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PRASA: Managed light

Lighting's quiet revolution

Making airports a little less horrible

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In his article, 'Intelligence takes many forms', Craig DiLouie of the Lighting Controls Association draws attention to what he calls the 'quiet revolution' that is taking place in lighting – that of intelligent lighting control. Signs of this development were to be seen at Light+Building 2014 where a number of lighting's larger players focused on connectivity and smart control, including the management of urban lighting to reduce energy consumption. Since then, as DiLouie points out, both products and applications have continued to evolve at "a breakneck pace".

Intelligent lighting offers flexibility. It saves energy by switching off lights in unoccupied offices and achieving the right amount of illumination by taking into account the contribution of natural light. It improves personal comfort by allowing individuals to adjust the lighting to suit their requirements. It facilitates lighting management by providing maintenance managers with real-time information on the status of luminaires and alerting them to any faults in the system. It can also be used to mimic the solar passage of time, thereby decreasing fatigue and lessening depression in people who work in environments where there is little or no natural light.

It was a lighting concept which supported the well-being of its operators over a recurring 24-hour cycle that PRASA (Passenger Rail Agency of South Africa) chose for its operational control centre, or Nerve Centre, as it is called. Shift work can lead to a reduction in alertness and productivity as well as other health risks such as diabetes, depression and cardiovascular problems so it was important to PRASA that the lighting scheme embraced the physical and psychological effects of light. Continuously changing programmed light will ensure that the people working there will be exposed to sufficient amounts of light of the right spectrum for a sufficient amount of time, at the right time.

In Montreal, Lightemotion was chosen to develop a lighting scheme for the *Complexe Desjardins*. Its brief: to create a warmer overall ambience, be dynamic and programmable and produce a call to action to pedestrians on the street to enter the complex. The company developed an 'Urban Clock' that uses a DMX system to adapt colours, tones, intensity and colour temperature to produce morning, lunch time and night time lighting schemes. The system offers a daily show to visitors and in addition reduces energy consumption. It has been enormously successful.

Also, as Gavin Chait explains in his article, 'Can better lighting help airports be a little less horrible?', modern technology has allowed renovation-through-lighting to be seen as a relatively cost-effective means of "face-lifting sometimes quite hideous buildings".

Intelligent control offers flexible and responsive lighting that can be adjusted as required. As the energy crisis in South Africa continues and legislation dictates how we use energy in future, and as LED lighting becomes progressively more commonplace, intelligent lighting control systems will become increasingly popular for their advanced levels of energy efficiency, flexibility and personalisation.

Till next time.

Karen

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PRASA's Nerve Centre

In 2011, GAPP Architects and Urban Designers won the competition for the design of the new operational control centre for Gauteng's railways and it was the dynamic lighting concept that motivated the jury's decision. Anthony Tischhauser of Pamboukian light design reports.

Rail transport will form the backbone of public transport in Gauteng. With a complete overhaul of passenger rail services, a new rail traffic management centre will centralise 43 signal cabins and steer the fully automated signalling on the province's network. This is an important feature in PRASA's (Passenger Rail Agency of South Africa)

programme to mend the neglected and outdated railway network and speed up services. All rolling stock will be replaced and stations renovated, including CCTV cameras. Central command-control of signals will improve the capacity, efficiency and safety of trains on the network. Corrected track geometry will enable trains to run at speeds of up to 120 km/hr.

The RFP (Request for Proposal) document for the limited and invited competition was extremely thorough, based on Portuguese Railway's Operational Control Centre (OCC) in Porto.

What, at the time, were radical principles were



All photographs by Natalie Payne.

applied to the control room, with managed daylight and electrical lighting rhythms. The RFP was very clear about including daylight for the health of staff, and that it should also be a Green Building. GAPP's design for the PRASA Gauteng Nerve Centre (as it is called) directly opposite Kaalfontein Station, Kempton Park, featured these requirements; originally providing the control room with a mix of daylight through eye-shaped skylights and side windows with controlled electric light, diffused by translucent ceiling fabric, for cloudy days and night work.

The lighting concept embraced the physical and

psychological effects of light on people. By day or night, there would be an interplay of continuously changing programmed light. The lighting concept by Paul Pamboukian supported the well-being of the operators over a recurring 24 hour cycle. The first design saw the application of cold cathode because of its subtle colour nuances. Owing to the technical nature of the work space the lighting would also convey mood and be aesthetic.

