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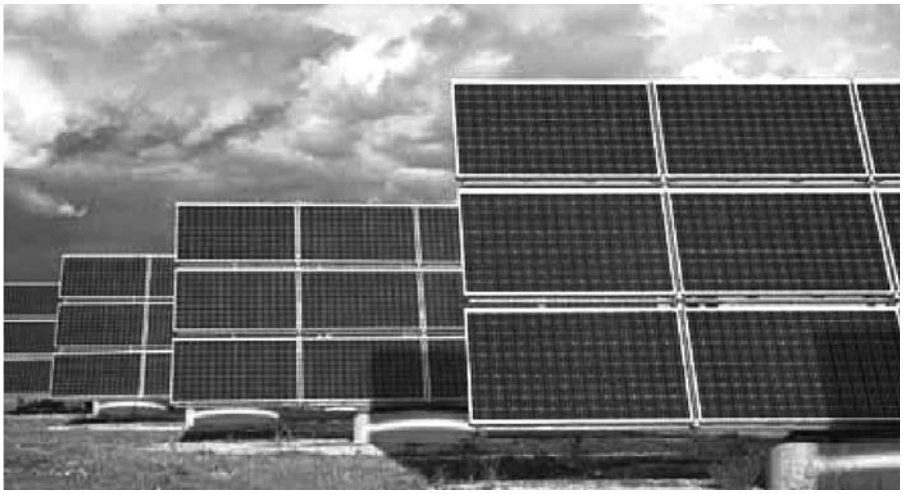

In its coalition agreement, the German Federal Government has established a clear objective and formulated its "National Electromobility Development Plan" that plans to have one million electric vehicles on the street by 2020.

The first series of electric production vehicles for the German market were produced in 2010 and 2011. It is planned that many more will flow in 2012. With emphasis on developing a more efficient electric vehicle, battery and automobile manufacturers are increasing their efforts and allocating significant funds for further research. All vehicles will be equipped with charging plug and socket devices which enable the quick and safe charging of the vehicle.

It is necessary to develop a large enough charging infrastructure that integrates with the existing power network (which will go in hand with increasing use of renewable energies) that will guarantee the security of supply for the electric vehicles. In future, the charging infrastructure will become a controlling element of the intelligent power network – also called "smart grid". The function of the charging infrastructure is – among others – to charge electric vehicles when there is an overcapacity in the power grid and to feed it back into the grid at times of peak demand. But there is more: Besides miscellaneous safety aspects for users, the charging station has to identify users, activate them and interact with them. Fleet managers may want to assign charging priorities. Energy providers need consumption transparency for invoicing. The charging infrastructure can be placed in public or private areas and is therefore subject to different requirements. For car fleets or at home, simple wall mounting and installation solutions are in demand. The so-called E-boxX range allows individual solutions and designs. Suspension-type and mobile supply units inside a trolley case, testing and simulation devices and pedelec cabinets are examples of customised solutions.

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Because of its experience and being a member of the essential standardisation committees for charging plug and socket devices and charging infrastructure (DKE and VDE for Germany and CENELEC and IEC on the international level), WALTHER was able to actively shape and drive forward the developments. The relationships and projects that WALTHER have developed with worldwide leading automotive manufacturers, energy suppliers and other partners have allowed them to build a leading technological position in the market specialising on the entire range of products between vehicles and the power grid.

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State Associations News

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E-mail: pes233@tm.net.my / pes233sabah@gmail.com
pes233@streamyx.com

PES 15th Anniversary Dinner

Once again a historic day has been drawn up by the Sabah Electrical Association (PES) for successfully organising its 15th anniversary dinner on 7th January 2012 at Ocean Seafood Restaurant, Kota Kinabalu. About 1,000 people from among PES members, family members and friends attended the dinner. The theme for that night was "1 PES OVERCOME CHALLENGES" which was graced by Tn Hj Ir Abd Razak Sallim, Managing Director of SESB who was the Guest of Honour. The special guests for that night were TEEAM Vice President, Ir Chew Shee Fuee and his spouse, Lily. Other VIPs were Sarawak Electrical Association's Chairman, Mr Francis Chew; Malay Chamber of Commerce Sabah Branch Chairman, Datuk Awang Buhtaman; Kota Kinabalu Chinese Chamber of Commerce and Industry's Vice President, Mr Chu Fui Khin; Sandakan Electrical Association's President, Mr Ricky Lim; and Lahad Datu Electrical Engineering Association's President, Mr Philip Chia.

All smiles *– (6th from left) Guest of Honour, Tn Hj Ir Abd Razak Sallim (SESB Managing Director) and (centre) Mr Woo Soo Poo (PES President) posing with other VIPs.*

PES 15th AGM

PES 15th Annual General Meeting (AGM) was held at PES office on 17th March 2012. A total of 35 PES members were present. During the general meeting, Mr Arius Yu and Mr Matthew Ng were appointed as PES Internal Auditors. Ir Dr Jacob Yan Ngai Nen was appointed as PES Technical Adviser and Datuk Lee Chuen Wan JP as PES Legal Adviser. They will serve for the term 2012-2013. President, Mr Woo Soo Poo also presented souvenirs to PES Past Committee Members. A total of 12 children from among PES members received scholarships which were presented by the Organising Chairman, Mr Chin Chung Kee during the AGM.

Welcome address *– PES President, Mr Woo Soo Poo delivering his speech at the general meeting.*

The 8th Office Bearers Installation

The 8th office bearers installation night for the year 2012-2013 was held at Kampung Nelayan (Puteri), Bukit Padang on 18th May 2012. The installation and sworn-in ceremony was witnessed by Ir Dr Jacob Yan Ngai Nen (Technical Adviser) and Datuk Lee Chuen Wan JP (Legal Adviser).

For the album *– (standing from left) Committee Members: Mr Chin Chung Kee, Mr Alexander Richard, Mr Mohamed Zulfikar, Mr Leslie Jong, Treasurer - Mr Lai Tet Vui, Secretary - Mr Lee Vui Ken, Asst.Secretary-Mr Aldrin Wong, Mr Roslan Serin, Mr Bunny Teh, Mr Lau Tong Liong and Organising Chairman - Mr Foong June Choy). (sitting from left) Vice President - Mr Chin Fui Ming, Legal Adviser - Datuk Lee Chuen Wan JP, President - Mr Woo Soo Poo, Technical Adviser - Ir Dr Jacob Yan Ngai Nen, Immediate Past President - Mr Chung Kee Hung and Vice President II - Mr Wong Chee Sen.*

NIOSH – SESB Safety Passport Training Course

All ears *– PES President Mr Woo Soo Poo addressing the participants before handing over the session to the speaker, Mr Condrad from SESB.*

It was noted that all contracting service maintenance works with SESB are compulsory to have NIOSH-SESB Safety Passport. The 3rd SESB safety passport 1-day training course for PES members was held on 24th April 2012 at Wisma Tabung Haji, Jalan Sembulan, Kota Kinabalu. A total of 50 participants took part in the training course. To date, PES has organised up to six such training course covering over 300 members and their staff.

PES Trade & Technical Visit to GILE 2012

PES organised a trade delegation to Guangzhou International Lighting Exhibition (GILE) 2012 cum factory visit from 9th to 12th June 2012. Event organiser Mr Foong June Choy together with eight members participated in the trip.

(from left) Mr Aldrin Wong (Asst Secretary), Mr Chew Kon Inn (Member), Mr Alexander Richard (Committee Member), Mr Wong Chee Sen (Vice President), Mr Woo Soo Poo (President). (second from right) Datuk Lee Chuen Wan (Legal Adviser), Mr Foong June Choy (Organising Chairman) and Mr Lee Hon Hwa (Committee Member).

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..... Continue State Associations News

TEEAM Fellowship Golf

President, Mr Woo Soo Poo, together with Committee Member, Mr Alexander Richard and PES members, Mr Chiew Kon Inn and Mr Michael Tong attended the TEEAM fellowship golf competition which was held at Kelab Golf Sultan Abdul Aziz Shah (KGSAAS) on 18th July 2012. Mr Alexander Richard emerged as the Nett and Gross championship in category 'B'.

VIPs flight *– All set to tee off for the 2012 TEEAM golf challenge.*

Penang Electrical Merchants' Association
No. 171A, Malacca Street, 10400 Penang.
Tel: +604 - 229 0195 Fax: +604 - 228 4233
E-mail: pema@streamyx.com
Website: www.pema.org.my

PEMA 64th Anniversary Dinner Celebration

PEMA celebrated its 64th anniversary dinner at the Midland Court Restaurant, Penang, on 28th April 2012. More than 500 members and guests including trustees and advisors attended the celebration dinner. Highlights of the dinner were lucky draw, karaoke and presentation of new membership certificates to new members.

Happy birthday PEMA *– PEMA officials preparing for the cake cutting ceremony.*

TNB Seminar for Electrical Contractors

A half-day seminar for electrical contractors in Penang was organised by TNB Pulau Pinang at Hotel Royale, Penang, on 8th May 2012. The seminar was conducted by various officials from TNB Pulau Pinang & the Energy Commission. Mr Teoh Yew Yean (PEMA Contractors` Chairman) and Dato` Hong Yeam Wah (Past President) were invited to sit in the seminar panel which includes Mr Mohandass S Nair (TNB General Manager for Penang State), and Mr Mohd Hosnan Tembong, (Technical Executive Director of Energy Commission, Northern Region). Mr Mohandass gave his opening address, followed by Mr Teoh Yew Yean who gave a speech and briefing on some of the issues faced by electrical contractors in Penang.

