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General Overview of Sensors and Selection Methods

This article is contributed by Mr Muhammad Izzuddin Abdul Latif, Hager Engineering (M) Sdn Bhd

The plethora of energy saving products in the market is indeed a positive indicator for growing awareness for green initiatives. One of such products which are commonly sought after is the sensor, which is used not just for reducing energy consumption but also for enhanced user experience.

The instance of lights turning ON when entering a room, for example, has a sleek modern impression on any user. But the opposite will be felt by a saddened premise owner, when suddenly the sensor fails to work.... You can imagine the annoyance one might have when a sensor needs to be triggered constantly during a meeting, or even in a bathroom!

The fact is, there are considerations that are sometimes overlooked by the installers when selecting and installing a sensor. One approach that might contribute to a better selection and installation of a sensor is by narrowing your choices by asking the following questions:

1. What type of movement usually occurs in the location that should trigger the sensor CONSTANTLY?

If you're looking to install a sensor at a passageway or a corridor, this transit area is commonly associated with walking movement (which is a relatively large movement). This might differ from a classroom or a living room where the movement would be smaller such as hand gestures, head scratching, nodding, etc.

The smaller the 'targeted' movement, the more sensitive the sensor should be. Examples of sensitive sensors are presence/occupancy sensors, while motion/circulation sensors are categorized as less sensitive.

Less sensitive sensor are not used for areas with small movements, since it will hardly detect your presence and you will probably end up having a meeting in the dark.

2. The dimension of the area?

Each sensor will have a different coverage area. Match the area you wish to cover with the sensor's coverage. You might want to identify where the sensor will be installed. If it's a ceiling mounted type, the height of the ceiling should be taken into account. This differs with wall mounted sensors, as you

have a little more flexibility in determining the height of the installation.

Or if necessary, with some wiring configuration, you also have the option to install more than one sensor in parallel to increase the coverage.

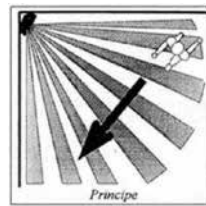
3. Outdoor or indoor?

The Ingress protection rating of the sensor helps to deal with this. A rating higher than IP40 is compatible for outdoor usage.

4. The angle coverage of the sensor?

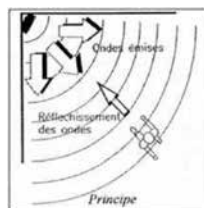
Depending on the technology of the sensor, the angle of placement is an important factor.

Passive infrared (PIR) sensor which incorporates passive technology (which means that it is not radiating energy for detection) will log in detection when there is a difference in temperature across at least two areas or rays of its lens coverage.



Following these criteria, the optimal placement of the sensor is to have the targeted movement set transversely to the axis of the sensor.

You will have less to worry about technologies used by certain sensors such as the hyper frequency sensor. Unlike PIR sensors, it implements active technology as signals will be emitted 360 degrees and the echo would be measured to define a movement occurrence, which is indeed more flexible in terms of angle placement.



5. Is there any interference with the detection system?

For sensors which utilize 'temperature difference' as key detection method (such as PIR sensors), disturbance can be caused by fans, heaters and hot or cool air flows. Thus, sources of these disturbances must not be placed near enough to compensate the detection efficiency (not to install near the HVAC system). In the case of lights, for

instance, most sensors are advisable to have a minimal 1m distance.

Unlike the hyper frequency sensor, obstacles such as thin walls can shunt detection for PIR sensors. But depending on the usage objective, this can be an advantage to avoid false detection.

It's worthwhile to mention that the hyper frequency sensor which can generally penetrate thin walls, glass and wood, is also totally independent of the ambient temperature.

6. Is the sensor too sensitive?

Yes, a high sensitivity sensor can at certain setting, become a disadvantage! You don't want to have a false detection and have your meeting room lights switch ON and OFF without obvious reason. For example, using a hyper frequency sensor in a room which has thin walls can create this situation and possible rumours of haunted stories in your office!