As human beings are exposed to electrical light for longer periods, blue rich (short wavelength) light frequencies during hours of darkness are linked to a number of health risks, which include increased



diabetes, depression and cardiovascular problems. We need to be exposed to sufficient amounts of light of the right spectrum, for a sufficient amount of time and at the right time, for our biological clocks to synchronise with the solar day. Otherwise, we may experience decrements in physiological functions, neurobehavioral performance and sleep. This is due to the effect of light on melatonin, a hormone secreted by humans to regulate their circadian rhythms.

Specifically, three types of light signals impact the circadian system: dynamic wavelengths of bright blue-dominant daytime light of the morning hours; dynamic long red wavelength dominant light, present during the late afternoon and early evening hours; and regularly occurring periods of darkness at night. Circadian rhythms are biological rhythms that repeat approximately every 24 hours. These conditions, which are found within the natural diurnal cycle, can be mimicked with the use of dynamic electric light and controls. Colour has an impact on human biochemical and psychological processes. The light should also be free of glare and the walls not contribute to light reflection. The contrast ratio to the media screens is controlled to reduce fatigue. Each desk has a warm adjustable task light.

The plan of the Nerve Centre follows the shape of an 'eye'. The building is a vertically layered structure of solid floating planes with spaces woven

in-between: entrance lobby, atrium, training areas, meeting and staff rooms, lounge and canteen. The complex is ordered around a central atrium off the entrance. LED sticks of linear light, all the same length, criss-cross the three stories adding to the public face of the building. The controls are placed in an adjacent room for accessibility, as they are generally the elements to fail. The bell-shaped control room is nestled against an elliptical layered wall plane. It has five continuous raked rows of grouped desks, 36 in total. Each individual operator has a series of four computer screens to monitor train movement.

The dimmable dual fluorescent fittings of 2700 K and 4500 K (original specification 6000 K) colour temperature, change continuously according to the time of day. The daylight is reduced to a slither that filters in without being explicitly visible from behind the parapet and without permitting a view to the sky, at the high end of the space to give operators an idea of the time of day. Bands of Extenzo translucent stretched ceiling fabric with a light transmission of 48% conceals the fittings and distributes the light. A huge concentric elliptical LED screen spans 60 m across the wider end of the space recording the entire network as an entity, viewed by operators for shared discussion. The impressive tracking of train movement by the time-mimic system is a technical truism.



The Nerve Centre represents a significant technical and functional evolution, its main role being to command, control and supervise all functions and activities relating to rail operation processes, within its area of coverage. It also allows network operation to be optimised, increasing its available capacity and improving the quality of the service provided with higher levels of reliability, availability and safety. From here rail passengers will, in future, be informed on train performance, punctuality and emergencies. LID



Can better lighting help airports be a little less horrible?

by Gavin Chait



Beijing Capital International Airport



Dublin International Airport



Dubai International Airport



Dubai International Airport



San Jose International Airport



Barajas Airport



Airports are a bit horrible, aren't they?

My most recent excursion took me through the complete range of agony that the modern airport experience has to offer. From Heathrow's Terminal 4, which is a dull and dark paean to 1980s rabbit-warren shopping, through Qatar and into Tanzania.

Qatar's new Hamad International is projected to be nearly two-thirds the size of nearby Doha, when complete. The \$5 billion terminal is a sterile, endless shopping centre filled with glassy-eyed travellers desperately clinging to sanity as they await connecting flights. And it doesn't help knowing that – with Qatar's dire record of immigrant worker's rights – construction and maintenance of the building was performed largely by slave labour.

Tanzania's Julius Nyerere, 12 kilometres from Dar es Salaam, is more difficult to describe – literally.

The power was out when I arrived and, after being forced off the plane one-by-one (it was raining

and there was only one umbrella ... even though it's only 20 metres walk to the terminal building and I didn't mind getting wet), we trooped into the darkness of immigration and arrivals.

Tanzania is building a new airport terminal worth \$150 million but the money has run out, so it may not be completed.

So, there we go; the entire horrible journey. Airport terminals aren't an entertainment destination, like a shopping centre (Johannesburg's gaudy and bustling airport aside – clearly there isn't much to do in that part of Gauteng). They're a kind-of forced internment centre for people, filled with amusements to prevent you from noticing the prison bars.

A modern airport terminal isn't simply a shed with access to the apron and buses to ferry people to distant planes. Now, the aircraft pull right up to individual air corridors that lead into the building.