About 60 participants benefited from the seminar which ended with an interactive Q & A session during which Mr Mohandass explained and resolved some of the issues brought up by the participants. Dato` Hong Yeam Wah also gave a briefing on some technical aspects and problems concerning electrical contractors in Penang. On the whole the event was very informative to all the participants.

PEMA-TNB Dialogue

An annual dialogue with TNB Pulau Pinang was successfully held on 31st July 2012. Prior to the dialogue, a contractors` meeting was held on 27th July 2012 to discuss the issues and agenda for the dialogue. Mr Cheah See Yeong (PEMA President) led a 14-member delegation to the dialogue. TNB Pulau Pinang was represented by their newly appointed General Manager for the State of Penang, Mr Mohandass S Nair and eight of his officials.

Thank you *– Mr Cheah See Yeong (PEMA President) presenting a token of appreciation to Mr Mohandass S Nair (TNB Pulau Pinang General Manager).*

The dialogue started with a briefing on new procedures and time duration for MV/HV large power user application, followed by a briefing on power quality equipment. Issues brought up at the dialogues were installation and standardisation of metering, schedules of TNB works for industrial category, problems on the unavailability of coloured metering control power cables above 35 mm^2 and the requirements and procedures of TNB with regards to application to JKR/MPPP for permit approvals. It was a very fruitful dialogue with many issues resolved.

For the album *– Attendees posing for a group photo after the dialogue.*

The Perak Electrical Association
No. 12-A, Jalan Datuk Mahmud,
31650 Ipoh, Perak Darul Ridzuan.
Tel: +605 - 254 1502 Fax: +605 - 250 9145
E-mail: multi99@streamyx.com

Seminar on Capacitor Bank

On 12th May 2012, Electrical Components Sdn Bhd (ELCO) in association with The Perak Electrical Association (PEA) and Bang Guan Lee Hardware Electrical Sdn Bhd presented a seminar titled "Capacitor Bank: Box-Type vs Cylindrical-Type & Common Mis-Applications" at Tower Regency Hotel & Apartments, Ipoh, Perak. The seminar, approved by The Institution of Engineers Malaysia for four CPD hours, was attended by 60 participants. Each participant was presented with a certificate of attendance and the seminar adjourned to buffet lunch at the hotel.

Speaker *– Mr Christopher Wong giving his presentation.*

Overwhelming *– A cross section of the seminar participants.*

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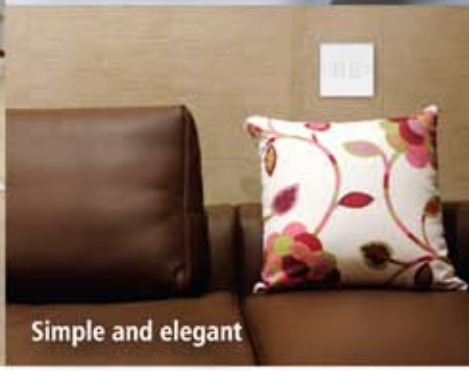

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Technical Visit to MNI

Fourteen members from PEA joined TEEAM for the technical visit to Malaysian Newsprint Industries Sdn Bhd (MNI) plant in Temerloh-Mentakab, Pahang, on 16th June 2012. Members had the opportunity to view the generators and equipment used and also see how newsprint is being produced. The energy requirement uses biomass from palm oil mill waste.

Attentive *– Briefing on production process.*

ST's Customer Day

On 5th July 2012 , Suruhanjaya Tenaga (ST) invited The Perak Electrical Association (PEA) to participate in ST's Customer Day organised in conjunction with the Commission's 10th anniversary celebration. The event was held at Dewan Cempaka Sari, Kompleks Silveritage Galleria, Medan Gopeng, Ipoh. It was attended by over 100 participants from TNB, CIDB, IKM, ILP, IKBN and stakeholders from the E&E industries.

ELCO's booth *– PEA members posing with ELCO's personnel during ST's Customer Day in Ipoh.*

Johor Bahru Electrical & Electronics Association

No.7-01, Jalan Bentara Luar, Taman Iskandar,
80050 Johor Bahru, Johor Darul Takzim.
Tel: +607 - 333 8174 Fax: +607 - 224 1923
E-mail: info@jbeea.com.my
Website: www.jbeea.com.my

JBEEA 34th Anniversary Dinner

The Johor Bahru Electrical & Electronics Association (JBEEA) celebrated its 34th anniversary with a grand dinner at Restaurant Daiman Pekin, Johor on 30th June 2012. Some 520 members and guests attended the celebration dinner. It was fun-filling with karaoke contest, dancing and lucky draws.

Meeting with ST

JBEEA Chairman, Mr Leong Kam Meng led a 6-member delegation to meet Suruhanjaya Tenaga (ST) Johor Regional Office on 14th February 2012. The delegation was welcomed by ST Johor Regional Head, Ir Idris Jamaluddin and his officials. The meeting aimed to understand more about ST's competency examination.

Ir Idris informed that effective 1st July 2012, ST will no longer conduct competency exam for Wiremen PW1, PW2, PW3 & PW4 and Chargemen A0 & A1. Instead, candidates will have to sit for the exam at ST's recognised training institutions. However, ST at the moment will continue with the examination for Chargemen A4-1 & A4-2 and B0, B1 & B4 until further notice.

Ir Idris further mentioned that with effect from year 2015 or 2016, ST will also no longer handle the Registration of Contractors except for individual competent persons, i.e., the issuance of 'Terhad' certificates only. Contractors' registration will be done by CIDB.

Electrical Association of Sarawak & Sabah (EASS)

No. 2 A/F, 2nd Foor, Hardin Road, 96000 Sibu, Sarawak.
Tel: +6084-319 949 Fax: +6084-346 114, 325 112
E-mail: sibucci@gmail.com

Academic Excellence Awards & Council Meeting

The Electrical Association of Sarawak & Sabah (EASS) held its 10th Academic Excellence Awards Presentation and 3rd Council Meeting on 30th April 2012. EASS Academic Excellence Awards are presented to members' children who achieved outstanding academic results in government examinations. There were 16 recipients for the awards this year. The awards presentation was held during the EASS Council Meeting. In his welcome address, EASS Chairman, Mr Hii Hua Chuon informed that the association hopes to ease the problem on shortage of technicians by co-organising wiring installer course with other training centres.

Congratulations *– EASS academic excellence awards presentation was held during its Council Meeting on 30th April 2012.*

Delegation to China

The EASS organised a trade delegation to China to visit "The 110th Session of China Import & Export Fair" last October. The 12-member delegation was headed by EASS Chairman, Mr Hii Hua Chuon. Besides visiting the fair, they also visited the Chinese lighting manufacturers. It was a good learning trip to get to know the new technology for energy saving products. LED lighting is commonly used in China. Besides general use as street lighting, LED is widely used in shopping malls, houses, offices and electrical appliances. Mr Hii hopes that EASS can join effort with TEEAM in the near future to promote the use of LED products to reduce carbon emission.

Learning trip to China *– A 12-member delegation from EASS led by its Chairman, Mr Hii Hua Chuon.*

Other State Association Members' contacts:

Malacca Electrical Contractors and Traders Association

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Negeri Sembilan Electrical Engineering Association

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Sarawak Electrical Association

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The realities of AEC 2015 - How is TEEAM Preparing for Its Members?

Random notes by Ir Rocky H T Wong, TEEAM Honorary Fellow and Technical Adviser

Introduction

Come 1st Jan 2015; ASEAN's metamorphosis into the ASEAN Economic Community (AEC) will take place. ASEAN Free Trade Agreement (AFTA) will then make way for the AEC. Malaysia will be an ASEAN member state in a common or an open and free market (and a borderless production base too) serving some 600 million people. Current limitations to Market Access (MA) and Commercial Presence (CP) will be reduced further; from then on, to a level that will be truly "free & borderless". ASEAN will be Malaysia's "domestic" market; and what a market! The same goes to the other nine ASEAN member states. AEC will therefore mean opportunities and challenges; as any competitive market will be.

Regional Coherence

1st Jan 2015 is only a starting date. Liberalisation and harmonisation of the ten ASEAN member states' regulatory regimes to achieving regional coherence, will be accelerated from the current mode of "progressive liberalisation". AEC is modelled after EEC (formed in 1957), which gave rise to the present EU (filtering off the negative aspects for the AEC). It is real and on track, and there will be no backsliding. We must all understand the implications of AEC and take full advantage of the common market and understand the challenges too.

Liberation is NOT deregulation

It is the sovereign right of any nation to regulate; and that applies to all the ten ASEAN member states. This cardinal right is respected in ASEAN. However ASEAN is a rules based economic grouping; underpinned by the ASEAN Charter: meaning that all decisions at the appropriate levels of coordinating committees, AEMs and summit meetings are legally binding. The mood and shared desire among leaders of ASEAN member states are: there shall be regional coherence which can be achieved, among other means, the harmonisation of (standards centric) regulatory regimes. A start has been made in AHEEERR – a derivative of the EEEMRA. More need to be done, but the private sector stakeholders cannot leave matters solely in the hand of officials. We must be proactive in driving things along. After all, AEC, FTAs and MRAs are for trade; and that affects private sector stakeholders such as TEEAM members too.