7. Does the area need artificial lights EVERYTIME when people are around?

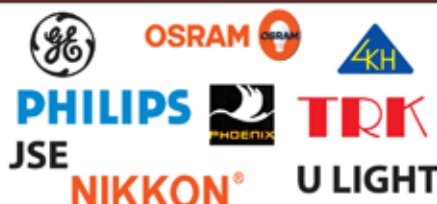
It is common for sensors to be equipped with lux detection. Depending on the product design, this technology acts as a double confirmation (after movement detection) based on light intensity around the area. This implies that if the room is already bright enough with daylight, there is no need for lights to be turned ON although movement is detected. The lux sensor eliminates redundancy of energy usage by checking the luminosity of the area as well. This feature would be irrelevant of course, if the respective room is always dark.

Between the types of sensors, there are differences in how the lux function operates: The lux function in a motion/circulation sensor will only confirm the daylight level when lights are in the OFF condition. If the level is low, the sensor will initiate turning ON the lights upon significant motion detection. It will then stop sensing the room's daylight level and waits until lights are turned back OFF (depending on your time delay setting), before it starts sensing again.

On the other hand, lux function in a presence/occupancy sensor will confirm the daylight level even when lights are already turned ON

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		Title : WETEX 2015 Publisher: Dubai Electricity & Water Authority



..... Continue General Overview of Sensors and Selection Methods

and will turn OFF the lights when daylight in the room is bright enough (defined by your lux setting) and according to your time delay setting.

8. What is the trend of time delay period between movements?

The delay period between each sensor models might be different, although they are usually adjustable. Some might have 3 mins to 15 mins, while some can range from 1 min to 1 hour. If the time delay is not appropriately available or set, there is a tendency for the ON-OFF switching cycle to increase more than it should. This redundant switching ON and OFF may affect the light's lifetime due to unnecessary cycle of switching/inrush current.

One such example is when putting a sensor in a workstation where there are predetermined instances where a worker will leave the workstation, only to come back within a few minutes. If the time delay is set shorter than these repeatedly short 'leaving' periods, then the lights will have redundant cycles of light switching ON/OFF. Overlooked by the eagerness for energy saving, this might cost some compensation due to the shortened lifetime of the lights.

As technology is constantly developing, specifications and parameters for sensors will also evolve and change. Although there are general tips to serve as guidelines, a particular product might have unique characteristics that should be taken into

special account. Thus, never hesitate to contact your supplier for expertise and further guidelines prior to selecting and installing your sensor!

Muhammad Izzuddin Abdul Latif sees himself as an explorer in the world of engineering.

He is passionate about the idea of simplicity, inspired by a famous remark made by Albert Einstein: "Everything should be made as simple as possible, but not simpler."

Graduated in Electronics & Electrical Engineering from University of Strathclyde (UK), he was with Sony as a Senior Engineer before joining the marketing team in Hager Engineering (M) Sdn Bhd. He can be contacted at izzuddin.latif@hager.my.





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ASEAN SME Showcase & Conference 2015

As Malaysia welcomes its Chairmanship of ASEAN, SME Corporation Malaysia organised the inaugural ASEAN SME Showcase and Conference 2015 (ASSC 2015) from 26th to 28th May 2015 at the Kuala Lumpur Convention Centre. The event was an interactive platform for local and regional SMEs to showcase their products, services and technologies for the global market and seize global networking opportunities. Themed “One Business, One Community”, ASSC 2015 aimed at providing ASEAN SME Community with vast trading and networking opportunities beyond borders.

The 3-day event drew more than 10,000 trade visitors with over 500 exhibitors

including international pavilions consisting MNCs, government bodies and agencies from Malaysia, other ASEAN Member States, United States, United Kingdom, China, Japan, Korea and Sweden. TEEAM took part in the showcase along with some members to tap business opportunities.

Business matching sessions which established linkage between SMEs in Malaysia and ASEAN Member States were successfully organised to forge strategic partnerships and to enhance product knowledge and gather market information.

The 2-day conference featured prominent speakers covering key topics such

as “SMEs as an Economic Power in ASEAN”, “Empowering SMEs through Technology”, “Youth Entrepreneurs – the Future of ASEAN”, “Innovative and Inclusive Financing for SMEs”, “From Risk to Rich: The Brands that Made it” and “Innovation Gap in ASEAN: Cashing in on Ideas”.