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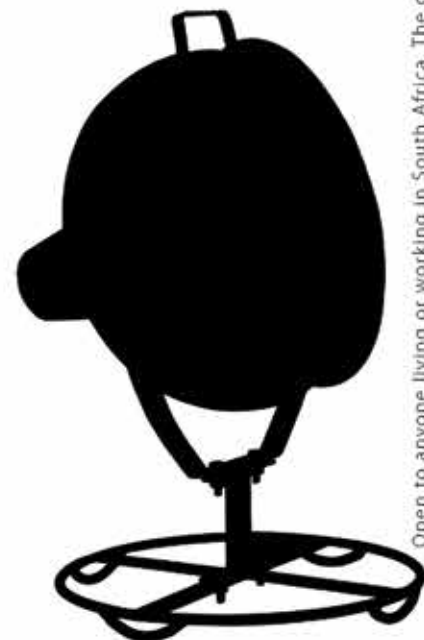
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Heathrow Terminal 2, London

Heathrow Terminal 5, London

Once people enter an airport in Heathrow they may not leave the series of hermetically-sealed buildings and vehicles until they reach their final destination 24-hours later. Non-stop artificial environments filled with electric light, humidified and conditioned air, and endless corridors cut off from the outside.

Add in immigration and a succession of semi-humiliating security checks, and you have ideal conditions to reducing travellers to gibbering lunatics just before squeezing them all into metal lozenges and hurling them into the sky. Anyone taking on the task of improving an airport has to contend with the scale of its operations and the stress suffered by its tenants: which is where modern design and lighting come into play.

Designers must contend with security and access controls, and the size of developments implies that different contractors can be responsible for different parts of construction. Somehow, as travellers go through the parking-lots, into the land-side terminal and then to air-side, it should all feel like a single environment. Lighting also needs to guide travellers through complex layouts and permit them to find their way through the terminal and to their aircraft. Critically, modern airports – for all their size – need to sip at electricity to reduce their carbon footprint.

Sometimes even award-winning designs fail basic practicality requirements.

When Heathrow Terminal 5 opened to great fanfare in 2008, it featured some of the most sophisticated lighting in any airport terminal. Fitted with 120 000 lamps and 2 600 sensors to control them – responding to motion and daylight – it was a source of great embarrassment that no-one had thought they may need replacing.

In 2013, with 60% of the downlights broken and airport staff complaining it was too dark to see their own work-stations, a team of professional tight-rope walkers was hired to replace the 1 000 most unreachable lamps with LEDs.

Rogers Stirk Harbour + Partners, the architects for Terminal 5, have suffered severe embarrassment, but doubled-down and – in classic engineering-speak – declared the lighting design to be a feature, not a flaw.

So let's avoid such churlish errors.

Modern glass production, along with suspension building, means that a lot more natural light can be brought into the buildings. That can save dramatically on lighting costs during the day and the view of the outside also helps travellers feel less trapped.

Terminal 2 at Heathrow features an undulating roof with carefully integrated lighting designed to complement sunshine during the day. studioFRACTAL was appointed as the lighting expert on the project. One of the company's first innovations was to mimic external sky conditions with a coloured lighting strategy. Most obvious at dawn or dusk, but also during the UK's frequent rainstorms, lighting acts to link the inside and outside and break down the sense of isolation.

These RGB LED roof lights create waves of subtly changing colour, concealed so that only the effect is seen. Thinking ahead, studioFRACTAL also needed to ensure that the lighting diffusers and components could easily be reached for maintenance.

Over 1 856 bespoke sliding brackets and diffusers were made and installed, and the system is deliberately run well-below its maximum rated energy capacity to extend its life-span to 30 years.

Airport terminals are also meant to inspire and public art has been commissioned and incorporated into the architecture. Arriving at Terminal 2, travellers rise up through Slipstream, Europe's largest permanent sculpture, longer than an A380 plane. Downlights would simply blind those looking up, so studioFRACTAL worked with the artist to ensure that diffuse and indirect lighting permitted clear access while complementing the sculpture.

In Spain's Barajas Airport in Madrid, Speirs + Major developed a mirror reflector system to take advantage of transparent roof panels and reflect sunlight into the terminal. For lower areas inside the buildings, Speirs + Major installed a 'wok-like' ceiling luminaire to provide downlighting as well as scavenging and redirecting light from a central spill-ring. The eye-catching nature of the installation masks the concrete ceiling and conduits and means that there was no need for an additional (and expensive) suspended ceiling.