So what shall TEEAM do to prepare its members for AEC?

- TEEAM shall outreach to its membership, on a sustained effort, to educate them on the realities of the AEC; the opportunities and challenges. TEEAM must play the role of a "game changer"; a great service to members!
- On the back of AFEEC, TEEAM to facilitate the establishment of the ASEAN E2WMRA; and as a complement, to determine the bench-marks of the various service providers - be they electricians/ installers, technicians, and other electrical/ electronic and other mechatronics professionals, para-professionals & other skilled workers. TEEAM must move with the time; now or never.
- Develop ASEAN Codes of Practice (basing on IEC Standards) for the various practices that are normally regulated that can be used to harmonise the various regulatory regimes. Move on from AHEEERR to the next level of integration.
- To move the above initiatives, TEEAM should touch base with MITI, etc.

A request letter has been written to MITI's Secretary-General seeking an appointment to contribute TEEAM's expertise inputs in the E & E services sector to place Malaysia in a favourable position when AEC becomes a reality.

Building Wiring Installer Course

Introduction

The Building Wiring Installer training programme is designed for the construction personnel involved in the low voltage installation of electrical wiring and related electrical equipment. It is also a skill standard developed by the Construction Industry Development Board (CIDB) with participation of industrial experts from the public and private sectors. The 3-month course is sponsored by CIDB subject to prior approval.

Course Content

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3. ***Protective devices***
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4. ***Read and interpret drawings***
   Electrical layout diagram. Schematic diagram. Wiring circuit diagram. Electrical symbols.
5. ***Electrical wiring***
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6. ***Installing electrical equipment and appliances***
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7. ***Use measuring and testing instrument***
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Challenges and Opportunities in Electrical Industry - Part 18

This paper is prepared by Ir Chew Shee Fuee, TEEAM Vice President.

Construction Industry Payment and Adjudication Act (CIPAA) 2012 (Act 746)

The Construction Industry has been plagued with payment issues for a very long time. It is inconceivable that some companies or corporations have no intention of paying the contractors for work completed. They have the upper hand of decision on payments. Disputes will always put the contractors on the losing end. It is also required that work be continued even when a dispute is not resolved. The eventual available avenue for the contractor is to have arbitration. Arbitration proccess is long and costly.

Many countries have acknowledged the neccesity to provide better means of resolving payment disputes. The Adjudication Act will hasten the process of dispute resolution thus ensuring a more equitable platform for the industry as a whole.

The initiative made by CIDB in addressing the payment issues started in 2003 and it has taken many years to finally get it gazzetted this year. Along the way there have been obstacles and resistances by various interested parties. The CIPAA is not able to fully express the wishes of the original team of authors. Compromises had been made and this Act is the result of the many years of discussion. TEEAM has been involved in the early stages of the drafting process. We have tried our best to give inputs on practical experiences on payment issues.

Kuala Lumpur Regional Centre For Arbitration (KLRCA) is responsible for roadshows promoting the CIPAA. They will also provide Adjudication Training Programme.

Please visit KLRCA website http://www.rcakl.org.my/scripts/view-anchor.asp?cat=9

Voltage Dips Affecting Production

Voltage dips or sags pose the greatest concern to factories causing loss of production. Voltage dip is defined as reduction in voltage magnitude for a few cycles up to a few seconds. Industrial equipment will malfunction or shut down during the voltage dips causing massive financial loss. The effect can be very disruptive in the manufacturing process. It is probably the most common PQ problem in Malaysia because of overhead lines exposing to heavy lightning activities. It can be caused by interference due to cable failures in the system. The utility is doing their best to strengthen the system keeping voltage dips to a minimum. To guarantee supply without voltage dips will be a very expensive option.

Equipment sensitive to voltage dips are affected and mitigation measures are available. It is a compatibility issue meaning equipment must be able to withstand some forms of voltage dips without malfunction or shut down. The supply side has to maintain the system without voltage dips outside the defined limits. The definitions of the limits will help the industry to gear towards finding mitigation solutions.

Equipment must be designed with voltage dip immunity. Therefore it is important to note that equipment purchased complied to voltage dip immunity to prevent malfunction and shut down. The immunity level has to be tested so that equipment can survive during voltage dips.

Addressing the voltage dips is an economic issue. The primary part is system improvement preventing the occurrence of voltage dips; secondly mitigation measures deploying interfacing facility between the supply and equipment; and lastly improvement of immunity of equipment. The current difficulty is to define the limits in each of the preceding areas. The semiconductor industry has introduced the SEMI F47 curve which will define the voltage sag immunity level.

The practical approach to solving the voltage sag effects is to have a complete inventory of equipment. Understanding the sensitivity of each equipment to voltage sags is important. Based on the findings, solutions can be used to mitigate effects of voltage sags.

Some of the solutions are listed below:

- Power conditioner (1 single phase conditioner & 3 phase conditioner)
- Isolating transformers to feed specific facility equipment, and
- Battery backups to insure continued computer operation and orderly shutdown.
- Less sensitive voltage relay settings
- Time delay relay

Ir Chew Shee Fuee *B Sc (Hons) (Strathclyde), PEng, CEng, FIEM, MIEE Member, IEEE Member, 1st Grade Electrical Engineer (Competent up to above 500 kV).*

Ir Chew is the Vice President (Engineering Construction and Services) of The Electrical and Electronics Association of Malaysia (TEEAM). He was TEEAM President for 2001 - 2003 and 2003 - 2005. He is the Past President of the Asean Federation of Electrical Engineering Contractors (AFEEC).

Ir Chew is the Managing Director of G H Liew Engineering (1990) Sdn Bhd and QATM Engineering Services Sdn Bhd. He graduated from the University of Strathclyde, Glasgow with a B Sc (Hons) in Electrical & Electronics Engineering. He is a Professional Engineer and is also licensed by Energy Commission as a competent engineer (without voltage limits) and a service engineer to carry out electrical testing up to a voltage of 500 kV.

Ir Chew has more than 30 years experience in electrical control and relay protection. He is also specialised in electrical site tests on power equipment, electrical fault investigation, service and maintenance of electrical switchgear and relays. His work also includes electrical supervision of substations and electrical audit. He presents lectures on electrical apparatus and the protection system. He is at present a WG representative in the development of Green Technology Road Map Phase 1. He is also a member of the National Energy Efficiency Technical Working Group. He is the Immediate Past President of IET Malaysia (Institution of Engineering & Technology) and Board Member of IET's APRB (Asian Pacific Region Board). He can be reached at E-mail: sfchew@ghliew1990.com.

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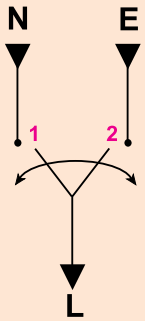
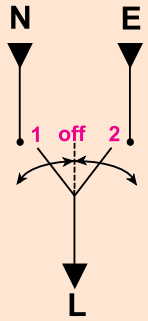
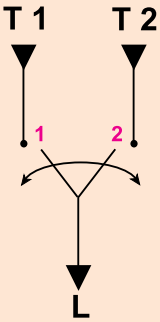
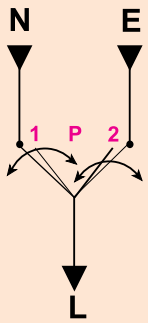
ATS 2 pole, 3 pole, and 4 pole	 Open Transition Without "OFF" position	 Open Transition With or Without "OFF" position	 HIGH SPEED Open Transition With "Sync Check" feature	 Close Transition With "Sync check" feature
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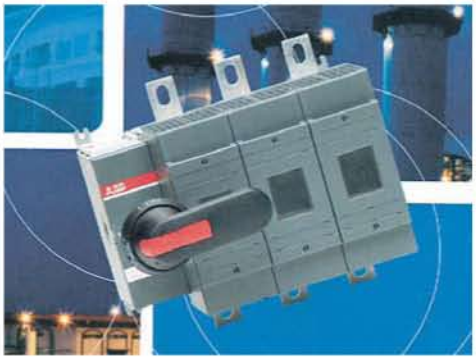

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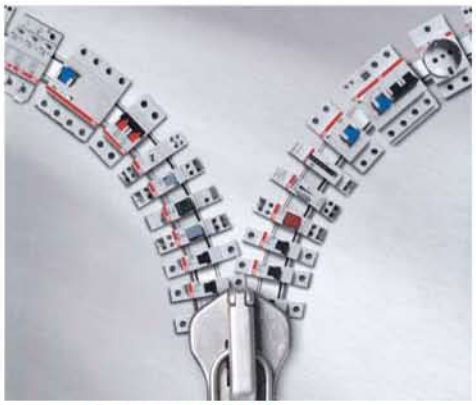

