency requirements, supported by strict market surveillance, for Edison and Bayonet cap lamps as early as 2009.

Most of the light sources impacted by these energy efficiency requirements would be traditional incandescent lamps.

This proposal by the manufacturers will allow time for a switch to high-efficiency halogen and compact fluorescent lamps and the development of LED and high-efficiency incandescent lamps.

Under the proposal, within 8 years from now, 85% of the total EU traditional incandescent lamp market of 2.1 billion lamps would need to meet new efficiency requirements. Starting with highest wattage lamps (over 100W) and gradually covering lower wattages (down to 25W) by 2015 the least efficient domestic lamps (energy efficiency classes E, F and G) would no longer be available.

To ensure continued quality and cost effectiveness for Europe's consumers, all lamps placed on the EU market, including the energy saving alternatives, would also have to have a minimum rated lifetime of 1000 hours and comply with relevant International and European safety and quality standards.

To learn more, check out the official release :

<http://www.newswire.ca/en/releases/archive/June2007/05/c8918.html>

LED Group Releases New ASSIST recommends

The Alliance for Solid-State Illumination Systems and Technologies (ASSIST) has published two new volumes in

its ASSIST recommends series. The 3-part volumes discuss under-cabinet lighting and directional lighting in terms of general design and application, how to select LED lighting, and recommendations for manufacturers testing and evaluating their own fixture products.

ASSIST's top priority in developing these two volumes was to begin public discussion on the need for testing criteria and methods that allow lighting fixtures to be compared on the same playing field, regardless of the type of light source technology inside, said N. Narendran, Ph.D. LRC director of research and organizer of the ASSIST program. "Right now, it is very difficult for the general public to compare the performance of a fluorescent under-cabinet fixture or directional fixture with that of a similar LED fixture because the evaluation criteria used by manufacturers are different for each light source," said Dr. Narendran. "At the LRC, we have developed technology-neutral, fixture-based testing methods that allow fixtures of the same type but with different light sources to be compared appropriately," he said.

All ASSIST recommends publications are available in Adobe Acrobat PDF format for free download.

Link :

<http://www.lrc.rpi.edu/resources/newsroom/enevs/Apr07/Research356.html>

<http://www.lrc.rpi.edu/programs/solidstate/assist/recommends.asp>

LRC Students Design Lighting for First Optimum Performance Home

In fall 2006, a select group of students from the Lighting Research Center (LRC) at Rensselaer Polytechnic Institute was asked to design the lighting for the first Optimum Performance Home - an exemplary home/office complex at the Sea Ranch development in Sonoma County, California. The home is a Platinum-level LEED (Leadership in Energy and Environmental Design - part of the U.S. Green Building Council) for homes project and is one of only two homes in California to achieve this status.

The students placed some science behind the art and based their lighting design for this complex endeavor on research-based evidence. Graduate students Sandhya Parameswaran, Rui (Nancy) Qi, and Robert Soler were joined by Justin Bosy, an undergraduate student. Their challenge was unique in the sense that this home was to represent all things not only good and sustainable, but technologically cutting edge as well - and it was to accommodate both a family and a work environment.

Link :

<http://www.lrc.rpi.edu/resources/newsroom/enevs/Apr07/Research361.html>

Anool Mahidharia

Dear Mr. Mamak

I have just received the April 2007 edition of the ISLE Newsletter, and as usual it is full of news and interesting articles. I have very much appreciated receiving the Newsletters which you have kindly sent to me through my involvement in Lux Pacifica and the CIE.

The time is now approaching for me to retire from my position at the University of Auckland; my official retirement date is 31 July 2007. With my retirement, I will also be ending my involvement in the New Zealand National Illumination Committee and, through that Committee, with the CIE. I have advised Dr Warren Julian of my forthcoming retirement and he has encouraged me to continue to be involved with Lux Pacifica. My response has been that I shall continue to have an interest in Lux Pacifica, just as I shall maintain my research interests in lighting design, but that I need to step back from any formal ongoing commitment. My opportunities to travel in my retirement will be more limited than they have been up until now and although I would very much like to attend future conferences of not only Lux Pacifica but other groups as well, I will need to carefully consider each one as information becomes available.

Under the circumstances, it seems appropriate that I should ask for my name to be removed from the mailing list for the ISLE Newsletter. I can, of course, keep in touch with news and events through the internet and will have the time to do so. If I am able to attend a future conference, I will look forward to the possibility of meeting with you again. If that does not eventuate, please accept my sincere appreciation for your kindnesses in the past when ISLE hosted the CIE Session in 1995 and, in particular, at Lux Pacifica in 2002.

I wish you well in all your activities in the future, and again offer many thanks for your contributions to the international lighting community of which I have been a grateful recipient.

Yours sincerely
Hayden Willey

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