These technologies and design approaches are

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gradually making their way into existing terminals, with renovation-through-lighting seen as a lower-cost (relatively) means of face-lifting sometimes quite hideous buildings.

Amsterdam's Schiphol Airport (and one I have a particular dislike for – perhaps you can imagine what I call it) is implementing a radical new approach to lighting. Not so much a technology, as an economic model.

Modern design can imply hidden and expensive operating costs even as operators attempt to lower energy and maintenance costs. Philips, the lighting conglomerate, and Cofely, an energy services company, will provide the airport with 'light as a service'. Schiphol will pay for the light it uses, while all the fittings and fixtures remain the property of Philips.

Philips has a tremendous incentive to reduce maintenance costs while extending lighting lifespans. It's a rather neat way of aligning the motivations of the airport and the supplier.

Kossmann.dejong, an architecture firm (and, yes, designers and architects needs a bit of abstract punctuation in their names), worked with Philips to produce light fixtures designed to last 75% longer than the standard versions, and which can be individually replaced. The entire airport will be renovated as part of the contract, with new control systems monitoring light efficiency and reporting to both the airport and to Cofely to respond rapidly to maintenance requirements.

Philips' revenue model requires that it delivers a minimum standard of lighting, while also getting a share of the energy savings. The Washington Metro in the US funds its lighting through the \$2 million a year it is saving on energy and maintenance following its signing of a 10-year contract with Philips to take over its 13 000 fixtures.

Philips has formalised a few such contracts and the idea looks to be catching on. Cisco, a manufacturer of internet interconnection devices, and

amBX, a lighting control specialist, are forming a joint project to develop a managed network system to support lighting-as-a-service and it won't be long before we see similar initiatives from some of the other infrastructure players.

Airports are ideal for such experimentation. The largest have become international shopping and transit hubs with 24-hour operations and a need to support both highly-secure and technical operational staff, along with enhancing the experience of jaded and harassed travellers.

Airport terminals are massive adverts and forward-looking countries know that the first impression shows what they're capable of and has the potential to inspire investors. Some of the more ambitious developments are at new terminal hubs in emerging markets. Both Dubai and Doha are competing as transit hubs, but Turkey, Ethiopia and even India are emerging as alternative players.

Mumbai's Chhatrapati Shivaji International Airport handles over 30 million passengers a year. Its recently-completed Terminal 2 aims to take that to 40 million. It is not just a transit point but also a reflection – even an advert – for the investment destination that India wants to present itself as.

It is probably too much of a stretch to posit that airport terminals are ever likely to present themselves as anything other than shopping and entertainment centres you struggle to leave, but they are doing their best.

One wag used to meet prospective clients at the glamorous international airport an hour away from his far more hum-drum and poky office to disguise his humble origins. That way he could always claim to be either just arriving or just leaving, and present himself as a jet-setting success.

It worked.

One doesn't have to like airports not to be impressed by them, and lighting is their most important component.





Dynamic lighting signature for retail complex

Working closely with the facilities team at *Complexe Desjardins* in Montreal, Lightemotion has breathed new life into that city's largest mixed use development, a space totalling four million square feet.

Located in the *Quartier Des Spectacles* and facing the recently renovated *Place Des Arts*, featuring an innovative lighting scheme designed by Lightemotion, *Complexe Desjardins* is the latest addition to the *Quartier* to include a dynamic and innovative lighting design.

The client was keen to resolve numerous issues through a lighting design strategy for the interior retail concourse and two main entrances to the retail concourse. Lightemotion was selected to develop a distinctive lighting scheme to create a warmer overall ambience, be dynamic and programmable, reduce heating and cooling costs and produce a call to action from the street so pedestrians enter the complex. A main requirement of the design was the ability of the client to create programmable and dynamic lighting effects that adapted to time

of day; season; and activity within the space. Environmental sustainability was also paramount in the lighting program to reduce hydro consumption, cooling and maintenance costs.

Lightemotion undertook an exhaustive research and mock-up programme that recommended replacing the existing flood lights with a custom designed fixture. The team conceived a bi-directional 140 W LED lighting fixture that showcased the diamond coffered ceiling combined with a powerful downlight to illuminate the entire shopping centre, adding much needed texture and nuance to the space. This also created an interesting floor pattern which enlivened the space, enhanced intuitive way-finding and diminished the vastness of the space. The lighting system not only provides a warmer ambience, with pre-programmed lighting that



changes over the course of the day, but it is 67% more economical than the previous system and provides triple the lighting intensity at floor level.