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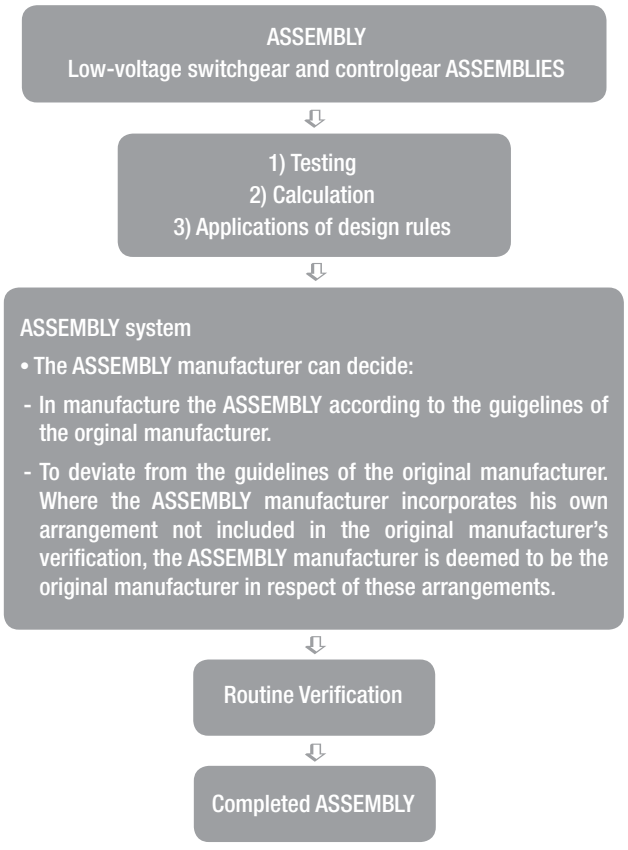
IEC 61439 Low-voltage Switchgear and Controlgear Assemblies

This article is contributed by Mr Willy Wong, TEEAM Safety & Quality Committee Member

The new IEC 61439 is the new replacement of the previous version of IEC 60439. It was introduced in the late 2009 till the beginning of 2010. The initiative was introduced by several countries following dissatisfaction with the IEC 60439 series. The purpose was to harmonise and define all general requirements for low-voltage electrical ASSEMBLIES. The aim of this guide is to allow panel builders, electrical installers, planners or purchasers to familiarise themselves with the new standards and point out the main changes that have been introduced as elements that remain unchanged.

The new IEC 61439 standard applies to enclosures for which the rated voltage is under 1000 V AC (at frequencies not exceeding 1000 Hz) or 1500 V DC. The standard defines the design verified ASSEMBLIES and eliminates completely the categories TTA and PTTA. In order to conform to the standard, type tests have been replaced by design verification which can be carried out by the three following equivalent and alternative methods such as testing, calculation/measurement or application of design rules. Here are the following categories:

1) IEC 61439-1: General Rules
2) IEC 61439-2: Power switchgear and Control ASSEMBLIES
3) IEC 61439-3: Distribution boards
4) IEC 61439-4: ASSEMBLIES for construction sites
5) IEC 61439-5: ASSEMBLIES for power distribution
6) IEC 61439-6: Busbar Trunking



No.	Characteristic to be verified	Clause/Subclause
1	Strength of materials and parts	10.2
	Resistance to corrosion	10.2.2
	Properties of insulating materials	10.2.3
	Thermal stability	10.2.3.1
	Resistance of insulating materials to normal heat	10.2.3.2
	Resistance to abnormal heat and fire due to internal electric effect	10.2.3.3
	Resistance to Ultra-Violet (UV) radiation	10.2.4
	Lifting	10.2.5
	Mechanical impact	10.2.6
	Marking	10.2.7
2	Degree of protection of enclosures	10.3
3	Clearance and creepage distances	10.4
4	Protection against electric shock and integrity of protective circuit. Effective continuity between the exposed conductive parts	10.5
	The ASSEMBLY and the protective circuit	10.5.2
	Effectiveness of the ASSEMBLY for external faults	10.5.3
5	Incorporation of switching devices and components	10.6
6	Internal electrical circuits and connections	10.7
7	Terminals for external Conductors	10.8
8	Dielectric properties	10.9
	Power-frequency withstand voltage	10.9.2
	Impulse withstand voltage	10.9.3
9	Temperature rise	10.10
10	Short-circuit withstand strength	10.11
11	Electromagnetic compatibility (EMC)	10.12 + Annex J
12	Mechanical operation	10.13

"Grey" Area

A number of "grey" areas have been clarified:

- Neutral conductors will have a current rating equal to 50% of the corresponding phases if not otherwise specified.
- Agreements between customer and manufacturer have been more detailed, extended and listed in annex C
- It is mandatory to specify the rated current of the ASSEMBLY
- A technical report IEC 61439-0 "Guide for specifying ASSEMBLIES" is under development for a better understanding of the new standard
- Questions regarding the internal form of separation have been clarified (e.g. a moulded case circuit breaker's casing provides separation from other functional units)

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New Books in Our Library

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Title : ACCCIM Bulletin, February 2012
Publisher : The Associated Chinese Chambers of Commerce and Industry of Malaysia

Title : ACCCIM Bulletin, April 2012
Publisher : The Associated Chinese Chambers of Commerce and Industry of Malaysia

Title : Annual Report of The Chinese Chamber of Commerce & Industry of Kuala Lumpur and Selangor, 2011
Publisher : The Chinese Chamber of Commerce & Industry of Kuala Lumpur and Selangor

Title : EUMCCI Review, April 2012
Publisher : European Union – Malaysia Chamber of Commerce and Industry

Title : Hong Kong Electrical Contractors' Association Newsletter
Publisher: Hong Kong Electrical Contractors' Association

Title : Invest In Ninghai
Publisher : Ninghai Foreign Investment Promotion Bureau

Title : KECA
Publisher : Korea Electrical Contractors Association

Title : Laporan Tahunan PEMUDAH 2011
Publisher : PEMUDAH

Title : Master Builders Journal, Volume 1, 2012
Publisher : Master Builders Association of Malaysia

Title : Master Builders Journal, Volume 2, 2012
Publisher : Master Builders Association of Malaysia

Title : MASSA News, April 2012
Publisher : Malaysia South-South Association

Title : Berita MFPA, March 2012
Publisher : Malaysian Fire Protection Association

Title : List of Members of The Chinese Chamber of Commerce & Industry of Kuala Lumpur and Selangor
Publisher : The Chinese Chamber of Commerce & Industry of Kuala Lumpur and Selangor

Title : Love Beauty Handbook
Publisher : Yuan Zhi Publisher Resources

Title : Malaysia Economic Monitor, April 2012
Publisher : The World Bank

Title : SIRIM Corporate Profile
Publisher : SIRIM Berhad

Title : Standards Malaysia 2011 Annual Report
Publisher : Standards Malaysia

Title : Suara Perunding, Second Quarter 2012
Publisher : Association of Consulting Engineers Malaysia

Title : Tenaga link, Vol 1/12
Publisher : Tenaga Nasional Berhad

Title : The Ingenieur, Dec 2011-Feb 2012
Publisher : Board of Engineers Malaysia

..... Continue IEC 61439 Low-voltage Switchgear and Controlgear Assemblies

Summary Table with the main changes

IEC 60439	IEC 61439
IEC 60439-1 Type-tested and partially type-tested assemblies	IEC 61439-2 Design verified ASSEMBLIES
Mix of different rules and demands in each part	Clear structure: IEC 61439-1 "General rules" IEC 61439-2….. -6 "subsidiary parts" (product standard)
Each part is complete entity and can be used on an individual basis	Each "subsidiary part" is based on the "general rules" (Part 1) and included only the specific additional rules for the specific product
Testing each type of ASSEMBLY: Partially type-tested or type tested	Three alternative methods for verification: Test, calculation/measurement, design rules
ANNEX E: Agreements between customer and manufacturer	ANNEX C: Agreements between customer and manufacturer are more detailed and extended
	Shared responsibility: Original manufacturer Vs. ASSEMBLY manufacturers
	Technical changes and clarification: Diversity factor, verification of temperature rise, mechanical characteristic, neutral conductor 50%, additional verification (from IEC 62208)

Conclusion

The new standard IEC 61439 introduces important modifications in comparison with the current standard IEC 60439 on low-voltage switchgear and controlgear ASSEMBLIES.

The structure of the new standard is clearer with a general part and product specific parts. New definitions have been written (e.g. "original manufacturer" and "ASSEMBLY manufacturer"). New compulsory characteristics have to be specified (e.g. rated current of the ASSEMBLY).

A new "design verified ASSEMBLY" concept has been specified. This new concept completely discards the categories TTA and PTTA, and the compliance of an ASSEMBLY can now not only be verified by means of tests, but also with alternative methods: calculation/ measurement and design rules.

The new standard is more precise, eradicating the "grey" areas contained in the previous standard. The responsibilities for an ASSEMBLY care clearly define, making the job much easier in the electrical markets nowadays.

