



# LIGHT

the official

# NEWSLETTER

of the **indian society of lighting engineers**

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## FROM THE PRESIDENT'S DESK

From the very beginning ISLE has stressed the importance of lighting education. I remember well being a participant of one such initiative twelve years ago when 20 of us went to the Lighting Research Center at Rensselaer Polytechnic Institute at Troy in Upstate New York. And now in 2012 I am happy to announce the latest endeavour in this field.

ISLE has signed a Memorandum of Understanding with the Lighting Education Trust UK to run their Diploma Course in India through universities in India. The first such university is Mewar University. In due course ISLE will collaborate with other institutions to give a greater geographical spread. With the rapid growth of the lighting industry in India there is an urgent need for trained lighting personnel.

While I was unable to make it to the Frankfurt Fair this year, I learn that from the technology and product displays that there are really exciting times ahead for those of us in Lighting. We will try and see that some of this information reaches our members through technical programmes in the course of this year. In the meantime, this issue carries a brief note from Mr. Mamak who did in fact go there. He also attended the ISA (International Solid State Lighting Alliance) meeting there in place of Dr. Kulkarni who was unable to go as a result of personal commitments. A brief report is given on this too.

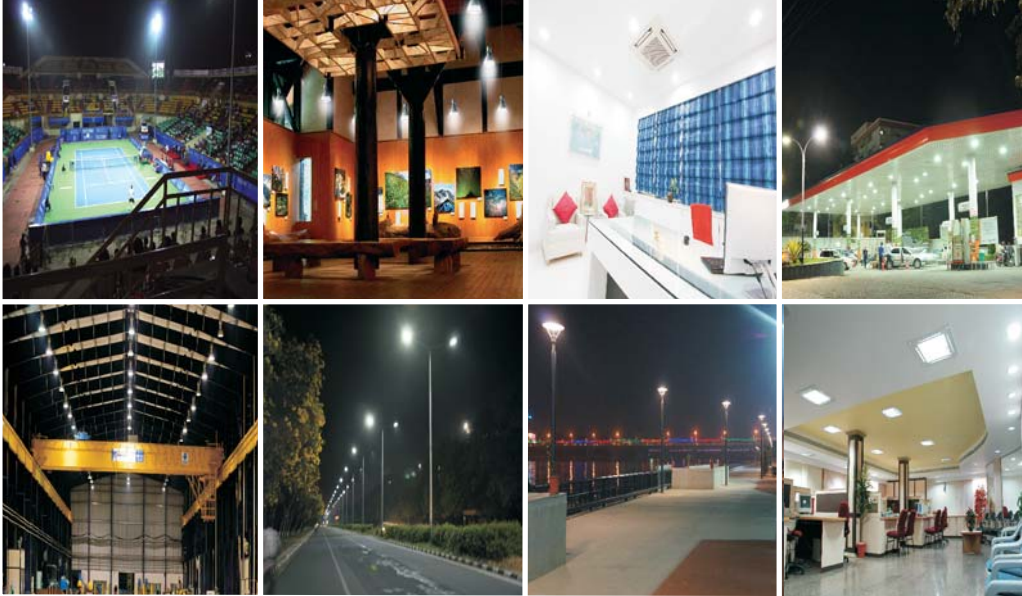
This year ISLE is publishing the seventh edition of its well known and much appreciated Directory of the Lighting Industry in India. I would request all members to give their help in making this as successful as the earlier editions. Information on this is given in the following pages and brochures are available with all State Centres. If you play any role at all in the field of lighting then your entry in the Directory is essential.

Gulshan Aghi  
President



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I have just returned from a hectic and exhilarating trip to Frankfurt. Below I have given a brief report on the Fair as well as on the ISA Meeting held there.

This issue has an excellent paper on the many considerations that go into the making of a master plan I was fortunate to attend this presentation at the CIE Session in South Africa last year and got permission to share it with our readers in the newsletter.

The WebWatch section contains three interesting items on the use of LED lighting for museums, two in the US and one in France.

We have a letter pointing out on omission in the obituary notice we published for Jayantibhai Mahidharia.

### **Frankfurt Messe Light and Build**

Messe Frankfurt Light and Building Exhibition beckons all lighting enthusiasts from around the world. This is a truly international exhibition which is representative of the latest developments and innovations from all over the world. The other lighting exhibitions are mostly country oriented – Lightfair covers USA while Guangzhou presents China.

The Frankfurt fair is one of the largest spread over 100,000 with 1770 exhibitors this year. It was impossible to cover the total exhibition and can at best convey only a subjective impression from what I was able to visit.

LEDs continued to hold centre stage, but this time the stress was on demonstration. All the large manufacturers had guided tours of their booths to highlight specialisations. What is more, Frankfurt Messe also organised overall tours of the exhibition with qualified guides.

I give below some of my observations:

- 1) Lamps were seldom on display.
- 2) LEDs in almost all applications and demonstrations were carried out either by lectures or computer simulations.
- 3) Visitors were encouraged to “play with light” in most stalls to observe, to calculate data and even to compare.
- 4) T5 in office lighting was generally recommended and displayed.
- 5) The high end product range was separated and companies like Philips, Osram, Zumtobel, Trilux etc. saw large interest in the ultra designs on display.
- 6) There were 54 countries that participated this year out of which 12 stalls were booked by Indian Companies.

- 7) It was a pleasure to see the NTL-Lemnis large booth with LED products produced in India holding great interest.
- 8) The medium and small booths were also of interest because they presented custom built propositions particularly in electronics.
- 9) I must mention that what attracted me were products that gave “Zero” glare without compromising on light output ; energy saving systems that have made auto-switching a lot simpler; blinds that worked along with lighting levels for shading spaces; hybrid systems that gave energy saving results even with large lumen packages; stand alone office lighting that presented individual options; a 13W LED bulb with 800 lumens and LED retrofit spotlights; controllers of indoor and outdoor at unbelievable prices.
- 10) Then there is Hall No.6 where domestic lighting is displayed. This is a fairyland of colours, shapes, dimmers and sizes. You name something from your imagination and you will surely find it there. It is difficult to pull yourself away from this fantasy world where lighting and design has come together to sometimes produce science-fiction type products.

### **ISA Meeting**

ISLE decided in 2011 to accept an invitation by International Solid State Lighting Alliance (ISA) to join them in their efforts to promote LEDs throughout the world. President Avinash Kulkarni was nominated on the Council of Management of ISA and was invited to attend the Beijing meeting in May, 2011. Subsequently Mr. Hari Mamak was nominated on the Board of Advisors.

#### ***Mission of ISA***

International cooperation using Global initiatives, effort and resources to:

1. Accelerate and foster the development of the Global Solid State Lighting industry and applications.
2. Enhance people's lives and to create a green and sustainable society.

#### ***ISA working Meeting 17th April in Frankfurt***

Since Dr. Kulkarni was unable to attend this meeting due to personal reasons I decided to attend in his place to ensure the ISLE continuity and interest.

My observation is that ISA is a very professional group that has very earnest intentions of contributing to the existing technical knowledge on SSL. The extremely high profile of the participants ensured that discussions were focused.

I want to give some points that come up for information:-

1) 5 Working groups were appointed:-

- WG1 Strategic Research Agenda & Global SSL industrial roadmap,
- WG2 Global show case to attract public awareness,
- WG 3 Eco-system development (Talent, education & training),
- WG 4 Facilitate dialogue and cooperation in standardisation and testing methods,
- WG 5 Public relation, awareness and promotion of SSL reports by each group was given in brief.

- 2) There was an excellent presentation on the establishment of ISA Technical Committee on Standardisation by Mr. Mark McClear which took participants on a tour of areas of concern and need for common grounds for evaluation.
- 3) The president of ISA, Ms Wu Ling made a very thought provoking presentation in the China SSL strategy and Five Year Plan.
- 4) Mr. Herbert Cibulka, President Elect of Professional Lighting Designer's Association (PLDA) brought out the difficulties that Designers face due to inadequate data and technical information by manufacturers. This gap needs to be filed to ensure wider understanding and usage of SSL.
- 5) Philips Lumileds, Ray Chock spoke at length about the approach and guidelines of the US Department of Energy.

**Conclusion**

India is still an infant in this technology but the SSL acceptance both by Policy makers and specifiers is good reason why ISLE should seriously involve itself with standards and developments around the world.

H.S. Mamak  
Editor

**ISLE ACTIVITY**

**ISLE - LET Diploma Course**

As some of you will remember ISLE has been in discussion with the Lighting Education Trust (LET) UK to run their Diploma Course in India. The LET is a charitable trust established for the purpose of furthering lighting education by developing syllabuses and course content to accredit courses and to advance the overall standards of lighting practice. The LET Diploma Course is presently run by London South Bank University. Discussions with LET were begun in 2009 by three Past Presidents of ISLE, Mr. H.S. Mamak, Mr. S. Venkataramani and Dr. Avinash Kulkarni. ISLE has now signed an MOU with LET to be the sole authority to run this course in India.



Exchange of MOU

Over the last year ISLE General Manager, Mr. Tapan Chattopadhyay and Mr. H.S. Mamak have approached various institutions to interest them in the this Diploma course. These ongoing discussions have resulted in the signing of an MOU with Mewar University on April 13, 2012.