To create a lighting ambience that was both friendly and dynamic, Lightemotion conceived a bi-directional LED lighting fixture that the Montreal company Lumenpulse developed for the project. Composed of two elements (a frame equipped with RGB LEDs and a downward-directed directional flood), the fixture directs coloured light upward as well as directing lighting downwards towards the floor.

By installing one of these fixtures in each ceiling coffer, Lightemotion made it possible to create subtle chromatic nuances that produced the effect of a path of colours covering the vault of the retail concourse.

Outside, the marquees covering each of the building's two entrances were also provided with a lighting system that can project onto the ground a chromatic ambience creating a call to action to enter the retail concourse. The downlights provide four times more lux level than the previous fixtures while also creating a visually stimulating pattern on the floor that eliminates the typical flat floodlight wash effect.

Since the Complex is an event space and a shopping centre, there was a mandate to ensure the fixtures provided a wide range of visual options. After a careful study of the traffic patterns based on time of day and activity, Lightemotion developed

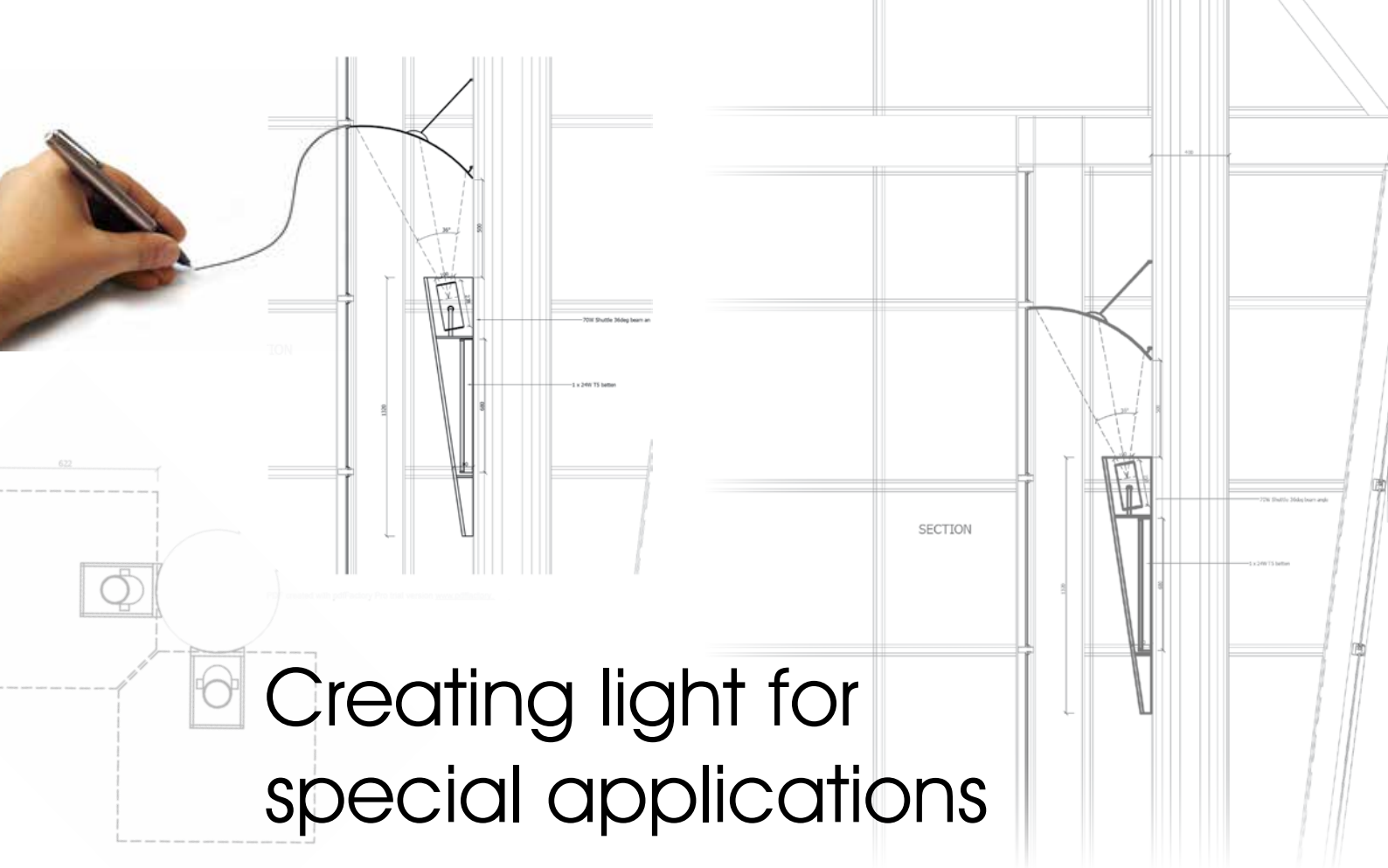
an 'Urban Clock' concept that uses a programmable DMX system to adapt the colours, tones, intensity and colour temperature.