Mr Willy Wong is the Technical Manager of Windrad Industries Sdn Bhd. He can be contacted at willywintrad@gmail.com

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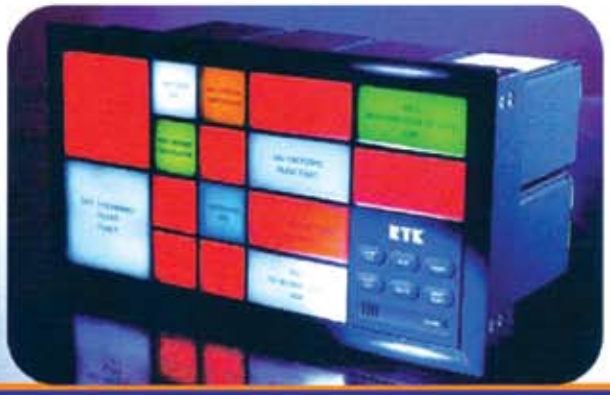

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Mobility of Engineering Services Professionals (ESPs)

by Ir Rocky H T Wong, TEEAM Honorary Fellow & Technical Adviser

This paper was presented at the AFEEC/FAPECA Conference 2012 held in Hong Kong on 4th June 2012, themed "Human Resource Issues in The Electrical Contracting Industry".

Preamble

1. Electrical contracting traditionally had been a skilled or trade based service industry (under "CPC 516" for: "Installation Work" of the WTO CPC 511 to 518 codes); but not necessarily so these days.

2. It is now more and more an integrated engineering, science, technology & innovation (i.e. an ESTI professional) services industry - an integrated professional engineering services industry (under WTO CPC 8673 code).

3. Electricity generation & supply generally are associated with risks and danger, and accordingly regulated. So too is the related electrical contracting industry; involving both certification and licensing.

4. Certification is for the natural person; be he/she a skilled person or a professional, and licensing is for the body corporate (BC) that employs those certified personnel to deliver the contracted services.

5. Here lies the issue and challenge: in advanced and advancing economies such as HK and Malaysia, for example, the electrical contracting industry is experiencing a shortage of certified domestic skilled workers with the traditional pool of potential apprentices shrinking, and there is hardly any fresh-blood for the trade/skills.

6. The imbalance of human resource to meet the Industry's demand is a tangible challenge to the sustainability of the business of electrical contracting.

7. In the context of ASEAN and APEC, each of the economic groupings has, for a primer, a MRA for E&E Equipment - a "do-able" first generation (1-G) MRA; more of a snapshot of status quo wherein all can buy in.

8. The next step is to work out progressively to upgrade & up-scale the next generation MRA's; such as our AFEEC's (2005) proposed E2WMRA i.e. the Electrical Engineering Works Mutual Recognition Arrangement.

9. The coverage of the proposed E2WMRA was meant for professional and trade specific electrical engineering works integration services, such as those related to:

   - electrical (secondary circuit) installations and wiring systems;
   - power and energy generation facilities;
   - transmission & distribution systems;
   - metering and protection & control;
   - testing & commissioning;
   - power turn-on and operation & maintenance;
   - supply & power quality, etc,;
   - all E&E works covered by IEC Standards.

10. The E2WMRA (kept in abeyance) was meant to involve the mobility of ESPs and/or skilled workers; the topic of my presentation that follows.

Synopsis

11. On the conclusion of GATT's Uruguay Round (1994), Trade-in-Services was introduced (for the first time) as a part of WTO's scope and global trade agenda since 1st Jan 1995.

12. Regional Economic Grouping such as ASEAN embarked upon expanding trade in AFTA to also include Trade-in-Services under AFAS.

13. Persevering towards the end goal of ASEAN Vision adopted in 2003 by Bali Concord II - the outcome of 9th ASEAN Summit; Trade-in-Services within the ASEAN Economic Community (AEC) will then be liberalised by 2015 (5 years ahead of 2020: the original target date).

14. ASEAN will then be a borderless production base and a common market catering to more than half a billion ASEAN citizens - what a market!

15. In addition (& a bigger market yet), ASEAN has entered into FTA's with:
   - Japan, Korea & China, i.e. ASEAN + 3;
   - CER, i.e. Australia & New Zealand; and
   - India

16. Result: intra ASEAN together with extra ASEAN trade in an expanded & enlarged economic cluster would in effect take place in a "free market" but competitive & liberalised (NOT unregulated) environment.

17. The Construction Industry (including electrical contracting & vendoring) is the corner stone of a nation's economy.

18. By extrapolation - the same can be said of all member states that make up the AEC and the larger extra ASEAN economic cluster such as APEC member jurisdictions' economies.

19. Engineering Services Professionals (ESPs) and their representative bodies are prime stakeholders in the Construction Industry.

20. ESPs must therefore appreciate that GATS/AFAS, FTAs and subsequent MRAs are agreements/arrangements and measures/disciplines forged and formulated to facilitate/promote free/freer trade.

21. To achieve seamless or free/freer trade:
   - trade officials must engage with stakeholders;
   - stakeholders in turn shall readily respond with sector-specific expertise & expectation in helping to create an "inclusive" environment; and
   - stakeholders are encouraged to adopt a magnanimous approach leading to a win-win situation wherein integrity in the management of business process will be a norm.

22. The topic i.e. Mobility of ESPs deals with:
   - ESTI professional services (together with risk based services provided by skilled workers or artisans) as regulated by specific national Profession (or skills/trade) Regulatory Authorities (PRAs).
   - TBT (i.e. Standards/COP) principles centric domestic regulations being promoted by stakeholders to be aligned to or harmonised with binding measures negotiated & forged at WTO and other WTO+ trade groupings to achieve a preferred NTB free market place.
   - A proposed stakeholders' driven initiative that will enable trade-partner countries to be better integrated into a multilateral system; more so the ASEAN Economic Community (AEC), and in time TPP - the primer of a long awaited APEC FTA? (hopefully in the making).

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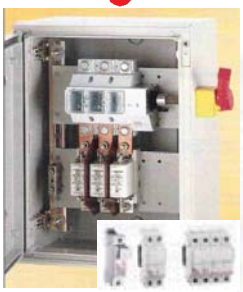


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..... Continue Mobility of Engineering Services Professionals (ESPs)

Mobility of ESPs

23. WTO is underpinned by a constellation of multilateral agreements; among which is General Agreement on Trade in Services (GATS).

24. Tradable services under the ambit of GATS are those as detailed in the WTO/120 list; covering 12 clusters services of >120+ sectors/sub-sectors.

25. WTO member countries are obliged to make "offers" of those services in National Schedules under the obligation of GATS; also used as templates in offers for AFAS and modified versions for TPP.

26. There are more than 120 sectors/sub-sectors of identifiable and trade-able services; and for this presentation three examples are given as follows:
- CPC8672 for Engineering Services;
- CPC8673 for Integrated Engineering Services; and
- CPC511 to CPC518: in sum for Construction & Engineering Services.

27. In the Malaysian context; CPC8672 & CPC8673 come under our National PRA, which is the Board of Engineers, Malaysia (BEM), and CPC511 to 517 (excluding CPC 518) - under the Construction Industry Development Board (CIDB). Both BEM & CIDB are bodies under the MoW.

28. Other WTO listed sectorial services that are delivered by both Integrated Engineering Services and Construction & Engineering Services are:
- environmental services,
- testing & analysis services,
- energy transport services,
- R & D services, etc.

29. This intervention is on the 3 services described earlier in Item 26 - under Malaysian circumstances:
- The delivery of CPC8672 (Engineering Services) is by Engineering Consultancy Practices (ECPs) as provided for under Clause 7A of the Registration of Engineers Act, 1967 (REA'67).
- An ECP's principal is either the Principal Submitting Person (PSP) or a Submitting Person (SP) under provisions of the Uniform Building By-Laws 1984 (UBBL '84), and the Street, Drainage & Building Act, 1974.
- An ECP can be either a sole proprietorship, or a partnership, or a body corporate; otherwise known as a private limited company.
- Whilst Clause 7B of the REA'67 permits the establishment of MDPs, it however does not quite fit the bill of CPC8673: Integrated Engineering Services - the delivery equation of which gives rise to: on the Demand Side there is PMC, and on the Supply Side we have EPCC.

30. Integrated Engineering Services are delivered by engineering teams, and a typical team consists of a few grades of Engineering Services Professionals (ESPs) who are:
- Engineers (bench-marked to WA),
- Engineering Technologists (bench-marked to SA), and
- TAs/Technicians (bench-marked to DA).

31. Though the term "ESP" is the focus of the ASEAN MRA on Engineering Services (but limited to CPC8672 only); the said MRA is another 1-G "doable" MRA, dealing with the mobility of licensed engineers only.

32. ESPs are key to a successful delivery of a promised service - they coach and supervise the other ranks of the "team" to attain specs-centric jobs.

33. The logical next step is to expand the coverage of the existing MRA on Engineering Services to also include CPC8673 and CPC511 to 518; and in so doing, our AFEEC's 2005 E2WMRA may yet be realised – at last?

34. ASEAN: for it to be a community i.e. the AEC, there shall be regulatory coherence dealing with the supply chain in the delivery of ESTI services (these services are by way of example only) herein identified as: CPC8673 – Integrated (ESTI) Engineering Services, together with Construction and Engineering Services involving ALL ESPs.

35. The ASEAN Community in the direction of regulatory coherence calls for the alignment of development of national standards (and for the E&E sector/works based on IEC Standards) to be followed by harmonisation of the regulatory regimes of the 10 member-states; and a start has been made in AHEEERR for "controlled

36. In support of AFEEC's aspiration for the realisation of E2WMRA it shall be the aim of stakeholders to develop aligned Codes of Practice(s) among others, for the following examples;
- electrical installations & wiring systems;
- transmission & distribution practices;
- metering, protection & control schemes;
- testing & commissioning procedures;
- supply quality & power quality issues, etc.