Mewar University is an autonomous body promulgated by the Government of Rajasthan and the University is approved by the UGC under u/s 2(f) of the UGC Act 1956. Mewar University has a campus in Chittorgarh as well as in Ghaziabad and offers various bachelors/masters degree/diploma in almost all the engineering disciplines.

At a special ceremony held on April 13, 2012 at Mewar University the MOU was signed by the Chairperson of Mewar University, Mr. Ashok Kumar Gadiya and the President of ISLE, Mr. Gulshan Aghi. On this occasion Dr. Ramesh Chandra VC, Dr. Ramachandra, Director Energy and Environment Management and Dr. Alka Agarwal, Director Women's Business Studies from Mewar University and from ISLE Mr. H.S. Mamak, Mr. S. Chakraborty and Mr. Tapan Kumar Chattopadhyay were also present.

**7th Edition of the ISLE Directory**

Established for over twenty years, the Directory of the Lighting Industry in India, continues to provide a highly visible platform for businesses involved in all aspects of lighting to a clearly defined audience. The Directory is distributed to key decision makers in the government and private sectors, including lighting designers, architects and interior decorators.

The Directory recognises the progress and contributions that lighting has made in recent years and its transition from a mere witness of national and international development to becoming a proactive partner in highlighting almost every application in society. A constant upgradation of the Directory has been necessary to keep pace with the ever changing world of lighting.

The lighting industry in India has been growing at nearly 17 to 18% per annum over the last 3 years to an annual turnover of Rs. 7500 crores and more. One of the emerging lighting trends is eco-friendly and energy saving solutions. This has brought forward an immediate need for more energy efficient products and also has pushed the market towards LEDs and Solar Lighting.

In its 7th edition, the Directory covers most of the contemporary concerns such as lighting standards, testing requirements, environment and health, sustainability and the green movement, lighting design as a delivery tool for architects and consultants, and requirements for export etc. In addition, there is insightful analysis, evaluation and critiques by renowned lighting authorities.

In brief, the Directory is your reference book for lighting. This edition of the Directory attempts to cover both vital information required by lighting practitioners and a knowledge presentation on the where, whys and wherefores of Indian and international lighting.

For further information:  
ISLE  
A 274 Defence Colony  
1st Floor  
New Delhi 110 024  
Tel: 46562981/82  
Email: [isledel@vsnl.com](mailto:isledel@vsnl.com)

## KOLKATA STATE CENTRE

### Technical Programme March 6, 2012

The Kolkata State Centre organised a technical programme on different types of luminaires and other electrical products at the Hotel Golden Park in Kolkata.

Welcoming the members and guests Mr. Bipin Dattani, Hon. Treasurer ISLE read out a letter from the President inviting ISLE Fellow, Mr. A.P. Joshi, former Chairman of Karnataka State Centre and presently Chief Engineer Electrical CPWD in Kolkata to function as the interim Chairman of the Kolkata State Centre.

Mr. Joshi asked those present for their cooperation and suggestions for running the State Centre properly and smoothly. He informed the gathering that until the election of the State Centre committee Mr. A.K. Das Chowdhury would function as the Secretary and Mr. Ashis Sen Gupta as the Treasurer.

This was followed by the technical display and discussion. Mr. A.P. Joshi gave a presentation on the lighting of monuments.



*The technical session in progress*

This was followed by Mr. Y.K. Gupta, Associate Director, Havells India who gave a brief overview of Havells and the products on display. Mr. Suhas Bhattacharya, DGM spoke on the subject of domestic switchgears. And finally, Mr. Debasis Sarkar, DGM gave a presentation on light fittings and LED products.

The vote of thanks was proposed by Mr. Suhas Bhattacharya. The programme was followed by dinner.

The programme was sponsored by Havells India and was attended by 65 members and guests.

## CHENNAI STATE CENTRE

### Student Interaction Programme December 29, 2011, Chennai

At the suggestion of faculty members of an Engineering College at Erode in Tamil Nadu, the Chairman and Secretary of the ISLE State Centre agreed to arrange an interactive meeting at Chennai during the students' educational visit to the city. During the meeting, the objectives and activities of the Society were detailed to them and some copies of the LED seminar books circulated during Lii2011 were given as a promotional activity for membership.

The interactive session was mainly to give them an overall picture of the emerging trends in lighting technology and the future openings in this area. In addition, the importance of energy conservation, green concepts, solar street lighting were explained. Fifty four students participated in the programme.

### Awareness on Electricity Conservation - Joint Venture Public Programme January 7-8, 2012, Chennai

In association with the Tamil Nadu Generation and Distribution Corporation and Lions Club of Anna Nagar,



an awareness campaign on electricity conservation was conducted on 7th and 8th January 2012. The programme was organised at a place of public gathering, Vishveshwarayya Tower Park and on two holidays viz., Saturday, and Sunday from 4.00 PM to 8.00 PM. An exhibition of models and posters on conservation and efficient utilisation of electricity along

with hourly talks on energy conservation tips for the benefit of the public were also arranged. In order to encourage usage of energy efficient lamps, a leading Osram dealer was asked to open a sales counter and sell the lamps at a highly subsidised price. It was agreed that a portion of the subsidy would be met by ISLE Chennai State Centre. The programme was highly appreciated by the general public and more than 500 persons participated.

## Technical Seminar on Lighting Trends February 18, 2012, Chennai

In association with K-Lite Industries, taking them as the main sponsors for a technical seminar during their Light Show, the Chennai State Centre organised the seminar, Lighting Trends - Right Lighting for the Right Applications on 18.2.2012 at the AIEMA Technology Centre Auditorium in Ambattur. The participation was by invitation to all ISLE members, and prior registration by Architects, Stakeholders in lighting industry, students nominated by the leading engineering institutions, etc. There were 198 delegates preregistered for participation. The spectrum of representation was phenomenal. To name a few, we had representation from Interior designers, managers and directors of private enterprises, biotech engineers, architects, consultants, software company maintenance engineers, corporation engineers, power station engineers etc., The programme was attended by nearly 150 Delegates.

There were two sessions. The seminar commenced with a welcome address by Mr. Balasubramanian, Chairman, Chennai State Centre and inaugural address by Mr. Dilip Kumbhat, CEO, K-Lite Industries and the Vice President of ISLE.

The first session was chaired by Mr. M.S.N. Swamy, Chairman, ISLE Karnataka State Centre. The following presentations were made during this session.

- *LED Lighting Technology - An overview*  
Mr. S. Chakraborty, Vice President ( Technology), Surya Roshni
- *Application of LEDs- Pros and Cons*



Messrs. Balasubramanian, Kumbhat, Saxena and Swamy

Dr. Amardeep M. Dugar, Founder - Director, Lighting Research & Design.

- *Colour Consistent LEDs and its application in general illumination*

Mr. Deepak Bapat, Sales Director and Mr. Senthil Kumar Madasamy, FAE Manager, Cree

- *Electronic Control Gear in Green Lighting*

Mr. Gajanan Inamdar, Head R&D, BAG Electronics

The second session was chaired by Mr. R.S. Saxena, Chairman ISLE Rajasthan State Centre. The presentations during this session are listed below :

- *HID Lamps as a source of light - An overview*

Mr. Amit Wadhwa, Product Manager, Osram

- *Energy Saving in Electric Utilities - Special Focus on Lighting*

Mr. V. Sankaranarayanan, Superintending Engineer (Rtd.) TNEB

- *The Art of Landscape Lighting*

Mr. Ravi Kumar Narayan, Principal Landscape Architect, Ravi Kumar & Associates

The seminar ended with a vote of thanks by Mr. T.M. Ilamathi, Secretary, Chennai State Centre.

R. Balasubramanian  
Chairman

## KARNATAKA STATE CENTRE

### M.S.N. Swamy Honoured January 8, 2012

The BBC Seva Samithi at their annual get together on 8th January 2012 honoured Mr. M.S.N. Swamy, Chairman, ISLE Karnataka State Centre in recognition of his services in the technical field "considering his all out efforts in spreading the knowledge of lighting, empowering people on saving of energy in addition to light



Mr. Swamy being honoured

pollution due to wrong selection of light source, luminaire - control gear and protect environment by proper disposal of discharge lamps".

## MP STATE CENTRE

### Lecture on Lighting in Architecture

January 29, 2012, Indore

Yet another successful monthly meeting took place on 29.01.12. The 27th consecutive lecture conducted by the State Centre took the form of a presentation made by a pair of speakers and those eminent personalities were Ar. Himanshu Dudwadkar and Ar. Shreya Bhargava who are partners in their consultancy as well as in life. In the novel presentation on "Lighting in Architecture" the subject matter was not only full of interest, but it was presented with beautiful visual effects of lighting through change of colours. The presentation demonstrated how good lighting design plays an important role in getting the desired physical and physiological effects within the spaces, how natural light is used to get best results and to exhibit the values of an architectural space. The presentation covered these issues in a comprehensive manner.



Architects Himanshu Dudwadkar and Shreya Bhargava

As a matter of continual improvement, ISLE MP State Centre introduced a programme coordinator from this year with the aim of organising the meetings to generate maximum opportunities for the members. This monthly meeting was coordinated by Electrical Consultant, Mr. Vivek Barve.