Overall it was a good platform for networking and forging business ventures. The event served as a gathering of SME entrepreneurs, policy makers, industry experts, practitioners and others from the business community in ASEAN to share insights and deliberate on pertinent issues towards harnessing the benefit of ASEAN Economic Community (AEC).



Official launch – ASEAN SME Showcase & Conference 2015



Business Matching – Buyers-sellers meetings



High profile – Heads of Delegations from ASEAN Member States at the opening.



Showcase – Officials at TEEAM's booth.



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WETEX 2015 Dubai

WETEX 2015, the 17th Water, Energy, Technology and Environment Exhibition, was organized by the Dubai Electricity and Water Authority (DEWA). Held from 21st to 23rd April 2015 at the Dubai International Convention & Exhibition Centre, it showcased the latest technologies and solutions in water, energy, environment, sustainability, oil and gas and other related sectors.

WETEX 2015 was the largest event of its kind in the region, attracted some 1,696 exhibitors from 46 countries. It served as a key hub for experts and specialists from diverse sectors such as energy, water and environment conservation and green buildings to converge with a common goal for a greener future. National and regional pavilions in WETEX this year included Saudi Arabia, the USA, China, Italy, France, Korea, India, Malaysia, Taiwan, Spain, Turkey, Iran,

Romania, Europe, and the general pavilion which hosted a large number of companies from the UAE and abroad.

WETEX 2015 was officiated by H E Saeed Mohammad Al Tayer, Managing Director & CEO of DEWA, and Founder & Chairman of WETEX. During the event, a series of seminars were hosted for visitors on topics such as new technologies, advances in research, regulatory information, and development in the water, energy and the environment. TEEAM together with Utama Cables, AM SGB and Well Prestige participated as exhibitors. Products on display included power cables, fuse links, fuse disconnectors and transformers.

WETEX 2015 was hosted during the Green Week, in conjunction with the World Green Economy Summit to further strengthen Dubai's position as a global hub for sustainability and green economy. It raised

awareness and encouraged a culture of environmental sustainability, and is a part of DEWA's drive to promote conservation in Dubai to encourage its consumers to use electricity and water as efficiently as possible.

It was a good exposure for TEEAM and the Malaysian exhibitors. WETEX 2016 will be held in September next year.



Networking – (left) Organiser, Mr Sanjay Nepali from DEWA visited TEEAM's booth.



VIP guest - Mr Suresh Kumar Gorasia (International Affairs Chairman & Past President) attending to an Arab visitor at TEEAM booth.



VIPs – Dignitaries touring the exhibition.

Exhibitors at WETEX 2015 Dubai



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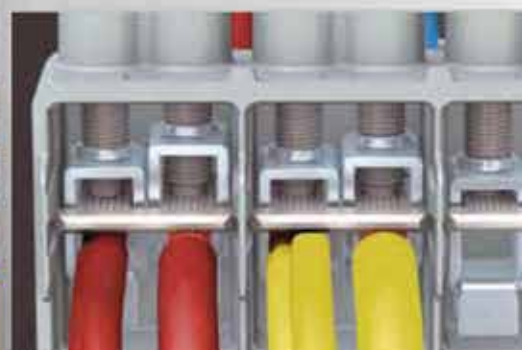


Innovative terminal technology

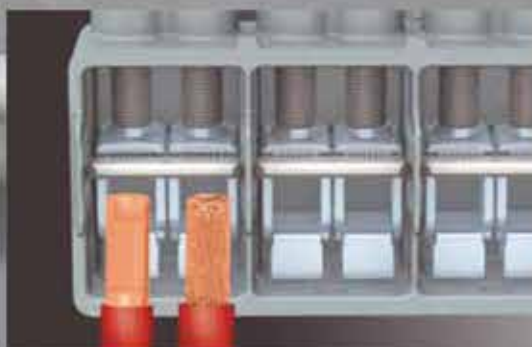
All screw-type terminals prevent damage of conductors and provide 2 clamping units per pole



Terminals prevent damage of conductors, also for flexible conductors without ferrule



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Nepcon Thailand 2015

Nepcon Thailand 2015 was a 4-day event focused on assembly, measurement and testing technologies for the electrical and electronics (E&E) manufacturing industry. This 15th edition of the event organised by Reed Tradex was held from 24th June to 27th June 2015 at the Bangkok International Trade & Exhibition Centre (BITEC) in Bangkok, Thailand.