37. For info: TEEAM as a government designated SWO has, for example, developed a COP (now used by our Regulator, the Energy Commission or "ST") to regulate Electrical Installations of Buildings for residential or equivalent electrical installations; based on IEC 60364.

38. To cater to EMC issues and problems associated with "last-mile" ICT installations, we in TEEAM-SWO have since developed two IEC based MS on "Installation & mitigation guidelines: Earthing and cabling"; viz. MSIEC 61000-5-1 & 61000-5-2.

39. Among other WIP standards/COP that TEEAM-SWO is developing - include one cluster of standards on cable lugs that will eventually lead to a MS COP for the installations of cable splices and terminations of both Cu and Al stranded-conductors of 1-c to 4-c (solid dielectric insulated) cables by mechanical crimping methods; ST would consider using the said MS COP to regulate their "cable-jointing" provisions of their Regulations.

40. It is the belief that other AFEEC/FAPECA member-associations are also Standards Writing Organisations (SWOs) in their own countries, or part take in their national standards development process; then there is an opportunity for cross-border information exchange among stakeholders on standards/COP which can result in the development of ASEAN COP.

41. For completeness of information, TEEAM facilitated the formation of the designated national CIE Committee for Malaysia (NCCIE), and by way of a TEEAM driven working committee (i.e. MyCIE): standards on lighting, imaging etc. are being developed in the name of MSCIE.

42. There will be challenges and opportunities awaiting ESPs involved in the delivery (by BC-providers) of ESTI professional (integrated engineering) services plus construction & engineering services; among which is the establishment of a "rules based market-place" wherein standards/COP can be developed; and a certification process worked out that can help in the mobility of ESPs - thus providing a means to address human resource issues.

Summary and Conclusion

43. a) Electrical Engineering Contracting Industry/Trade has been transformed and continues to evolve - in keeping up with technology that requires new skills sets and the application of ESTI professional inputs to achieving the desired/specified outcomes. It is therefore not surprising that the human resource requirements have progressively moved up to an increasing higher bar.

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..... Continue Mobility of Engineering Services Professionals (ESPs)

b) Besides those traditional artisans and skilled tradesmen, the delivery of contracted services now very much depend on the knowledge and skills of ESPs who are engineers, and/or engineering technologists (sometimes known as British incorporated engineers), and/or technical assistants/engineering assistants and technicians - not necessarily only in the electrical engineering discipline, but can be in electronics, or ICT, or E&I/ C&I, or mechtronics, or other engineering/ technology disciplines.

c) These three categories/grades of qualified ESPs each has its own specific and measurable qualification/skills/ attributes which have been framed & based upon international practice benchmark such as the WA, SA, & DA.

44. a) With 14 jurisdictions which are signatories to WA, with more wanting to join those three Accords (viz WA,SA & DA); then there exists a larger international pool of ESPs which can bridge the supply gap - on an out-sourcing basis involving the mobility of ESPs.

b) To provide the necessary legal framework to enable the mobility of ESPs with least/lesser limitation; e.g. within the AEC from 2015, the present ASEAN MRA on Engineering Services (CPC8672 only) shall be expanded in scope & coverage to also include Integrated Engineering Services (CPC8673). Better still, AFAS takes on board our AFEEC's E2WMRA; a stakeholders' initiative - to be given another push.

45. a) The proposed E2WMRA (originated since 2005) shall deal with the seamless (or free) mobility of qualified ESPs who have been duly certified by National PRAs for electrical safety competency: in ASEAN member states & other extra ASEAN trading partner jurisdictions. Besides ESPs, the E2WMRA shall include artisans and skilled tradesmen such as wiremen, linesmen, jointers, testers, and others involved in the trade.

46. a) The equivalent of skills sets & levels of competency for artisans and skilled tradesmen can best be gauged when there are in place trade-based Codes of Practices for electrical erections & installations of various types universally adopted by all ASEAN member states.

b) Pan ASEAN standards & COP developed by ASEAN stakeholders: not only will they contribute to AEC regulatory coherence, they can also form the base line & datum levels to determine the levels of skills set and the right/acceptable (duly certified) competence.

47. a) Addressing this Year's Theme; the challenge confronting this Assembly is to propose and resolve once again that the ASEAN Economic Ministers' Meeting/ ASEAN Summit consider our proposal of E2WMRA be taken on board by AFAS Coordinating Committee to support the need for an expanded scope/coverage of ASEAN MRA on Engineering Services to also include Integrated Engineering Services (CPC8673), and Construction & Engineering Services (CPC 511 to CPC 518): vis-à-vis the mobility of ESPs & artisans/skilled tradesmen in the AEC; starting Year 2015.

48. a) In support of AEC/APEC regulatory coherence, we stakeholders - members of AFEEC/FAPECA - shall endeavour to develop regional standards or Codes of Practice that would, firstly, provide the means to prime ASEAN Directives; and later, work concertedly towards harmonising the regulatory regimes.

GET WHAT WE DESERVE - WORK FOR IT!

Acronyms

AEC: ASEAN Economic Community.
AFAS: ASEAN Framework Agreement on Services.
AFEEC: ASEAN Federation of Electrical Engineering Contractors.
AFTA: ASEAN Free Trade Area.
AHEEERR: ASEAN Harmonised Electrical & Electronic Equipment Regulatory Regime.
APEC: Asia Pacific Economic Cooperation.
ASEAN: Association of South East Asian Nations.
BC: Body Corporate.
BEM: Board of Engineers, Malaysia.
C&I: Control & Instrumentation.
CER: Closer Economic Region.
CIDB: Construction Industry Development Board.
CIE: (French acronym for) International Commission of Illumination.
COP: Code of Practice.
CPC: Central Product Classification.
DA: Dublin Accord.
E&E: Electrical and Electronic.
E&I: Electrical & Instrumentation.
ECP: Engineering Consultancy Practice.
EMC: Electro-magnetic Compatibility.
EPCC: Engineering, Procurement, and Construction & Commissioning.
ESPs: Engineering Services Professionals.
ESTI: Engineering, Science, Technology & Innovation.
FAPECA: Federation of Asia Pacific Electrical Contractors Associations.
FTA: Free Trade Area.
GATS: General Agreement on Trade in Services.
GATT: General Agreement in Trade & Tariff.
ICT: Information & Communication Technology.
IEC: International Electro-technical Commission.
MDP: Multi Disciplinary Practice.
MoW: Ministry of Works.
MRA: Mutual Recognition Arrangement.
MS: Malaysian Standard.
NTB: Non Technical Barriers to trade.
PMC: Project Management Consultant.
PRA: Profession Regulatory Authority.
PSP: Principal Submitting Person.
REA: Registration of Engineers Act.
SA: Sydney Accord.
SP: Submitting Person.
SWO: Standards Writing Organisation.
TA: Technical Assistant.
TBT: Technical Barriers to Trade.
TEEAM: The Electrical & Electronic Association of Malaysia.
TPP: Trans Pacific Partnership.

Ir Rocky H T Wong, FIEM, P Eng.

Ir Rocky H T Wong graduated as an Electrical Engineer in the mid-60's from the University of Malaya and served the Malaysian Power Authority for some 16 years before resigning to join the private sector as an engineering consultant in early '80s - centering around energy, environment, power, process & plant engineering. He is a BEM registered Professional Engineer (P Eng).

In the private sector, Ir Wong has had been active in serving the engineering profession; such as Past Chairman of ACEM, Past Chairman of MABCON, Past President the Federation of ASEAN Consulting Engineers, Past Chairman of the Asia-Pacific grouping of FIDIC; etc. Ir Wong continues to be a resource person in out reaches to young engineers for C&C building. Ir Rocky H T Wong is a Fellow of the IEM, and Honorary FAFEO-ASEAN Engineer and Honorary Fellow (TEEAM); besides other professional memberships. He is the Technical Adviser of TEEAM – an honorary position for close to 30 years.

He can be contacted at rocky.wong1940@gmail.com

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Understanding LEDs

1. Introduction

Over the past few years a new light source – light emitting diodes, or LEDs – has been introduced into the exterior lighting market. LED luminaires are now able to deliver appropriate lighting to achieve the lower levels of both the BS5489 ME and the S classes.

It is envisaged that within a relatively short period LED luminaires will be available to achieve the requirements of all classes.

The LED luminaires have come from established lantern suppliers who understand the intricate requirements of the UK local authorities, and also from a number of new companies with a background based more on electronics.

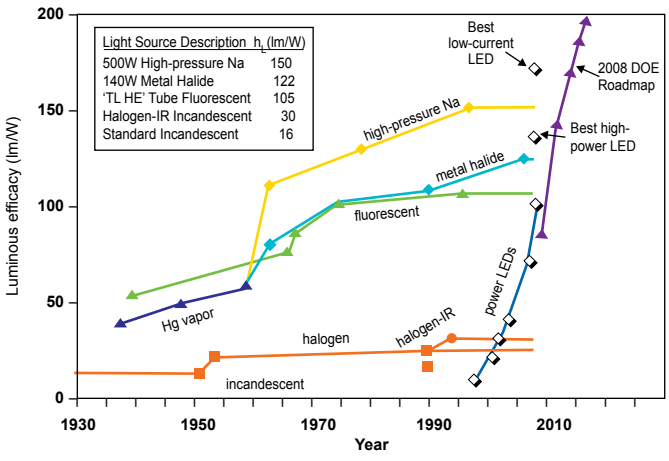
This new light source has introduced new terms and uncertainties to the lighting designer/engineers which are making comparisons difficult between competing LED manufacturers and traditional HID lantern performances.