Mr. Atul Pandey, Estate Manager IIT and Mrs. Sunita Rawlani, Structural Design Engineer welcomed the speakers and the mementos were given to the speakers by Mrs. and Mr. A.M. Kekre (Retired Chief Engineer R.R. CAT).

The welcome address given by the Chairman Mr. Akhilesh Jain, The vote of thanks was proposed by Hon. Sec. Er. Dinesh Wadhwa.

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## Lecture on More Light without Lights

February 26, 2012, Indore

The 28th monthly Sunday breakfast meeting of ISLE MPSC was entitled "More Light without Lights" by Interior designer Ms. Bhoomika Chainani of Eleganteriors, Indore.

She started her presentation with the different effects of lights and "no lights or less lights" on the famous Taj Mahal monument. The other visuals included dinner without lights, studying,



Ms. Bhoomika Chainani

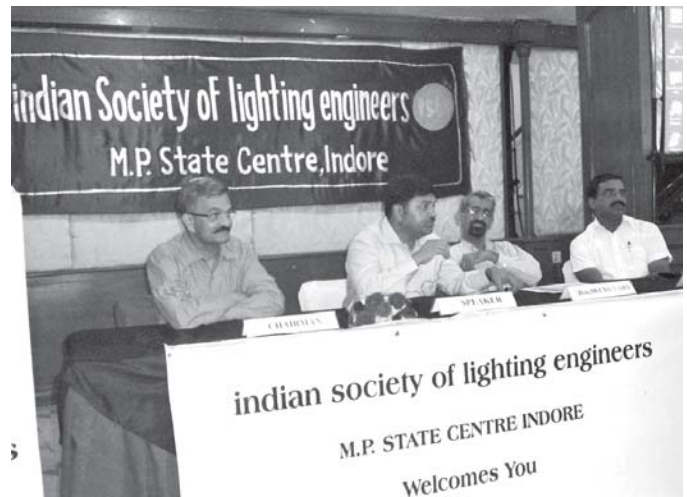
sleeping, cooking, with single source of light in South Africa, In the villages where fire is used for cooking and lighting the home, there are individuals who own generators to charge mobiles of the villagers, for a rupee value. The mobile serves multiple purposes of communication instrument, night lamp, as a torch etc.

Another facet of light reflected in her presentation was the energy efficient offices using maximum day light for illumination and the Luminaire festival at Belgium, where 55,000 LEDs brighten up a cathedral just for 20 kWh consumption. Some other appropriate examples were taken from interiors of bars, restaurants, Air Force memorials, British Museums, Mosques in Abu Dhabi and some astonishing future concepts in lighting like use of battery powered LEDs used to illuminate the underneath of sofa sets in drawing rooms and restaurants.

She gave examples of her own projects from residential interiors, hospitality projects, some showrooms of the malls in the city, and use of heat insulated transparent glass for interiors using daylight.

A brief discussion on Lux and lumens after the well appreciated presentation made her talk into a "techno-aesthetic" event, concluding that the customer needed to be educated that less light than conventionally used can give the same output and serve the purpose of lighting the spaces. The questions from the audience were aptly responded to by the speaker, Mr. Raje, Mr. Kulkarni and Mr. Bharat Rawlani.

The concept of Birthday coordinator started in January was continued and birthdays of all members and audience whose birthday was in February was celebrated with an AV presentation and ceremonious cutting of the cake. The welcome address was given by the Chairman Mr. Akhilesh Jain and the vote of thanks was presented by the Hon. Sec. Mr. Dinesh Wadhwa, who also anchored the show.



L to R Messrs. Akhilesh Jain, Alok Tiwari, Dinesh Wadhwa and Sameer Kotwal

## Lecture on Non-Conventional Methods of Lighting

March 25, 2012, Indore

The 29th monthly ISLE MPSC meeting was entitled Non-conventional Methods of Lighting by Architect Alok Tiwari, Proprietor and team leader Neo Concepts Architects, Indore. An IIT alumnus and a social worker in his own right, Mr. Tiwari's presentation was truly unconventional. He started his presentations with pictures of slums, poor areas deprived of light and sanitation facilities and a focus on urban slum rehabilitation.

He highlighted the problems of illegal and unauthorised electrical connections in the slums leading to wastage. because electricity is "free"! Possible solutions to this, according to him, involved an integrated approach of lighting and sanitation issues together.

Lighting in the daytime by natural sources is a myth in the slum areas as even for getting a glass of water to drink, the occupant of a one room house has to switch on artificial light. A very novel idea of Solar-Bottle-Bulb, (SBB) on which many NGOs are working, was the focus of the rest of his presentation. The method of making this low cost device using a corrugated galvanised iron sheet, a rubber sealant, empty PET bottle, filtered water, some bleaching powder, the SBB can generate about 55 watts and approx 15 ~ 20 lux with a costing of less than Rs.100.

Lighting at night in slums could be made possible by using human waste and organic kitchen waste created by star hotels and domestic houses.

The Q & A session was very participative. The programme was coordinated by Mr. Sameer Kotwal of Friends Combine, the welcome address was given by ISLE MPSC Indore Chairman, Mr. Akhilesh Jain and the vote of thanks was proposed by Hon. Sec. Mr. Dinesh Wadhwa.

Akhilesh Jain  
Chairman, MP State Centre



C&S Electric Ltd., the pioneer in the field of lighting solutions, announces the launch of its new one-of-a-kind LED based energy efficient lighting product range “ETERNITY”. One of the key advantage of these new LED based products are that they deliver very high lumen output with optimum system efficacy. These elegantly designed LED luminaires reduces the Total Cost of Ownership (TCO) because of their longer life & low energy cost. Thus, C&S LED lighting are not only energy efficient but also amp up the ambience & brings comfort in your life.



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## WHAT SHOULD BE CONSIDERED BY LIGHTING MASTERPLANS AND HOW

L. DJOKIC, A. KOSTIC, M. KOSTIC

### Abstract

During the preparation of a lighting masterplan it is of crucial importance to take into account all of the available possibilities to achieve an interesting and attractive urban image. Therefore, this paper treats all relevant aspects of urban lighting, including: selection of landmarks, zoning, state of the existing urban lighting, solutions for functional and directions for architectural lighting, the possibilities for artistic lighting installations, selection of urban spaces suitable for light and sound spectacles, light pollution, maintenance of urban lighting, energy savings, light control devices and systems, as well as the financial aspect. Taking into account as many of the mentioned aspects as possible will certainly lead to better results in terms of aesthetics, city atmosphere, energy and financial savings, and light pollution.

Keywords: Lighting masterplan, Landmarks, Zoning, Energy savings.

### 1. Introduction

Until a few decades ago architectural lighting in cities was rare and mainly realised as floodlighting. In addition, buildings were frequently illuminated as individual objects regardless of the surrounding urban elements, which sometimes resulted in a visual chaos.

Aware that the attractive night presentation of the city image and its values can considerably improve tourism, social life and night economy, some city authorities initiated lighting masterplans, which a number of cities not only prepared, but also realised (Brinjac Engineering, 2002 and City of Melbourne, 2002). However, generally masterplans do not include all of the measures available for improving the various aspects of urban lighting. For example, an analysis regarding the existing architectural and ambient lighting, as well as the specific directions for the illumination of the selected landmarks, are usually not included. In this manner all elements of the design are left to the lighting designer, who is therefore free to consider that particular landmark as the most important element of the city nightscape, regardless of its actual significance within the urban context (CIE, 2007). Also, only few possibilities for energy savings are analysed. Techno-economic analyses, necessary for projects which assume large investments, are frequently simplified, and so on.

In order to draw the attention of authors of future lighting masterplans towards all influencing factors

relevant at this time, the Municipality of Belgrade commissioned a research which was supposed to have a comprehensive approach and offer recommendations for a successful treatment of all aspects of urban lighting. The final document contains all of the topics that need to be analysed when working on a masterplan.

### 2. The relevant topics for a lighting masterplan

#### 2.1. Selection of the city landmarks which deserve to be illuminated

City space is predominantly determined by its unique topography. Hills, valleys, flatlands and waters crucially influence the development of urban space. Different views (including panoramic views) offer different visual perceptions and, therefore, different impressions of the city (CIE, 2007).

Experience of the city starts with its first sight. If the city is located on hilly terrain, the first sight can embrace a large part of urban space from a distant view. The buildings that are emphasised in the panoramic views are certainly city landmarks. Those can be high buildings, monuments, symbols, landscape elements, hills, and so on. The illuminated landmarks will represent the city visually and, therefore, it is important to single out the ones significant for its identity. At sunset, the unique urban structure becomes a unique silhouette, in which, again, the city landmarks can be recognised (Fig. 1). During the night city landmarks need to be recognisable and attractive in order to hint on the atmosphere and ambience awaiting the visitors (CIE, 2007).



Figure 1. Silhouette of the oldest part of Belgrade

It is important to determine and analyse all relevant panoramic views from which landmarks can be seen. If certain parts of a landmark cannot be seen, these parts can be illuminated less intensively or left dark (reducing energy waste).