More than 360 brands of technology providers from 23 countries came together

to empower the manufacturing capacity of the Thai E&E industry. Every profile from upstream to downstream was gathered under one roof for over 10,000 quality visitors to source for new technologies and suppliers.



Colourful – VIPs officiating the opening.



TEEAM Officials – (from left) Ir Kok Yen Kwan, Mr How Chee Seng and Mr Charles Lee.

Concurrent activities held in conjunction with the show included an international E&E conference & networking which provided a unique platform for industrialists and business professionals to discuss and debate the latest challenges and opportunities in the field of E&E. Business inducing activity such as factory visits and Nepcon Sourcing were organised. Nepcon Sourcing fulfils business partners looking for subcontractors, as well as distributors of machines, equipment and technology for the manufacturing of electronic parts that

match their requirements. Factory visits to electronic component manufacturers were also arranged for products and technology knowledge enhancement.

TEEAM was invited to visit the exhibition and delegates took the opportunity to have business meetings with the suppliers. Overall it was a fruitful trade visit.

Next year's Nepcon Thailand is scheduled for 22nd to 25th June 2016 at BITEC Thailand.



Strong support – TEEAM's delegation.



At Omron – Booth visit



Networking – TEEAM and FMM Officials.



At the fairground – Delegates sharing a light moment.

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Power Quality Assessment on Various Type of Street Light in TNB Distribution System

This paper is prepared by Nor Diana Ruzaini Mohd Zin, Khairuddin Abdullah & Sharni Ahamad Sabki

Abstract

A feasibility study has been conducted by TNB Research to assess and evaluate the deployment of Light Emitting Diode (LED) and Induction street light technology. Presently, the light source used is High Pressure Sodium Vapor (HPSV) and LED and Induction are the emerging lighting technology in the world that has rapidly developed in recent years as an alternative light. In this study, the study evaluates the energy efficiency, power quality and adaptability of new street lights are evaluated and assessed. The study involves installation of the HPSV, LED and Induction street lights at site, measurement of its electrical performance at site and lab testing. The study indicated that LED and Induction street lightings can provide between 20% to 60% energy saving to the utility. Most of the new emerging technology street lights surveyed also are provided with better Ingress Protection (IP) rating and Colour Rendering Index (CRI) compared to HPSV street light.

Keywords: Light Emitting Diode (LED), Street Lighting, Induction, High Pressure Sodium Vapor

Introduction

The Government recently has call to move towards green technology. In specific, this study is concerned with the use of natural resources or replaced by higher efficient technologies. Electric energy is an indispensable component to people. Distribution of electric power from generation, transmission and distribution are important to meet requirement of the customer. Unfortunately, still more and more new technologies connected to the electric power supply have nonlinear voltage current characteristics, thus changing and deteriorating the overall power quality. Lower quality of electric power may effect to correct operation thus permanent damage to street lighting. Networks with non linear concentrated load can introduce distortions in the energy wave shape. In this study, it describes an assessment of LED street lighting technology and Induction street lighting technology as an alternative source to the current High Pressure Sodium Vapor (HPSV) street lighting. Their parameters characterising the electric power quality in lines supplying lighting system is assessed by means of field measurement and lab testing. A technical test of performance and impact over lighting network is assessed.

For this study, LED and Induction street lighting technologies has been considered for its street lighting retrofit program as the emphasis was on long-life, white light products that improve colour rendering and reduce maintenance costs relative to HPSV street lights, the prevailing technology used today in Malaysia. The main benefits of LEDs and Induction technology are their reduced energy consumption, has longer lifetime better Ingress Protection (IP) rating and Colour Rendering Index (CRI) compared to HPSV street light. The energy savings are claimed to have 40% or more and the lifetime is estimated at 50,000 hours for LED street light and 100,000 hours for Induction street light.