This report does not prescribe a definitive approach but its intent is to assist the lighting fraternity to understand the new technology and to help in a decision-making process when looking for quality products. LEDs promise the benefits of long life, low energy, minimal maintenance and flexible lighting output – this report helps ensure these benefits are realised.

LED lamp

2.General

LEDs were developed in the electronics industry when it was discovered that light is produced when a current is passed through a diode. This technology has seen rapid development in the recent past. A graph of the efficiency of various light sources from 1930 to the present day is shown below.



Efficiency in lumens per watt of different light sources from 1930 to the present day

If the trend continues then we may be seeing LEDs capable of producing 170 lumens per watt or more in the short term. This could shortly exceed the performance of all HID lamps and could establish LEDs as the premier light source for efficiency.

However, the intense light produced from a tiny source can be discomforting and can potentially cause disability glare. The LED as a light source is being addressed by European standards regarding laser light.

Therefore if the light output continues to increase, appropriate control of the light will be essential to avoid glare on the highway, or at worst damage to the retina if an individual inadvertently stares at the source for too long.

To achieve white light, either a combination of red, green and blue LEDs is used or a phosphor coating (approximately 21 microns) is applied to a blue LED to convert some of its light output to as many of the remaining visible colours as possible. The resulting 'white' light is, usually, almost all in the visible spectrum with little ultra violet (UV) or infra red (IR) elements. Its colour rendering ability will depend on how closely the spectral distribution matches the human eye. It should be noted that even with a high colour rendering index (CRI 60–90) the visible differences with a conventional white light sources may be considerable due to the way in which CRI is determined. However, if the CRI is above 60, it can be used for subsidiary road lighting to one class lower than if the lamp CRI is less than 60, according to BS5489-1:2003. It should be noted that a white LED's colour may shift throughout its life because of the effects of both operating temperature and natural ageing.

Currently the most efficient white LEDs are operating at around 5000–6000K, which in northern European climates is often deemed as a cold light. Lantern manufacturers are looking at warming the light through a variety of means to make it more attractive in these climates.

LED failures

Defining a failed lantern is not straightforward compared to an HID source. LEDs should be capable of a very reliable long life if produced from high quality components. However the initial supply of some residential decorative LEDs has shown that the initial light output can drop quickly and the unit can require replacing after a short period.

Light output

The binning (categorising) of the LEDs is a critical point. This affects the relative outputs as well as the colour temperatures.

Most LED manufacturers will provide lumen depreciation curves similar to HID curves for their LED range. This tends to show a lumen depreciation to say 80% or 70% over a period. The graph is often logarithmic-based and is reliant on the LED junction operating temperature and the current driven through the LED. These graphs are projections based on existing knowledge and modelling to predict effective life. Given that these projections tend to lose accuracy the longer the predicted life, claims of significantly more than 60,000 hours need to be supported with manufacturers' data for the specific luminaire.

However, the public lighting engineer is using the LED as a tool to provide a lighting design/output and it is feasible that a percentage of LEDs in a lantern could fail prematurely. This may leave a high percentage that are still operating, but the lighting distribution may be adversely affected, so although the lighting appears to be fully operational it is performing below the designed level. However, for the lighting engineer, a failure is when the required lighting level falls below the design criteria and thus taking lighting measurements is the only way of ensuring the LEDs are delivering the lighting required, even though this poses practical problems.

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..... Continue Understanding LEDs

LED driver/ballast

The electronic driver can potentially be the most vulnerable part of an LED luminaire and servicing must be a consideration. Whether it is integral, remote or sealed for life depends on the luminaire manufacturers' philosophy and approach to the drivers. However, as with LEDs, it is down to the quality of the design, components and manufacturing. For example, military standard equipment can withstand intense shocks and variations in temperature and provide long life. However the costs are high and a compromise is often delivered. It is the level of compromise that will affect the unit's potential life.

3. LED performance

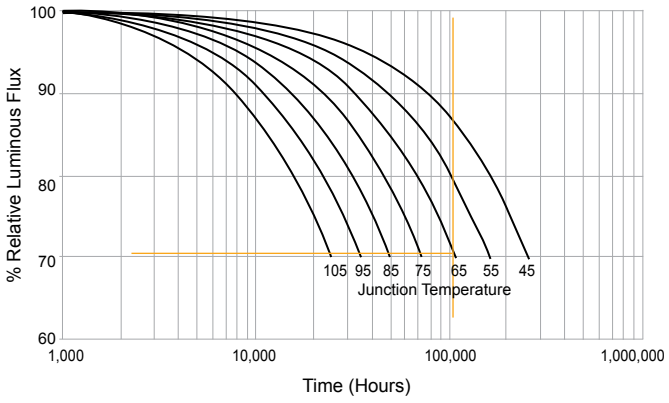
Manufacturers are continually improving the performance of LEDs. The improved light output from LEDs is not just down to developing the unit itself to squeeze more output from it (although there is an element of that); the enhanced performance often occurs in incremental steps where a new approach has been found to make substantial improvements (for example, removing the skin for the LED junction from its back which lets out more light.)

Therefore this report does not identify particular values that should be achieved now as they may become meaningless as development moves forward.

This report identifies key aspects of LED performance which the manufacturer should supply and the buyer should ask to have demonstrated or identified in the technical literature.

The LED manufacturer should provide data on the optimum operating conditions for each LED with a window that will allow variation of operation.

The LED operating temperature is critical to light output and lifetime; the junction and board temperature should be at as low a temperature as possible to prolong life.

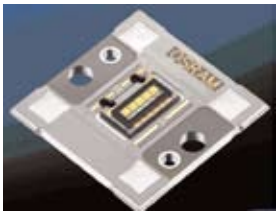


Typical life of LED with differing junction temperatures (degrees centigrade) over time (hours)

The light emitted by LEDs is fundamentally within the visible spectrum with negligible amounts within the UV or IR range. Therefore LEDs have a lower environmental impact than other light sources, particularly those that have a UV content as this tends to attract flying insects that then attract bats.

The LED drive current is provided by the LED driver (see section 5, Driver performance) and this will drive a known current through the LED. Working to the manufacturers' preferred optimum values will see the LED provide the lumen output with given life.
However, as LEDs are solid state units they are capable of being both under-run – i.e. the current is reduced, reducing the light output and extending its life, or they can be overrun, which will increase the light output but reduce the LED life.

4. Luminaire performance



Typical mounted LED chip

The luminaire needs to enable the lighting engineer to provide the required lighting levels and standards efficiently. The luminaire also needs to control the light from the LEDs and deliver it in an efficient manner without causing glare or light trespass.

However some LED fittings tend to cut light off very sharply which may not be good for residential areas and gives very poor vertical or semi-cylindrical illuminance – see BS5489: Part 3:1992 Section 3.2 paragraph 2. This aspect of lighting is still important, despite the fact that it is no longer mentioned in the current ILE standard. The k-curves will tell the designer what he needs to know about wasted light.

LED luminaires are available with either direct or indirect lighting projection. Within these two types are too many variations to comment on in detail, but the broad advantages and disadvantages of either system are listed below.

Direct advantages
More accurate optical control
Greater efficiency possible with some designs
Flexibility of design

Direct disadvantages
Difficult to control glare
Potentially poor uniformity
Failure conditions very noticeable
often large luminaire footprint

Indirect advantages
Better glare control
Better uniformity
Compact design possible

Indirect disadvantages
Optical control dependent on reflectors
Slightly lower system efficiency

Lumen depreciation and maintenance factors

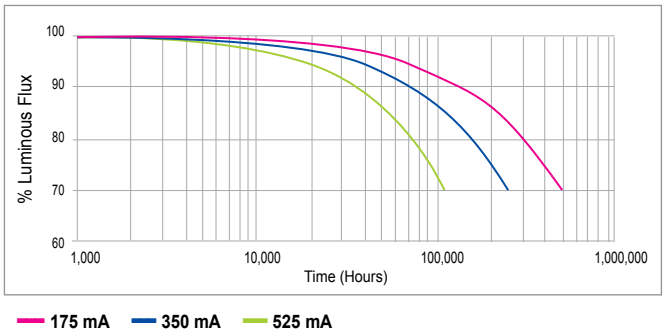
The UK lighting industry has agreed to quote L80 as the normal depreciation figure to be used on all LED luminaires.

With HID lamps and their established lumen depreciation and life graphs, combined with the luminaire's maintenance factor (MF), an overall MF that can be used in lighting calculations can be obtained. With a 3–5 year life for HID lamps it is acceptable methodology to over-light the subject for a number of years before changing the lamp to ensure the design levels are constantly being achieved. As LED luminaires are likely to have a substantially longer life than HID lamps this traditional approach may not be appropriate, and particularly with the focus on energy reduction, over-lighting for 25 years may seem excessive.