Significant city landmarks (not only those participating in panoramic views) should be illuminated in respect to their architecture, surroundings and relationship towards other landmarks. Even though their illumination styles will differ (intensive, subtle, dynamic,...), a certain dose of balance is necessary in order to create a memorable ambient. If a city contains a number

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of high urban elements (buildings, towers, chimneys), and if they are densely set, they do not all have to be illuminated. It is important to illuminate those city landmarks which will facilitate orientation and contribute to the attraction of the views. An interesting example is Moscow (Fig. 2), where church towers, domes and some tall buildings are illuminated to emphasise the historic city panorama, while the contemporary buildings and chimneys are left in the dark (Shchepetkov, 2006).



Figure 2. A view of Moscow

Illuminating a large number of closely located buildings in the same (or similar) manner causes monotony and reduces expression. A typical example is Hong Kong (or Japanese cities), which lack illumination hierarchy, in that way losing a focus which would strengthen orientation and contribute to the panoramic expression.

Landmarks should be illuminated according to their value in the urban context, regardless of their public or private status.

In order to be considered a city landmark, an urban element should be distinguished through its:

- location (which enables it to be perceived in panoramic views (Fig. 3)),
- value (architectural, historic, symbolic, ambient, quality of materials...),



Figure 3. The oldest part of Belgrade with the dominant Christian Orthodox Congregational Church

- function (public buildings or commercial areas which attract a lot of visitors),
- size (large dimensions, height in particular), and/or
- specific form (City of Melbourne, 2002).

In addition to well-known buildings or those dominant in the panoramic views, squares with dense vehicle or pedestrian traffic, as well as major streets, can also be city landmarks, although not visible in the panoramic view. Figure 4 shows one of the major streets in Belgrade which represents a city landmark.



Figure 4. One of the major streets in Belgrade connecting the old with the new part of the city

Rational use of energy assumes reduction of architectural lighting during late night hours. However, the illumination of major landmarks needs to be turned on all night in order to ensure orientation and recognition of the city even for a reduced number of users.

Bridges are usually city landmarks and should be emphasised by lighting. Water is their background, which is why they can be treated as sculptures in space. Lighting masterplans should ensure that if bridges are set closely, their sequence is perceived as harmonious.

## 2.2. Criteria for the determination of borders (both natural and artificial) between city zones which will be treated within different masterplans

Lighting masterplans can involve spaces which vary in size. Large cities can be divided into smaller entities, for

they certainly contain zones which differ according to architecture, function or density of pedestrian traffic. When working on a masterplan which only involves a few city blocks, the relationship between this area and its urban surroundings should be analysed. When considering a large city area, up to three levels of zoning may be necessary in order to coordinate the quality of illumination at the macro and micro scale (Shchepetkov, 2006).

Macro-zoning assumes defining the basic concept and general aims. It is important to determine what are the most important city (large area) landmarks emphasised in the panoramic views and city silhouettes. Strategic decisions, like the selection of lamp types which will be applied in street lighting, are also needed at this stage. Decisions regarding the colour of light for pedestrian walkways, squares, commercial zones, parks and landscape elements, are not necessary, since they should be illuminated with white light of excellent colour rendering.

The second level of masterplanning should be devoted to the determination of different urban zones, like city center, housing blocks, industrial zones and other functional areas, defining the lighting concept for each of them, as well as the hierarchy of their urban elements.

Through micro-zoning, solutions for functional lighting should be offered, as well as the basic concept for the illumination of each of the significant buildings. For small cities micro-zoning is often the second level of zoning.

Borders between different zones should ensure that the transition from one zone to the next is not sudden or unpleasant. Borders can be natural (waters, hills, forests, rocks) or built urban elements (streets, city walls, etc.). For determining the borders between zones three basic elements should be considered:

- topography,
- architecture, and
- function.

Topography is important for urban identity, for it influences views, the street pattern, the panoramic expression and silhouettes. For the city partition into zones treated through separate lighting masterplans, natural borders cannot always be recommended. For example, rivers can represent borders if the urban structure along opposite banks is different in terms of architecture, style, volume or organisation (Fig. 5). But, if the quality of urban space is similar on the two banks, the river becomes an axis, which, with the urban structure on the two banks, represents a whole.

A difference in topographic conditions usually causes a difference in architecture. The urban structure on a hilly terrain and the one on flatland would most probably



Figure 5. The Sava river as a border between old and new Belgrade

belong to different zones. The borders between these two zones could be streets, rivers or green areas.

The architectural context (the second element) is applicable in many European cities, since they contain both old and new city blocks. Lighting masterplans in such cases can be done separately for old and new parts of the city, due to the fact that their character and expression are very different. In cities dominated by historic architecture it is not recommended to emphasise urban elements without historic value by intensive, monochromatic or dynamic lighting.

The functional element is applicable in most cities and assumes the partition into the following zones: historic area, zone of culture and entertainment, commercial zone, residential zone, industrial zone, etc. Each of these zones requests different treatment through the lighting masterplan. It is important for the streets stretching through two or more zones to be lit in the same way along their whole length (assuming their profile is uniform).

### *2.3. Selection of local landmarks and the determination of their hierarchy, taking into account their relationship with major city landmarks*

Local landmarks (perceived in a smaller scale of urban space) are important for a certain part of the city or a certain direction. Besides historically or architecturally significant buildings, monuments, fountains and parks, local landmarks can be certain stores, gates or other urban details which attract the attention of the observers.

If landmarks are only visible in the panoramic view, their details cannot be recognised and, therefore, they should not be accented. On the contrary, illumination of a city element which can be observed from its immediate surroundings allows for the details on the building to be stressed by light (CIE, 2007).

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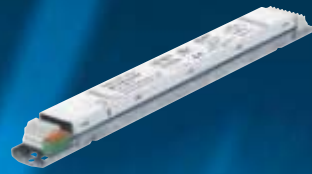
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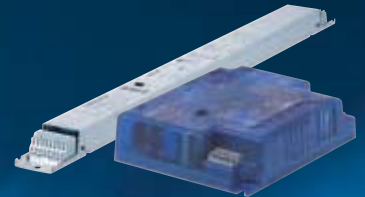
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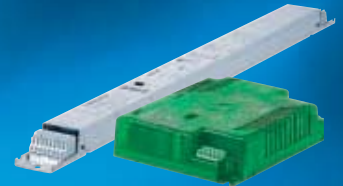
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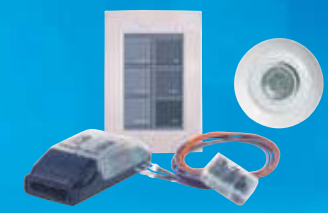
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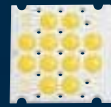
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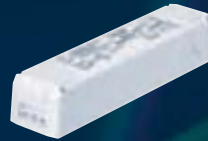
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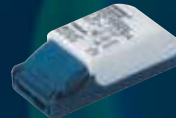
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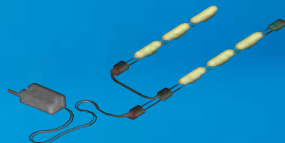
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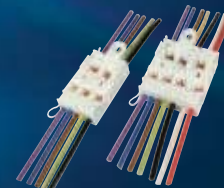
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Intensively illuminated buildings can threaten those subtly illuminated in their surroundings. Masterplans should certainly prevent "light wars" which appear when buildings are illuminated more intensively than the neighboring ones in order to be noticed. One should always keep in mind that if a certain building or ambient is illuminated too intensively, its immediate surroundings (even if sufficiently illuminated) become visually darker (Brinjac Engineering, 2002 and City of Melbourne, 2002).

Masterplans should offer a selection of landmarks that will be illuminated and, regarding the distance from which they can be visualised, recommend the intensity of light. Illumination can emphasise even a plain element of urban structure, but too many illuminated objects dilute the individual values of each one. Then the impression can be visually tiring, demonstrating irresponsible energy dissipation. This is why much of the urban structure should be the background for several distinct buildings and spaces (City of Melbourne, 2002).

In order to become a local landmark, the urban element should be distinguished through its location, value, function, size and/or form in the local area and visible in the significant local vistas. Additional quality would be if the surrounding space enables public gatherings.

City squares and other public open spaces usually contain buildings, statues, landscape elements or fountains which are exposed to views from the main access routes. These would be local landmarks which deserve to be illuminated (City of Melbourne, 2002).

Harmony in the night urban ambient can be strengthened by adequate hierarchy established between illuminated landmarks which are simultaneously viewed. The criteria which should be taken into account in order to achieve this aim regard their urban, architectural, cultural, functional and symbolic value, as well as the views in which they are seen (CIE, 2007).

Rivers or other water surfaces should be used to accomplish interesting and attractive effects which appear due to reflections of illuminated buildings or landscape elements (Fig. 6).



Figure 6. Landscape reflections in a Brazilian park

#### 2.4. Analysis of the existing urban lighting

In order to consider the need for possible interventions or new solutions, it is necessary to analyse the existing state of functional (street and ambient) lighting through a lighting masterplan. The analysis should refer to the age of the installation (if older than 25 years, a new installation should be planned), state of the equipment, adequacy of the light sources (in terms of colour, colour rendering, lamp efficacy and lamp life), type of luminaire (its photometric characteristics and degree of mechanical protection), as well as the material, form and height of the poles. It should also consider the influence of trees or other landscape elements on the performance of the lighting installation.

By measuring or through photometric calculations, the existing levels of illuminance (luminance) should be verified, since if they are unnecessarily high there is additional possibility for (significant) energy savings. The final result of the analysis should help to decide between a reconstruction (assuming lamp or luminaire replacement) and a new installation (assuming no restrictions imposed by the existing equipment). In some cases both suggestions should be offered to the investor, who will then make the final decision.