The morning bright and energetic dynamic white scheme helps people start their day. For the lunch time rush warm colour tones are added to provide a luminotherapy effect, especially in the darker fall and winter months, and at night darker tones in blues and greens create a relaxing ambience for shopping.

The custom-designed fixtures were also used outside at each of the building's entrances. By using the same design principles and technologies as inside, the entrance lighting system projects onto the sidewalk creating a chromatic coloured ambience which complements the lighting display inside.

The lighting design does more than offer a daily show to visitors and a visual signature to *Complexe Desjardins*. It is much more energy-efficient than the traditional 400 W lighting fixtures that it replaced. Using only 132 W each, the new fixtures reduce energy consumption by 67%. Because they are also equipped with photoelectric cells, they are capable of automatically adjusting the lighting intensity and power consumption to compensate for the amount of natural light entering the concourse through two large curtain wall windows at each of the two main entrances.

Founded in 2002 by Francois Roupinian, Lightemotion is an independent global lighting design consultancy that combines outstanding lighting design with technical excellence. **LID**



Creating light for special applications

Effective lighting is borne of an understanding of the aesthetic and technical aspects of design and how these relate to the way in which the environment is perceived. The lighting can be functional or decorative or both functional and decorative. In many installations the primary goal is to incorporate ambient illumination into the architecture through the use of indirect sources. Others add decorative fixtures to create variety and impact. Regent Lighting Solutions offers all these, but *Lighting in Design* spoke to Randal Wahl about what are termed 'specials'.

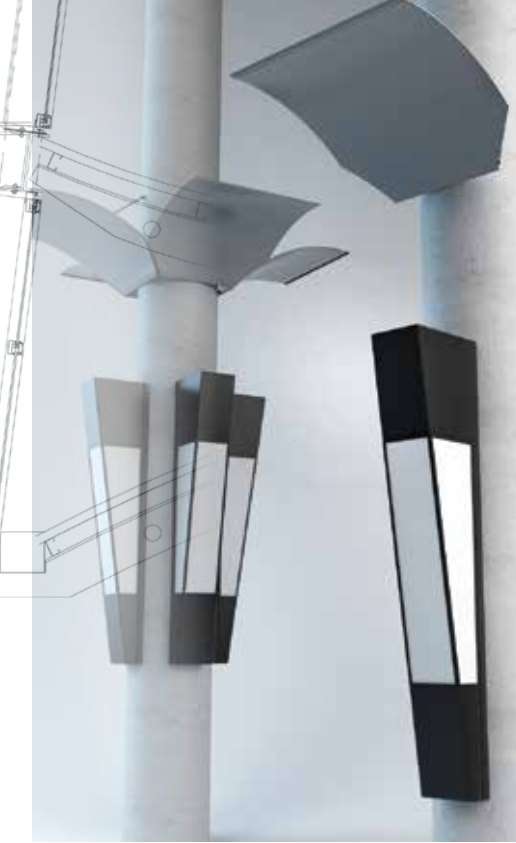
The request for a special fixture is usually, according to Wahl, from an architect or lighting designer and frequently involves a design element or piece of art that will mark a structure as different i.e., the architect may design a pendant that is more decorative than functional for a corporate office or building. Another time, the architect and his or her client may want to light the curve of a bridge or supply special lighting to emphasise certain key design elements of a commercial building.

Whatever the requirement, the key to a successful partnership – as Wahl says repeatedly – is collaboration; from the first sketch to the final installation when the lights are switched on.