Methodology and Findings

A) LED Street Lights Field Trial

Four Pilot LED and Induction Street Light Technology from different countries and manufacturers were selected for this study and installed in Malaysia. The rated power consumption of the LED and Induction street lighting technologies ranges from 90 Watts to 120 Watts. The sites were chosen based on few criteria such as sufficient length of straight roadways with easy access for photometric measurement purpose. The sites shall also have minimum environmental interference such as trees and lighting from other sources which may affect the accuracy of photometric measurement results.



Figure 1: LED Street Light before and after installation



Figure 2: Induction Street Light before and after installation

A total of 80 LED and Induction luminaires were installed at selected public roadways in two different state since March 2012. In all types of luminaires, average and uniformity of illuminance and luminance were measured in order to guarantee level requirements recommended by MS825 Part 1 (Code of practice for the design of road lighting - Part 1: Lighting of roads and public amenity areas (Rev 1)).

B) LED and Induction Luminaires Power Quality Assessment

The quality of the white light is excellent, providing better colour definition unlike the High Pressure Sodium Vapor lights. The ability to clearly see people's faces and true colour of environment is enhanced. Efficacy of LEDs is constantly improving. At the time of publication, LED and Induction street lighting technologies has advanced to efficacy approaching to 120lm/W with lower wattage consumption compared to HPSV luminaires. Power, energy and electrical characteristics measurement are carried out to confirm that the luminaires are operating within the manufacturer specifications and comply with certain standards.

The purpose of the measurements is to determine the effect of introducing LED and Induction street lighting technologies that replaced present HPSV street light. Electric power quality analyser

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which is Fluke 1750 Power Analyser was used to perform continuous measurement of numerous quantities, including voltage, current, power, power factor and harmonics.

1) Power Consumption and Energy Saving

Power measurement is required to determine the actual power consumption of LED and Induction luminaires. Instantaneous power measurement was performed at sites by using a portable power meter. In addition, monthly power consumption of each LED and Induction street lighting technologies were also monitored using the installed energy meter.

Based on the power consumption measurement, it is shown that the lowest energy consumption is 85Watt by the LED street light technologies A. The highest power consumption recorded is 96Watt by the LED street light technology D. The amount of energy saving by the LED street light technologies range from 36% to 43%, compared to the 150 Watt HPSV. For Induction street light, the lowest energy consumption is 105Watt by the Induction street light technologies G. The highest power consumption recorded is 131Watt by the Induction street light technology H. The amount of energy saving by the LED street light technologies range from 13% to 30%, compared to the 150 Watt HPSV. A summary of measured electric power and its saving results from the study are tabulated in Table 1 and 2.

Table 1: Measured power consumption and energy saving of LED street light technologies compare to 150W HPSV

LED Street Light Technology	Declared Energy Consumption (Watt)	Measured Energy Consumption (Watt)	Energy Saving (%)
A	90	85	43
B	90	92	39
C	90	92	39
D	90	96	36

Table 2: Measured power consumption and energy saving of Induction street light technologies compare to 150W HPSV

Induction Street Light Technology	Declared Energy Consumption (Watt)	Measured Energy Consumption (Watt)	Energy Saving (%)
E	120	118	21
F	120	113	25
G	100	105	30
H	120	131	13

2) Electrical Characteristics

Electrical characteristics in terms of power quality and power factor of the LED and Induction street light technologies are assessed to ensure they are operating within the specified limits of certain standards. Power quality measurements were performed at laboratory to determine the harmonic current emission level and flicker level produced by LED and Induction luminaires. Results of power quality measurement results are compared to the MS IEC 61000-3-2: 2000 (Limitation of voltage fluctuations and flicker for equipment input current <16A per phase) and MS IEC 61000-3-3:2005 (Limitation of voltage fluctuations and flicker for equipment input current <16A per phase). The power factor of each LED and Induction street light technology is also measured at laboratory to ensure they are complied with TNB requirement which is more than 0.85.

The site measurement results for electrical characteristics are summarised in Table 3 and 4. Power factor recorded indicates that all four LED and Induction street lighting technologies have a power factor of higher than 0.9. It is observed that individual harmonic

current emission for all the LED and Induction street lighting technologies tested are within the limits. LED street light technology D has the highest total harmonic distortion current which is 18.09% and Induction street light technology H has the highest total harmonic distortion current which is 11.23%. Flicker measurements indicate that the short time flicker, Pst for all LED and Induction street light technologies are within the limits of 1.0.