A lighting masterplan should also consider the existing state of the architectural lighting (buildings, bridges, monuments, fountains,...) in order to retain adequate solutions and offer new concepts for the ones that are not satisfactory.

#### 2.5. Solutions for street and ambient lighting, as well as directions for architectural lighting, in both public and private sectors

It is very important to notice the influence of street lighting on ambient and architectural lighting, and vice versa. Street lighting can no longer be treated only as functional lighting, since it significantly affects our impression of urban space. At the same time, ambient and architectural lighting contribute to the main functions of street and ambient lighting, such as orientation, safety, security, etc.

Streets, pedestrian paths, rivers, canals and railway tracks represent urban communications. Due to the need to provide easy orientation and express identity and visual comfort, it is necessary to strengthen their significance and hierarchy by illumination. Therefore, a lighting masterplan should determine the lighting solution for each street in terms of pole type, lamp and luminaire, as well as the geometry of the lighting installation. The differences in the significance of the streets (communication lines) will be expressed through the differences in the illuminance (luminance) level. This hierarchy can additionally be stressed by color of light, as well as by



applying a specific type of luminaire and pole in streets of equal significance. For pedestrian streets, squares and other spaces with dominant pedestrian traffic, where warm or neutral white colour of light and very good colour rendering are important, metal-halide lamps with a ceramic discharge tube are recommended. LED technology is another option. However, it has not reached the promised performance and it is not yet economically justified.

Special attention should be devoted to park illumination in order to create a pause in the urban pace. Here, dramatic effects based on contrasts make sense and contribute to urban experience.

A lighting masterplan should issue recommendations and guidelines for lighting design of commercial zones, squares, intersections and sports fields.

Masterplans need to offer directions for architectural lighting of each building or structure distinguished as significant. These guidelines should be the base for lighting design.

If a building with a glass façade is distinguished as an important landmark, the possibility of illuminating its interior should certainly be analysed. In order to save energy, a harmonious visual composition can be created, avoiding illumination of the complete interior space.

#### 2.6. *Artistic lighting installations and lighting intended for education or entertainment*

Urban cultural, educational or entertainment activities which include lighting effects attract visitors and contribute to city character. In some cities dynamic lighting is active all year round and it certainly determines the city image. Nevertheless, temporary lighting installations are usually more effective than permanent ones. They can draw attention towards a certain event in an amusing, witty or artistic manner. Masterplans should offer appropriate locations and ideas for such events, as well as specify all of the necessary installations (City of Melbourne, 2002).

Establishment of the city lighting day, which should promote lighting quality, provocative lighting installations, energy efficiency and ecological protection of the environment, is a concept adopted by some cities (City of Melbourne, 2002). Such an event should certainly include contributions of both public and private sectors.

Establishment of a city committee in charge of the city illumination, with its defined duties and authorisation, would certainly contribute to the quality of the illuminated urban environment.

#### 2.7. *Selection of urban spaces suitable for light and sound spectacles*

Dynamic lighting, sometimes coordinated with sound effects, can create a spectacle, making a strong impression

on the observers. Effective dynamic lighting needs: an adequate scenario for light or synchronised light and sound effects, appropriate lamps and luminaires (and acoustic equipment, if needed), and adequate equipment and software for spectacle lighting (and sound) control. Such a spectacle should enable: attractiveness of a building or ambient, effective presentation of significant national historic events or scientific discoveries, additional tourist attractions, commercial gains, support of cultural manifestations, notation of sports events, sending messages of universal value, etc.

Note that dynamic lighting used for commercial purposes usually degrades the ambient. Also, long lasting dynamic lighting with a quick change of light colour or intensity annoys people in the immediate surroundings.

Except for the light spectacles represented by two-dimensional pictures that are usually projected on a building (for example, on Sydney Opera House) or on a row of buildings surrounding a square (for example, Grand Place in Brussels), animated light and sound spectacles have also been introduced recently (Kharkov, Ukraine). They attract a lot of attention and represent a form of an urban outdoor show able to entertain and fascinate observers (Fig. 7).

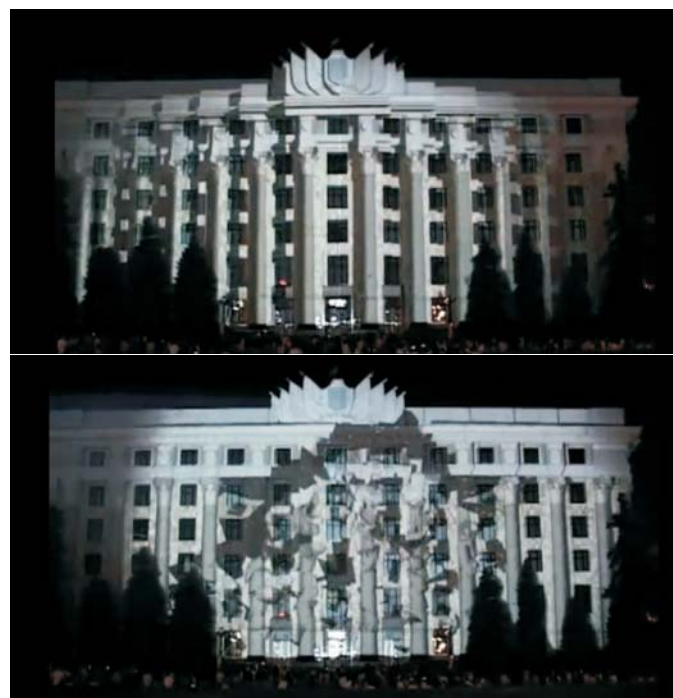


Figure 7. Two sequences of the Kharkov spectacle

The criteria for selecting spaces where dynamic lighting can be applied include: spaces on tourist routes, spaces which contain significant buildings (culturally, architecturally or historically), locations with interesting history, large surfaces for image projections, locations not occupied by residential buildings, accessible locations, spaces which enable the light show to be viewed from numerous positions, and spaces which enable easy set-up of the equipment and its maintenance.

## 2.8. *A view on all components and aspects of light pollution*

Urban lighting is often characterised by more light than necessary, which is running through also unnecessary time intervals. The consequence is not only waste of both energy and money, but also increased light pollution.

A lighting masterplan must regard all components of light pollution (sky glow, light intrusion and glare), offering measures for their maximum reduction in urban spaces. In order to achieve this goal, CIE 150 can be helpful (CIE, 2003).

Illumination of advertising signs, panels and billboards, when properly planned and performed, can contribute to the liveliness of the city, but otherwise can increase light pollution, cause annoyance and degrade the city atmosphere (IESNA, 2000).

## 2.9. *Maintenance of urban lighting*

Periodic group lamp replacement is economically justified (Philips Lighting, 1993). Lighting masterplans should, therefore, determine periods of group lamp replacement, luminaire cleaning and pole treatment. They should also include directions for the disposal of electronic waste. A database containing the relevant information regarding all urban lighting elements, since very helpful for large cities, can also be initiated. The database (accompanied by adequate software) should include the necessary information regarding all relevant elements of street and ambient lighting in order to facilitate maintenance. Each luminaire in the database should be assigned a unique address, through which all relevant information regarding the luminaire and the pole can be obtained. Such information would include type of pole foundations, date of pole installment, its type, form and height, as well as the type, length and tilt of the bracket. Regarding the luminaire, the database should include the luminaire type and date of installment, type of ballast or driver, the lamp type and its wattage, its position inside the luminaire, the date of the last group lamp replacement, and the date of single lamp replacement in a specific luminaire. The database should also contain information regarding the date of replacement of the ballast or driver, protector, socket. For each of the painted poles the date of the last treatment of the pole surface should be noted. The database software should enable easy access to information regarding the number and location of lamps which need to be replaced per (specific) year, those that should be replaced in the next month, the number and location of poles which should be protected, the number and location of individually replaced lamps, protectors, ballasts (drivers) and sockets, percentage of early failed lamps of a certain type, the number of luminaires of a

certain type in city streets (information necessary if, for example, the replacement of high-pressure mercury with high-pressure sodium luminaires is planned).

For large cities, a Geographic Information System (GIS) can be recommended, showing the poles and luminaires on the city map. This system should also contain the location of each of the distribution boards and transformer stations intended for public lighting.

## 2.10. *Recommendations for energy savings*

All applicable possibilities for energy savings in urban lighting should be analysed through masterplans. They include the correct determination of the street lighting and reflection classes, the use of energy efficient lamps and luminaires, the application of mesopic theory, the adequate determination of the luminaire maintenance factor, the use of devices or systems for the luminous flux reduction during late night hours, etc. (Kostic, Djokic, 2009). Unfortunately, very few of these possibilities are presented in masterplans.

## 2.11 *Large investments*

Urban lighting which assumes large investments can be realised through functionally justified phases, which should be proposed by the masterplan. Additionally, for large investments at least two solutions should be prepared and financially compared using the generally accepted cost-discount method (Kostic, Djokic, Pojatar, 2009).