Constant output drivers providing a constant light output are available that will manage the light output throughout the luminaire's life. An MF approaching 100% could therefore be considered.

Alternatively, lighting designers will need to make some engineering judgement to provide a practicable solution.

Photometry from the lantern manufacturers may vary as a unified approach to measurements has yet to be agreed upon.



Graph showing typical lumen depreciation with drive current and time

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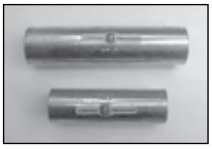
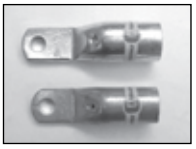
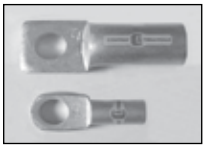


Cable Link
(MS 1779:2005)



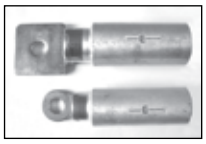
Cable Link
(MS 1779:2005)

MV Cable Lug &
Link (Up To 33KV)

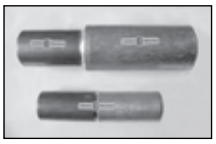


Aluminium Lug

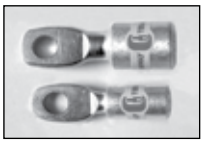
2-Hole & Long
Barrel Lug



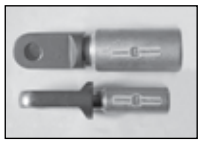
Bimetal Lug
(IEC 1238-1)



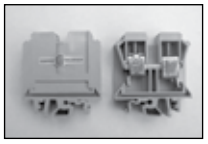
Bimetal Link



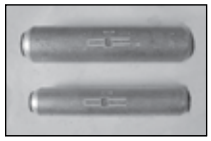
Mccb Bimetal Lug
(For MCCB)



STP
Bimetal Lug

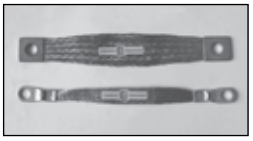


Terminal Block



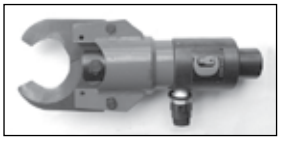
Aluminium
Ferrule

'C' Clamp

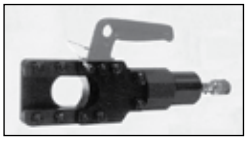


Flexible Braid

Outdoor Cable Lug
(Solder Sealed)

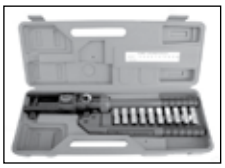


CC-630 Cable Cutter
(Non-Armoured)

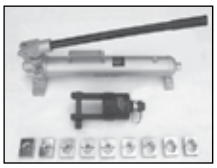


S-100H
Cable Cutter

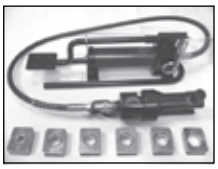
CP-120
Crimping Tool



CP-240
Crimping Tool



CP-400
Crimping Tool



CP-630
Crimping Tool

HC-115
Hole Cutter

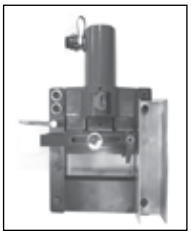
Hand Crimping Tool

Hand Cable Cutter

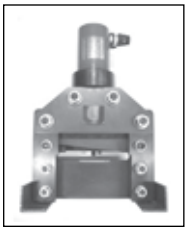
CH-240
Indent Tool

CH-630
Indent Tool

CP-1000
Crimping Head



BB-150
Bar Bender



BC-150
Bar Cutter

CH-60
Hole Puncher

PM-1000
Electric Pump

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..... Continue Understanding LEDs

5. Driver performance

LED drivers perform a similar function to the electronic ballasts used with HID lamps, and many of the same criteria apply.

General

There are many LED drivers available on the market - constant current, constant voltage, DALI addressable, 0-10v dimmable and even drivers that can dim LEDs using a domestic dimming potentiometer - so the correct type should be chosen for the given application. LEDs are often chosen and used on their merits of efficiency, but the efficiency of the driver is often overlooked, and this is where efficiency can be lost. Some drivers have an efficiency as low as 50%. A high efficiency design ensures cool operation and longer service life.

Operating temperature

If an LED driver is used within its temperature and voltage rating, unreliability should not be a problem. As with any electronic component, reduced running temperature should ensure increased expected lifetime of a driver. A reduction in temperature of 10 degrees, according to Arrhenius' law, may double the lifetime of a driver. Drivers will normally be marked with a maximum case temperature, Tc, which should not be exceeded when the lantern is subjected to the maximum ambient temperature specified by the lantern manufacture standard. For most of the driver's lifetime, its temperature will be well below this value.

Constant output

The LED's light output is determined by the applied current. LEDs need to be driven at constant current as the LED light output and power consumption varies less with small changes in current than for small changes in voltage. A constant voltage will, even within the same LED type, result in significantly different light output. Hence an LED driver system consists of two stages: a power supply, converting the alternating mains current to a direct current, and a current control unit, providing a constant current.

LED drivers are available that will self-monitor the LEDs and be able to drive the light output consistently through its lifetime, avoiding the lumen depreciation through the LED life.

Placement

Usually, the LED driver should be placed close to the LEDs where possible in order to reduce electromagnetic interference. Adequate heat management should be used to ensure that both the driver and the LEDs run as close as possible to their optimum temperatures.

Failure

The life of drivers is determined by the life of each individual component, the power and temperature. The LED driver should be chosen to have a lifetime compatible with that of the LEDs. As with any similar component, the quality of the components is important to the life of the driver. Each component has its own rated life and this should be taken into consideration. Often the limiting components are electrolytic capacitors, which become dry during their lifetime. Since they dry even without being operated at high temperatures during daytime, even though they may be running at well below Tc for much of their life, the prediction of a lifetime in service is extremely difficult.

The typical quoted lifetime of a driver is often taken as the point where 10% of the LEDs have failed. It may be that the life of the driver is appreciably less than the expected lifetime of the LEDs, requiring replacement within the LED's life. Hence drivers should be easily accessible.

6. Five key questions to ask:

Factors influencing the suitability of an LED luminaire for outdoor use:

Q1. Average life expectancy of the LED

Q1a. What is the hot and cold junction or board temperature of the LED?

The temperature will have a direct bearing on the life of the LED. The cooler the board/junction temperature the longer life the product will most probably have. The supplier should advise what the temperature is when tested in the lab (cold) and also when tested live (hot). It is usual for laboratories to test LEDs at an ambient temperature of 25°C. There are moves to drop this to 15°C for street lighting lanterns to better reflect the working temperatures of lanterns in northern Europe.

Q1b. What forward current are the LEDs being driven?

The life expectancy is usually given as the life to give a certain percentage of the flux compared to a new LED, L80 – the life to 80% flux – being typical. Long quoted life may be simply the life to a lower flux output (e.g. L50). A standard test method for the measurement of lumen maintenance of LEDs is IESNA LM80 and is commonly used by the major LED manufacturers. Fixture manufacturers should be able to substantiate lifetime claims through determining the LED 'junction temperature' at the highest design ambient temperature that the fixture is suitable for. The operating current for the LED relating to its operating temperature will provide information on the light output and projected life.

Q2. What test conditions are the photometry based on?

The output of LEDs is dependent on temperature and therefore it is important to know the conditions on which the output is based. Unrealistically low test temperatures in the laboratory will yield a higher output than is achievable in practice and the fixture may therefore not deliver what is expected.

Q3. Average life expectancy of installed driver

The driver life should be rated and tested in a similar manner to HID ballasts. The life of a driver may have an impact on the life of the lantern, i.e. it may be the part with the shortest life. As a general rule the cooler the driver and its components are running the longer and more trouble free it is likely to be.

Q4. Total circuit/system watts

It is important to understand the real electrical load and whether the lantern has an UMSUG rating.

Q5. Colour appearance and rendering

Q5a. What colour temperatures are the LEDs working at?

The most current efficient LEDs are cooler in appearance (5000–6000K) but may not be perceived as warm enough in the UK and other northern European countries.

Q5b. Do they maintain a stable colour over the entire rated lifetime? How do you know?

Colour stability is a common problem in lower quality LED fixtures. It can be a result of poor LED selection, poor thermal management, or both. LEDs should be appropriate for the application (lighting-class LEDs, not 5mm lamps designed for toys and novelties, for example), and the lantern design should have a good thermal management capacity for the worst-case expected operating environment. Colour shift is measured through Macadam Ellipses and the fewer steps the LED is rated at (for example, 2 Macadam Ellipses) the less variation is likely through life.

Panel
Nigel Parry – ILE
Nigel Townsend – Urbis Lighting
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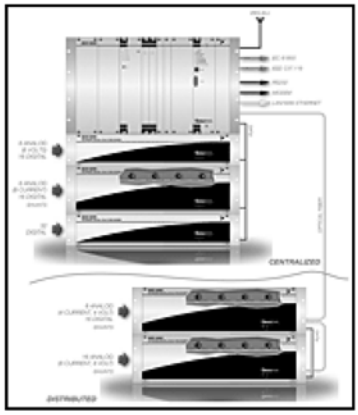

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