Table 3: Electrical characteristic measurement of LED street light technologies

LED street light Technologies	Power factor	THD Current (%)	Short Time Flicker (pst)
A	0.95	9.50	0.261
B	0.96	7.57	0.308
C	0.94	13.1	0.275
D	0.93	18.09	0.288

Table 4: Electrical characteristic measurement of Induction street light technologies

LED street light Technologies	Power factor	THD Current (%)	Short Time Flicker (pst)
E	0.98	7.15	0.371
F	0.98	7.97	0.475
G	0.98	8.58	0.330
H	0.99	11.23	0.863

Figures 3, 4 and 5 present selected results of measurements carried out at measurement points on the electric power network shown for LED street light technologies C.

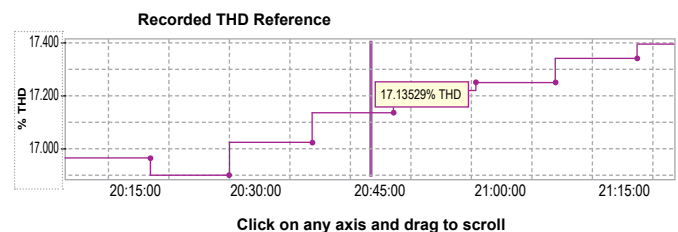


Figure 3: Recorded THD current for LED street light technologies C

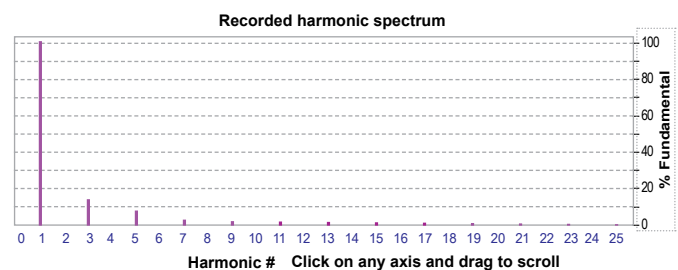


Figure 3: Recorded harmonic spectrum for LED street light technologies C

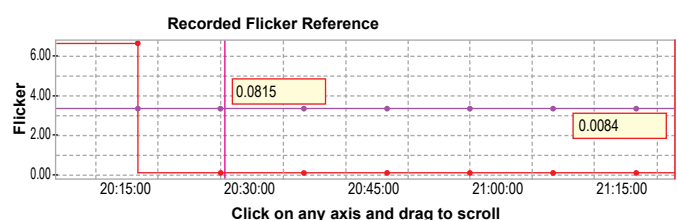


Figure 3: Recorded flicker for LED street light technologies C

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Guangzhou Lighting Exhibition 2015

9th to 12th June 2015 marked the 20th anniversary of Guangzhou International Lighting Exhibition (GILE). With its ongoing commitment to stay at the forefront of the global lighting and LED industry, the organiser set the theme of the 20th edition of the fair as “Envision the future of lights”, in which “Human-centric Lighting”, “Smart Lighting”, “Sustainability” and “Quality of Light” were emphasized. With the enthusiastic support from the lighting community, the industry peers were gathered here to showcase and exchange meaningful dialogue on the future of lights.

The 20th edition of the showcase was held at the China Import and Export Fair Complex, Guangzhou, China. An overwhelming 135,990 visitors from 131 countries and regions attended the event. There was a comprehensive showcase from 2,698 exhibitors from 27 countries and regions covering 22,000 sqm of 21 halls.

As one of the supporting organisations, TEEAM President, Ir Chew Shee Fuee was present as one of the VIP guests. He was joined by members from the Korea Electrical Contractors Association (KECA) and Hong Kong Electrical Contractors Association (HKECA).

With the support by government authorities and industry organisations, five international pavilions, including Taiwan, US, Korea, Japan and Hong Kong were organised. Many



Show of support – (from left) Mr Emil Yu (HKECA President), Ir Chew Shee Fuee KMN (TEEAM President), Mr Kay Lau (FAPECA Secretary General), Dr Chang Chul Ho (KECA President), Mr George Ko (HKECA Life President) and Mr Wai Yip Kin (HKECA Management Committee Chairman).

prominent industry brands and innovative small and medium enterprises showcased regional innovations to promote cross-region collaboration on Solid State Lighting (SSL) technology.