## 3. **Conclusions**

Due to the fact that attractive night presentation of a city and its values significantly influences tourism, social life and night economy, it is of crucial importance when developing a lighting masterplan to take into account all of the available possibilities to achieve the set aims. The following topics are relevant and should be analysed through lighting masterplans:

- Selection of those city landmarks which are significant and deserve to be illuminated,
- Zoning and determination of borders (both natural and artificial) between city zones,
- Determination of the hierarchy between local landmarks, taking into account their relationship with nearby city landmarks,
- State of the existing urban lighting,
- Solutions for street and ambient lighting,
- Directions for architectural lighting for individual buildings or structures in both public and private sectors,
- Possibilities for artistic lighting installations and lighting intended for education or entertainment,
- Selection of urban spaces suitable for light (and sound) spectacles,

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- Light pollution,
- Maintenance of urban lighting,
- Recommendations for energy savings in urban lighting,
- Light control devices and systems intended for public lighting,
- The financial aspect of urban lighting, and
- Establishment of a city committee in charge of urban lighting.

Lighting masterplans, as documents which include the strategy for development or physical renewal and revitalisation of a certain space, should assure that spaces which are attractive in daylight remain safe, comfortable and interesting during the night, that energy and money are responsibly used and light pollution is minimised. Since the above mentioned requests are often contradictory, the priorities should be determined for each location in order to achieve optimal results.

Finally, masterplans need to be revised periodically (e.g. every five years). Although the physical urban structure is changing very slowly, lamps, luminaires and regulations in the field of lighting are going through rapid changes, which impose periodic corrections of strategic plans.

#### Acknowledgement

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#### References

1. BRINJAC ENGINEERING 2002. *Highlighting South Bethlehem - an Architectural Lighting Plan*.
2. CIE 2003. CIE 150. *Guide on the Limitation of the Effects of Obtrusive Light from Outdoor Lighting Installations*. Vienna: CIE.
3. CIE 2007. CIE TC 5.21. *A Guide to Masterplanning Urban Lighting (draft report - 7a.1)*. Vienna: CIE.
4. CITY OF MELBOURNE 2002. *Lighting Strategy*.
5. IESNA 2000. *Lighting Handbook - Reference and Application, 9<sup>th</sup> ed.* New York: IESNA.
6. KOSTIC, M., DJOKIC, L. 2009. Recommendations for Energy Efficient and Visually Acceptable Street Lighting. *Energy*, 34, 1565-1572.
7. KOSTIC, M., DJOKIC, L., POJATAR, D., STRBAC-HADZIBEGOVIĆ, N. 2009. Technical and Economic Analysis of Road Lighting Solutions Based on Mesopic Vision. *Building and Environment*, 44, 66-75.
8. PHILIPS LIGHTING 1993. *Lighting Manual, 5<sup>th</sup> ed.* Eindhoven: Philips Lighting.
9. SHCHEPETKOV, N. 2006. Lighting Master Plan. Proceedings of Urban Nightscape 2006, 124-126, Athens.

Figure 1. <http://www.pbase.com/vmarinkovic/belgrade>

Figure 2. <http://www.aboutalltravel.com/wp-content/uploads/>

Figure 3. <http://www.emblema.tv/srp/Sajmovi-izlo%C5%BEbe.9/medjunarodni-sajam-hortikulture-beograd-2010.84.html>

Figure 4. <http://www.google.com/images?hl=sr&xhr=t&q=fotografije+Beograda+nocu+iz+vazduha>

Figure 5. <http://www.pbase.com/vmarinkovic/belgrade>

Figure 6. <http://www.cities-in-brazil.com/brasilgia/>

Figure 7. <http://www.youtube.com/watch?v=4DAP9x0Fk3U>

Authors:

L. Djokic<sup>1</sup>, A. Kostic<sup>1</sup>, M. Kostic<sup>2</sup>

<sup>1</sup>Faculty of Architecture, University of Belgrade, Belgrade, Serbia

<sup>2</sup>Faculty of Electrical Engineering, University of Belgrade, Belgrade, Serbia  
lidija@arh.bg.ac.rs

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### Training on CIE 201:2011 Recommendations on Minimum Levels of Solar UV Exposure May 16, 2012, Vienna

The upcoming Training on CIE 201:2011 Recommendations on Minimum Levels of Solar UV Exposure will take place on Wednesday, May 16, 2012

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This Technical Report gives recommendations for spectral radiant power, irradiance and radiance responsivity measurement of single element detectors in the 200 nm to 2 500 nm wavelength range. It covers measurement setups and methods, summarises the types and basic properties of typical detectors, radiometers and photometers and gives guidance on how to choose a reference detector. Spectral considerations for source and radiometer applications, detector amplifier application issues and measurement uncertainties are described. Primary detector standards and procedures for the realisation of units and responsivity functions are the

responsibility of national metrology institutes and are not discussed in this report. This Technical Report was written to update Technical Report CIE 64-1984 "Determination of the Spectral Responsivity of Optical Radiation Detectors" with respect to device and measurement technology, and to include spectral irradiance and radiance responsivity measurements for radiometers and photometers from the ultraviolet wavelength range up to 2,500 nm.

This publication supersedes CIE 64-1984 "Determination of the Spectral Responsivity of Optical Radiation Detectors".

The publication is written in English, with a short summary in French and German. It consists of 82 pages with 41 figures.

### **Characterization of the Performance of Illuminance Meters and Luminance Meters CIE Draft Standard DS 023/E:2012**

This Draft Standard defines quality indices characterising the performance of illuminance and luminance meters in a general lighting measurement situation, and measurement procedures for the individual indices and standard calibration conditions.

Measurements of illuminance or luminance and their accuracy are influenced by various parameters, such as operational conditions, properties of light sources, as well as characteristics of the applied photometers. The characteristics of these photometers alone do not allow the estimation of the measurement uncertainty for a specific measurement task. Nevertheless, it is generally true that instruments with "better" characteristics in most cases allow smaller uncertainties than instruments with "worse" properties. This Draft Standard has been written to:

- give clear and unambiguous definitions for the individual quality indices;
- define measurement procedures and methods for numerical evaluation of these measurement results;
- define calibration conditions for illuminance meters and luminance meters.

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. The Draft Standard is readily available at the National Committees of the CIE or via the CIE Webshop.

## A Computerized Approach to Transmission and Absorption Characteristics of the Human Eye CIE 203:2012

There has long been a need for a series of reference spectral transmission and absorption data for the human eye for applications in eye research and optical safety studies. TC 6-15 collected spectral data from the literature and determined from that literature the best form for the wavelength dependence of the transmission and absorption of the components of the human eye. After critical review, the data have been compiled in tabular form in comma-delimited computer-accessible data files. The tabulated data consist of the transmission and absorption data of the clear ocular media, including the cornea, the aqueous, the lens, and the vitreous of the young (<10 years old) human eye and the rhesus eye for the wavelength range of 200 nm to 2500 nm. Transmittance data of the total clear ocular media in the human eye for the wavelength range 300 nm to 700 nm and for ages between 1 year and 100 years are also tabulated. These data can be downloaded by readers of this Technical Report from the CIE website.

The publication is written in English, with a short summary in French and German. It consists of 66 pages with 23 figures and 9 tables. The price of this publication is EUR 135.

*Note: All CIE Publications are readily available at the web shop of the CIE (<http://www.techstreet.com/cgi-bin/joint.cgi/cie>). Members of the National Committees of the CIE get 66.7% discount.*

## OTHER NEWS

### Light India 2012 October 5 - 8, 2012

The Electric Lamp & Component Manufacturers' Association of India (ELCOMA) has joined hands with Messe Frankfurt to organise Light India 2012. The linking up of ELCOMA the largest lighting industry association in India and Messe Frankfurt, the world's leading exhibition organiser in the lighting sector, will now offer an opportunity to all the Indian lighting manufacturers especially those of small and medium size organisations to show their products to the global market. Light India 2012 will be the largest exhibition in terms of number of exhibitors and visitors ever seen in India. The event will give support to the local lighting industry which is witnessing a rapid technological advancement in both products and services.

Light India 2012 which is scheduled from October 5 to 8, 2012 at Pragati Maidan, New Delhi covering a gross area of 16,000 square metres attracting over 300 exhibitors both from India and abroad, will provide a platform for the world players in lighting to display and

demonstrate their latest developments and the future trends in technology. This will be a meeting ground for international producers, policy makers, specifiers and customers. The exhibition will also show-case India to the world of lighting.

The exhibition is open to business visitors on October 5, 6 and 8 and to the general public on October 7.

A technical conference, Redefining Light - Sustainability, New Technologies and Humanising Lighting will run concurrently with the exhibition on October 5 and 6. The conference will feature outstanding international experts in the six sessions planned.

For further information on Light India 2012 contact:

Mr. Rasheed Anwaar  
Project Head  
Light India 2012  
Mob: +91 9990101000  
(D): 011 41326666

Email: [rasheedanwaar@light-india.in](mailto:rasheedanwaar@light-india.in)

## WEBWATCH

### DOE Study: LED Museum Lighting Safe, Effective, Efficient

The US Department of Energy (DOE) has published the final evaluation report from a retrofit of track lighting used to illuminate a special photography exhibition at the J. Paul Getty Museum in Malibu, California. The LED lamps resulted in energy savings approaching 83 percent compared to the traditional halogen system. Simple payback was estimated to occur between years 2 and 3.

Further, regular checks of monitored photographs showed small, but visually undetectable, fading from the installed LED lamps. No more photodegradation than would be expected from UV/IR filtered halogen lamps.

During the demonstration, 12W LED PAR38 lamps replaced 60W halogen PAR38 30° flood lamps on a one-for-one basis across three adjacent gallery spaces.

#### **Key findings include:**

- In the three gallery spaces, a total of 34 track heads lamped with the LED lamps would use 920 kWh per year compared to 5410 kWh for the comparable halogen lighting system, representing a savings of 83 percent. At a melded electrical rate of \$0.12/kWh, this translates to a savings of \$540 per year for the museum.
- In a 10-year lifecycle cost analysis, the total present value (PV) energy savings amount to \$4621, with a total PV lifecycle cost savings of \$9843 including

maintenance. At this electricity cost, simple payback occurs at 2.3 years of operation.

- During the PAR38 lamp comparison, museum staff responded favorably to the visual results, and although there was no effort to inform the viewing public about the LED use, there also was no reaction, positive or negative, from visitors about the lighting. The museum plans to continue to use LEDs in exhibits where they produce desired visual results.
- Accelerated fading tests on a variety of sensitive museum materials showed that warm-white LED lamps produce no worse deterioration than filtered halogen lamps at equivalent lux-hours of exposure. However, it is always important to consult with conservators and curators on unique or especially critical museum materials.

The report is available for download at the DOE's Solid-State Lighting Gateway Demonstration Results page. This lighting demonstration is one of many DOE Gateway demonstrations that showcase high-performance LED products for general illumination.

Source: [www.ssl.energy.gov](http://www.ssl.energy.gov)

[http://www1.eere.energy.gov/buildings/ssl/gatewaydemos\\_results.html](http://www1.eere.energy.gov/buildings/ssl/gatewaydemos_results.html)

<http://lighting.com/doe-study-led-museum-lighting/>

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## LED Museum Accent Lighting: Chicago, Illinois

At Chicago's Field Museum of Natural History, 32 halogen track luminaires used to light an enclosed gallery exhibit were replaced with an LED system using 26 track fixtures. The LED system resulted in 63% energy savings compared to the halogen system, while achieving a simple payback of roughly 3 years. Because the LED luminaires used do not emit energy in the infrared or ultraviolet regions of the electromagnetic spectrum, they are also expected to be less detrimental to some museum artifacts. (November 2010)

This report describes the process and results of a demonstration of solid-state lighting (SSL) technology in an accent lighting application in a museum, under the U.S. Department of Energy GATEWAY Solid-State Lighting Technology Demonstration Program. In this project, an entire enclosed gallery originally used 32 halogen (various lamps) track luminaires to light an exhibit. The exhibit operated for roughly 2 months, and then the lighting was replaced with a light-emitting diode (LED) system that used 26 track fixtures.

The LED system resulted in 63 percent energy savings compared to the halogen system. Energy savings resulted from the LED system being more efficacious on a per-fixture

basis, greater centerbeam intensity for similar beam angles, and different distributions allowing for fewer luminaires to be installed. In terms of illumination, the LED system produced comparable illuminance on the lighted artifacts.

Aside from energy savings and illuminance, the LED system was demonstrated to examine the quality of the lighting from a source expected to be less detrimental to the artifacts. The mere act of lighting an artifact damages it, so museums are constantly balancing damage with visibility. The LED luminaires demonstrated do not emit light in the infrared or ultraviolet regions of the visible spectrum. Energy in these regions can be detrimental to the artifacts.

In terms of cost, the simple payback for the LED system compared to that of the Halogen system is roughly 3 years.

The report can be downloaded from:

[http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/gateway\\_field-museum.pdf](http://apps1.eere.energy.gov/buildings/publications/pdfs/ssl/gateway_field-museum.pdf)

[http://www1.eere.energy.gov/buildings/ssl/gatewaydemos\\_results.html](http://www1.eere.energy.gov/buildings/ssl/gatewaydemos_results.html)

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## The Louvre's First LED Exterior Lighting Sets the Pyramid Aglow

Toshiba Corporation has completed the first stage of renewing external lighting at the Louvre, the world's most popular art museum.

The lighting ceremony took place in Paris on 6 December in the presence of 450 invited guests from across Europe. The countdown numbers for the illumination were projected onto the Palace's Cour Napoleon façade and at the flick of a switch by Louvre Director Henri Loyrette and Toshiba's President Norio Sasaki, the Pyramid, Pyramidion and Pavilion Colbert were all simultaneously illuminated. The space, now bathed in new light, was filled with loud cheers and applause.

After speeches by Loyrette and Sasaki, a reception commenced with the traditional Japanese Kagami-biraki barrel opening. Pools, evocative of the ponds surrounding the Pyramid, were set up within the event venue, and elicited exclamations from guests at the beauty of the ceiling lights reflecting on their surface. The display set up within the event area featured a number of exhibits including the LED lighting installed in the Louvre Museum for this project and a "making of" video of the LED lighting installation through to completion.

As the conventional exterior lighting of The Louvre was reaching its end of life, the museum recognised the value of replacing the old, high-energy xenon lighting with energy-efficient LEDs. Toshiba has delivered and installed its latest LED products and fittings and designed the

lighting to bring out the intrinsic beauty of the museum. Fittings include high-beam lamps that illuminate the Pyramid and the palace walls.

Work on replacing the museum's old lighting will continue: the remaining facades of the Napoleon Court will be completed in the first half of 2012, and the courtyard will follow in 2013. A total of 3200 LED luminaires will replace 4500 xenon lighting fixtures and will cut annual power consumption for the exterior lighting by 73%.

Link:

<http://lighting.com/louvre-goes-ssl/>

## LETTERS TO THE EDITOR

Respected Sir,

My name is Megha Kaimal. I am not sure whether this email of mine will actually be read or not. I was just going through the official news letter of ISLE (Light the Official Newsletter of the Indian Society of Lighting Engineers). First of all, I would like to introduce myself. As I mentioned, my name is Megha and I am the grand-daughter of Jayantilal D. Mahidharia. He was the Founder and Fellow Life Member of the ISLE - F(L)0002 and held office as a Governing Body member of the Society as well as Chairman of the Bombay State Centre. He was also a member of the Optical Society of India, the Society of Reliability Engineers, the Standards Engineers of India, among others.

Firstly, I would take the opportunity to thank you for acknowledging my Late Nanaji in your obituary section and highlighting all the achievements he has made throughout his life. I am so proud to be his grand-daughter, and I cannot thank you enough. However, do forgive me if I sound a bit cheeky. I was reading further down your newsletter and I did read that you have mentioned that Jayantilal D. Mahidharia is survived by his two sons Anool and Dhaval Mahidharia. I just wanted to bring to your notice that he also has a daughter, Pintueli Gajjar (my mother), whom he often used to feel more proud about, more than his two sons. For my grand-father, my mother was his eldest son (literally), so it did prick me a bit not to see my mother's name there, since Nanu was always so proud of her.

I do apologise if I sound a bit daft here, but I just wished to let you know and bring this to your notice. If you do read this email, I do thank you for your time and consideration. Thanks once again on behalf of my Nanaji, who I'm sure is happy wherever he is.

Regards and best wishes,  
Megha Kaimal

## MEMBERSHIP APPLICATIONS APPROVED BY GOVERNING BODY

### New Members Admitted on 22nd November 2011

M. No	Name & Addresses	Grade	Centre
F(L).0743	Atul Kumar Pandey 136 Greater Vaishali Indore	Fellow (Life)	M P
F(L).0745	Chetan Dyamanna Rasmi Lighting & Energy India (P) Ltd 341, 8th Main 1st A Cross Basaweshwar Nagar Bangalore 560 079	Fellow (Life)	Karnataka
F(L).0746	Vemula Veeraswamy Department of Technical Education Govt. of Andhra Pradesh Government Polytechnic for Women, Palamaner Andhra Pradesh 517 408	Fellow (Life)	Chennai
F(L).0747	Kishor Kumar Spectral Services Consultants Pvt Ltd A-109, Sector - 63 Noida 201 301	Fellow (Life)	New Delhi
M(L).1658	Abhijeet Waghmare Malhar Fabricons Lun shed No 25 D-1 Sector D Sanwer Road Indore 452 006	Member (Life)	M P
M(L).1659	Imran Qureshi Crompton Greaves Ltd 103-B, Apollo Trade Centre Geeta Bhavan, Indore	Member (Life)	M P
M(L).1660	Anand Mulye 75, Anand Nagar Chitawad Road Indore 452 017	Member (Life)	M P
M(L).1661	Sharwan Kumar Biyani Pratibha Syntex Ltd. Plot No 4, Industrial Growth Centre, Khoda Pithampur, Distt. Dhar (M.P.)	Member (Life)	M P
M(L).1662	Monish Shah Kiron Electricals 2/2 Siyaganj Maharani Road, Indore	Member (Life)	M P
M(L).1663	Kamlesh Lahothy Laso Comfort System 33, Baxi Gali Rajwada Indore 452 004	Member (Life)	M P
S.0624	Laghate Prasad AM-239 Pandit Deendayal Upadhyay Nagar Sukhliya, Indore	Student	M P