With the focus on envisioning the future of lights, reputable industry specialists were gathered from across the world to share the valuable insights. There were all-rounded industrial information covering topics on the entire industry chain of LED and lighting via different programmes in four distinctive tracks: market, technology, design and network.

Major aspects covered in the 2015 event programmes included:

- Human centric lighting;
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The 2016 edition is scheduled for 9th to 12th June 2016 at China Import and Export Fair Complex Guangzhou, China. For details, please contact Messe Frankfurt (HK) for Ms Scarlet Mak. Tel: (852) 2238 9969 Fax: (852) 2519 6079 Email: light@china.messefrankfurt.com Website: www.light.messefrankfurt.com.cn



TEEAM members at GILE 2015.

..... Continue Power Quality Assessment on Various Type of Street Light in TNB Distribution System

Conclusion

This paper describes a study of energy saving testing and more efficient luminaires with the concerned the issue of the electric power quality. Field trial and laboratory test were carried on studding the LED and Induction street light technology performance and comparisons were made. The measurements were aimed at determining deployment of LED and Induction street light technologies will result in any significant deterioration of the electric power quality.

Technically, LED and Induction luminaires are possible technologies represent the present world industry best practice solutions as compared to HPSV street light as in terms of energy saving and electrical characteristics. The results provided for power quality, LED and Induction luminaires are not expected to cause any issues since harmonic current emission and flicker generated by LED and Induction luminaires are within the permissible limits. In addition, all LED and Induction street light technologies have recorded more than 0.9 power factor. In terms of energy consumption, the LED and Induction street light technologies have consumed less energy, which is between 13% to 43%, compared to the 150 Watt HPSV. The energy saving obtained is significant and the harmonics are acceptable.

With the viable and continuous improvement of LED street light design and technology, it is expected that it will be beneficial to enable the smooth and timely transition into new technologies to obtain maximum benefit in terms of energy saving, lower maintenance cost and better environmental impact. Concurrently, the electric power supply systems by the LED and Induction street light technologies should be monitored.

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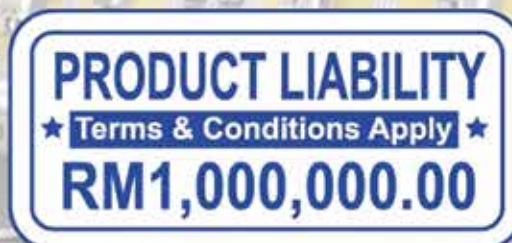
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Challenges and Opportunities in Electrical Industry - Part 24

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

A) The Registration of Engineers (Amendment) Act 2015

The following is extracted from BEM website: <http://www.bem.org.my/v3/REA15.html>

The Registration of Engineers (Amendment) Act 2015 and The Regulations of Engineers (Amendment) Regulations 2015 have come into operation on 31st July 2015.

The spirit of the Act is to support the government policy to liberalise the services sector in particular the engineering services. This Act is to ensure public safety. The earlier Act is very restrictive in that only Malaysian Professional Engineer can practice and hold equity in a consulting firm.

The amendment allows BEM to register and regulate the engineering team i.e. **Inspector of Works, Engineering Technologist, Graduate Engineer, Professional Engineer and Professional Engineer with Practising Certificate**. This is in line with the introduction of Certificate of Completion and Compliance (CCC).

In the spirit of liberalisation, all (citizen and non-citizen) are treated equally. Every registered person will undergo the same treatment, i.e. the same examination, qualification, registration procedure, etc.

Any person other than a Professional Engineer with Practising Certificate (PE with PC) can be a director and hold equity in a consulting firm.

The current rulings are as follows. However, local regulatory requirement must be fulfilled.

- One third (1/3) of the directors may be held by others
- 30% of the equity may be held by others

To ensure that only those who are competent may render professional engineering services, the Professional Competency Examination (PCE) is introduced. Only Professional Engineer who has passed the PCE and has the practising certificate can submit plan, engineering reports, etc. to any person or authority in Malaysia.