### Transfer of Grade

F(L).0744	Deepti Jitendra Vyas D. Vyas & Associates IC Sitabag Colony Dyenu Market, Opp agrawal Sweets, Indore	Fellow (Life) from M(L).1009	M P
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### New Members Admitted on 12th March 2012

I.0161(L)	Flux Lighting 3 Kerawala Bldg, 2nd Floor 61, Mangaldas Road, Lohar Chawl Mumbai 400 002	Institutional (Life)	Mumbai
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IM.0161(L)	Jitendra Lachu Ratwani Flux Lighting 3 Kerawala Bldg, 2nd Floor 61, Mangaldas Road, Lohar Chawl Mumbai 400 002	Institutional (Life)	Mumbai	A.1105(L)	Amit Chamaria Infinity Township Pvt Ltd Anil Plaza, 2nd Floor G.S. Road, Guwahati 781 005	Associate (Life)	Kolkata
F.0760(L)	Rajan Vernekar Rajan Vernekar Lighting 327, Laxmi Plaza Off Link Road Andheri West, Mumbai 400 053	Fellow (Life)	Mumbai	A.1106(L)	Sonu Sancheti 5, Nalia Bakhai Opp. Marwadi School, Indore	Associate (Life)	M P
M.1719(L)	Kishore Kumar Parikh 37, Classic Purnima Park Sch. 94, Opp. Hotel Radisson Indore 452 010	Member (Life)	M P	A.1107(L)	Achin Agrawal Mangal Machinery Stores 16/2, Siyaganj Ram Mandir Gali, Indore	Associate (Life)	M P
M.1720(L)	Alok Tiwari Neo Concept Architects 203, Silver Arc Plaza Race Course Road, New Palasia Indore	Member (Life)	M P	A.1108(L)	Nilesh Suresh Mistry Designer Concept Shop No. 7, Chanakya Bldg, Mahavir Nagar, On Link Road Kandiwali (W) Mumbai 400 067	Associate (Life)	Mumbai
M.1721	Sheetal Kirit Sandesara H/12, Mangal Kunj Jambli Gali, S.V. Road Borivali West, Mumbai 400 092	Member	Mumbai	A.1109(L)	Dilip Kumar Sharma 111/157 Agrawal Farm Mansarovar, Jaipur	Associate (Life)	Rajasthan
<b>New Members Admitted on 31st March 2012</b> with effect from 01-04-2012							
M.1722(L)	Sarat Chandra Kalita Prafulla Enclave 1/K2 Namghar Path, Panjabari Guwahati	Member (Life)	Kolkata	F(L).0761	Nagappan Muthusamy Sri Murugappa Electricals 1/58, Anna Salai Swarnapuri Salem 636 004	Fellow (Life)	Chennai
M.1723(L)	Umesh Chandra Boro Vortex Engineering Ground Floor, Raj Apartment 3, J.B. Road, Silpukhuri Guwahati 781 003	Member (Life)	Kolkata	M(L).1733	Dharmender Yadav 1901 Sector - 46 Gurgaon	Member (Life)	Delhi
M.1724(L)	Raj Gopal Nayak Havells India Limited 160, Rajgarh Road Guwahati 781 007	Member (Life)	Kolkata	M(L).1734	Ranjith K. Kartha Veda Lighting Design & Systems Pvt Ltd B2/A, Doshi Trinity Park Vengaivasal Main Road Santhosapuram Chennai 600 073	Member (Life)	Chennai
M.1725(L)	Chitra Ranjan Nath Havells India Limited 160, Rajgarh Road Guwahati 781 007	Member (Life)	Kolkata	A(L).1110	Vivek Kumar Srivastava Crompton Greaves Ltd Express Building 9-10, B.S. Zafar Marg New Delhi 110 002	Associate (Life)	Delhi
M.1726(L)	Sandip Kumar Phukan Havells India Limited 160, Rajgarh Road Guwahati 781 007	Member (Life)	Kolkata	A(L).1111	H.V. Meghana # 8, P.R. Layout 1st Main, Sheshadripuram Bangalore 560 010	Associate (Life)	Karnataka
M.1727(L)	Pritam Phatowali Havells India Limited 160, Rajgarh Road Guwahati 781 007	Member (Life)	Kolkata	S.0710	Sulthan Aribu 3/279, Krishnan Street Vedharaniam (T.K.) Pushpavanam (Post) Nagapattinam 614 809	Student	Chennai
M.1728(L)	Ajoy Bhaduri Havells India Limited 160, Rajgarh Road Guwahati 781 007	Member (Life)	Kolkata	S.0711	P. Subburam C/o P. Vijaya Lakshmi 4/303-C, Bharathi Nagar V.C. Puram (P.O.) Sattur 626 203	Student	Chennai
M.1729(L)	Deba Prasad Hazarika Kironshree Apartment Bye Lane No. 2, Tarun Nagar Guwahati 781 005	Member (Life)	Kolkata	S.0712	Sathiyaraj Ramachandran 107, Perumal Kovil Street Thottiyam (Post), Kallakurichi (T.K.) Villupuram 606 201	Student	Chennai
M.1730(L)	Arindam Adhir Chakraborty Flat-18, Building D-23 Radha Nagar Phase -III Near Khadakpada, Kalyan (W) Maharashtra 421 301	Member (Life)	Mumbai	S.0713	C.S. Sanal Cheeroth (House) Mullassery (PO), Thrissur Kerala 680 509	Student	Chennai
M.1731	Yogesh Bibra Saviour Aircon FB-127, Mansarovar Garden New Delhi 110 015	Member	Delhi	S.0714	R. Ragunathan 4/47, Nakkal Patti Pudur (Village) Pulikkarai (PO), Palacode (TK) Dharmapuri (Dt) 636 808	Student	Chennai
A.1103(L)	Vedavyas Kamath Shobha, Door No. 13-2-17C Kittur Chennamma Road Ajarkadu, Udupi 576 101	Associate (Life)	Karnataka	S.0715	Kiran Baby Keezhoottuveedu, Tgazhmel Anchal (PO) Anchal 691 306	Student	Chennai
A.1104(L)	Namratha Nagarmat Pai C/o Nithyandanda Pai House No. 2-1-82A4 Navaneetha Compound, Adkadakatte Road Nittoor, Gundibail Udupi 576 102	Associate (Life)	Karnataka				

S.0716	Suhad Salim Mammuz Manzil, South Aryad Avalookunnu PO Alappuzha 688 006	Student	Chennai	S.0727	C. Shenu 2/1842/3 Om Sakthi Nagar Ramanathapuram 623 501	Student	Chennai
S.0717	V. Govinda Rajan 73/59, IV Cross Street Renganathapuram Tambaram (West) Chennai 600 045	Student	Chennai	S.0728	V. Preethi 1/786 A, Loganathan 5th Street, Medawakkam Main Road Nanmangalam (PO) Chennai 600 117	Student	Chennai
S.0718	Midhun Prem Velivalath House P.O. Mullassery Thrissur 680 509	Student	Chennai	S.0729	S. Divya 1/849, S.S. Nagar Natham Road, Kullanampatti Dindigul 624 003	Student	Chennai
S.0719	Aneesh Satheesan Thenaively, South Aryad Avalookunnu PO Alappuzha 688 006	Student	Chennai	S.0730	S. Kavitha 355/D, MM Farm House 10th Avenue Street Sea Shore Town Panaiyur 603 119	Student	Chennai
S.0720	S. Selvanathan No. 4, Anjaneyar Koil Street Saidapet, Chennai 600 015	Student	Chennai	S.0731	S. Ambika No. 4/818, 24th Street 4th Cross Street, Shanthi Nagar Palayamkottai Tirunelveli 627 002	Student	Chennai
S.0721	C. Narendhar 5/258 E.V.R. Periyar St. Periya Vingeam Pakkam Singaperumal Koil 603 204	Student	Chennai	S.0732	K. Tamil Elakiya C/o Kannan No. 19/100 'G' Block Bharathi Dhasan St M.M.D.A. Colony, Arumbakkam Chennai 600 106	Student	Chennai
S.0722	M. Velavathem Sundar Rajan C/o M. Velavathem Kottai Puniji (Vill) Indular (PO), Cheyyur (T) Kanchipuram (Dist.) Tamilnadu 603 104	Student	Chennai	S.0733	L. Lakshmanan C/o K. Lingannan 3/16 Pudhiya Athikuppam Bommikuppam (Post) Tirupattur 635 653	Student	Chennai
S.0723	Balamurugan Ranganathan C/o Ranganathan Murugan Kovil Street Ananthur (P), Uthangarai (TK) Krishnagiri (D) 635 304	Student	Chennai	<b>Transfer of Grade</b>			
S.0724	Josen S. Palathra Palathra (H), Veroor (PO) Chethipuzha, Changanacherry Kottayam, Kerala 686 104	Student	Chennai	M(L).1732	Shyam S. Yadav M.J. Consultants 606, Madhuban Building 55, Nehru Place New Delhi 110 019	Member (Life) from A.0419	Delhi
S.0725	V. Vasudevan No. 77, Amaravathy Nagar Mela Chokkanathan Puram Bodinayakanur 625 513	Student	Chennai				
S.0726	S. Karthik 2/111, Sengunthar Street Elleri (Post), Kattumannar Koil (TK), Cuddalore (Dt) 608 303	Student	Chennai				

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