Professional Engineer PE

For candidate who is a Professional Engineer from outside Malaysia, he may apply to be registered as a PE immediately after being registered as a GE. After assessing his/her

application, BEM may register him/her as a PE directly or to be determined.

Professional Engineer with Practising Certificate (PE with PC)

Professional Engineer who wishes to continue to be a Submitting Person in the consultancy practice must apply for registration as Professional Engineer with Practising Certificate (PE with PC).

One year grace period will be given to all Professional Engineers from 31st July 2015 to 31st July 2016 to decide whether to maintain registration as Professional Engineers or apply to be registered as PE with PC.

Existing Professional Engineers will be exempted from the following provided that they apply for registration as PE with PC before 31st July 2016.

- **Passing the Professional Competency Examination (PCE);**
- **Paying the processing fee of RM50.00 and registration fee of RM200.00.**

All Professional Engineers registered after 31st July 2015 requiring a PC are required to sit and pass the PCE. Those who do not require a PC will remain as a P.E.

B) TNB Tariff (ICPT & IBR)

The electricity tariff in Peninsular Malaysia is determined through the Incentive-Based Regulation (IBR) framework and the Imbalanced Cost Pass-Through (ICPT) mechanism implemented in January 2014.

The ICPT allows the government to review the tariff every six months based on changes in fuel and generation costs.

ICPT takes into account changes in the price of piped gas, LNG, coal, medium fuel oil, distillate and other generation costs such as those related to the PPAs, displaced cost from Renewable Energy and the cost of importing electricity.

The Government of Malaysia (Government) has announced that the Imbalance Cost Pass-Through (ICPT) rebate of 2.25 sen/kWh will be maintained for the period effective from 1st July 2015 until 31st December 2015. The ICPT rebate will be applicable to all consumers except Domestic consumers with monthly consumption of 300 kWh and below.

The Government also announced the revision of the piped gas price for the power sector from RM15.20/mmBTU to RM16.70/mmBTU effective 1 July 2015. This RM1.50/mmBTU increase in piped gas is implemented as part of the energy subsidy rationalisation programme.

Despite the increase in piped gas, the Government is still able to maintain the ICPT rebate of 2.25 sen/kWh following the RM1,085.67 million of net savings in fuel and other generation costs for the period of January to June 2015. The savings are mainly contributed by a reduction in the use of Liquefied Natural Gas (LNG) for electricity generation supported by the high performance of coal power plants, as well as the downward trend of coal prices. This amount is also inclusive of RM300 millions of savings from the renegotiation of the Power Purchase Agreement (PPA) savings of the 1st generation Independent Power Producers (IPPs).

Ir Chew Shee Fuee KMN 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 current President 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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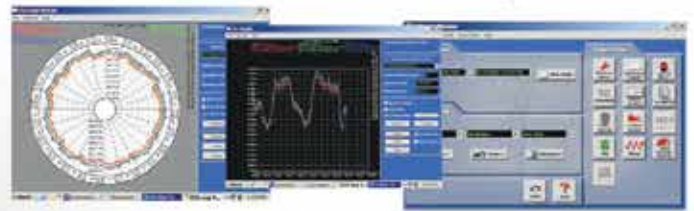
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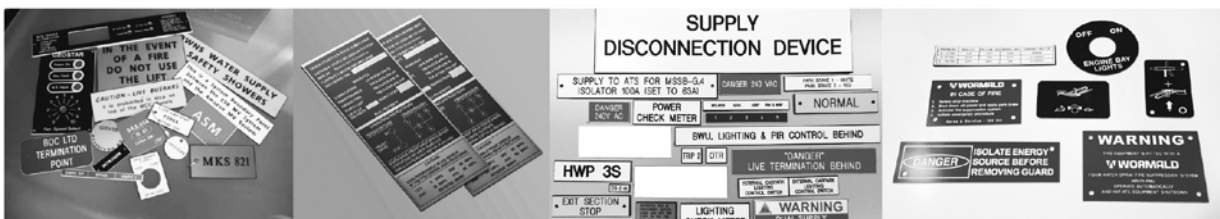
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