The process seems simple enough: the architect or lighting designer provides a rough sketch, often hand drawn, of the envisaged fitting, sometimes with an example of something similar; in-house designers interpret the sketch and send it for approval; the architect makes changes if required and the designer then creates a 3D rendering of the

product, including how it will work and how it will finally be mounted to the planned surface *in situ*. Once this is approved, a mock-up is made to see what the difficulties could be and to validate the design. If necessary, further mock-ups are made until the architect and his or her client are happy with the outcome.

In reality, however, the procedure has to be managed minutely. A special fitting defines its creators and must look good for years to come. Apart from working with the client to establish what is possible in terms of design and manufacture, the manufacturer has to consider photometrics, mounting options, the environment in which the fitting will be fixed, structural concerns, wind loading for external fittings, ease of servicing and maintenance. Wahl says, "We drive people mad finding out, for example, how the pendant will be fixed before we make the light fitting. It is critical for us since the manner in which the fixture is mounted can make a big difference to the overall aesthetics of the product. In some circumstances we need to make bespoke brackets or create a frame to allow for variances that have occurred on site. If the fixture is for a public environment and is accessible on the ground, vandal resistance elements will influence the design of the product. We work closely with electrical contractors and value any feedback that will make installation on site as easy and effective as possible. When we manufacture interior fittings, we also work with ceiling contractors or shopfitters to provide in-factory solutions to reduce the amount of on-site work, which can compromise the



Mthatha Airport: From concept to completion Regent works with clients to create the ideal light fitting.

overall lighting effect if not accurate. In certain cases we develop a complete system design including frames and recessed housings that are cladded on site. This reduces the likelihood of the ceiling recess detail not being straight and thus meets the designer's requirements."

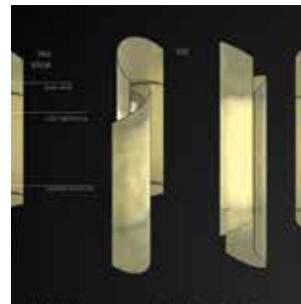
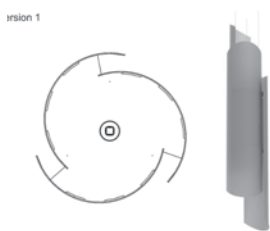
Not everything is done in-house; the company focuses on areas in which it has a competitive advantage and outsources the rest, so specialist suppliers are key. In many instances, Regent designs the fitting, sends out specific components for manufacture and then assembles it in-house and inserts the necessary lighting elements to attain the correct lighting effect.

A further consideration is transportation of the fittings. Every special light fitting that is transported must be crated and customised packaging, which incidentally can cost well over R1000 per crate, is often essential to ensure that the specials reach their destination safely.

Why do specialised lighting when it is so time-consuming and often a 'once-off' with no future annuity lighting? Wahl says, "Customised lighting can be very effective for enhancing building design elements and it gives our design team the opportunity to learn more about different materials and lighting techniques. On occasion we have developed a special light fitting for a project and then used elements of the design to develop a standard, more functional light. From concept to the



Elements of a special light fitting, such as this one for Centurion Mall, can be used for standard lights.



This fitting is a work in progress for Nelson Mandela Square.



Pamboukian light design worked with Regent to create these fittings for Woodlands Boulevard.



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completed product the process is iterative and often requires some compromise by all parties to accommodate sight or manufacturing parameters; having a professional team that is clear about its objectives and requirements makes the process much smoother.

Also, specialised lighting is the differentiator that keeps the company relevant. Wahl explains that the transition to LEDs has been radical and that by offering design solutions that clients require, the company remains viable. In addition, and as importantly, it is interesting, creative work. "We have invested heavily in design software and for our in-house designers it is stimulating to work on innovative and varied projects and products. It is a journey and the flexibility we offer allows us to learn from our clients and vice versa. By offering solutions we are able to develop long term relationships in our industry. The challenges associated are outweighed by the collaborative learnings.

Atrium on 5th

Previously known as the Sandton Twin Towers, this 32 year old structure in the Sandton CBD underwent a major refurbishment during the course of last year. The outdated exterior of the building was transformed by the addition of a new façade and glass atrium linking the two towers across all floors. In a bold design move by the architects, the building's overhanging beams with recess windows were transformed by cloaking the building in a high performance double glazed unitised façade to lend it a modern, sophisticated feel. The building's glass façade has made it one the most eye-catching buildings in Sandton and the suspended glass atrium, a first in South Africa, has a light post tensioned steel work structure which is not visible through the glass sheeting.

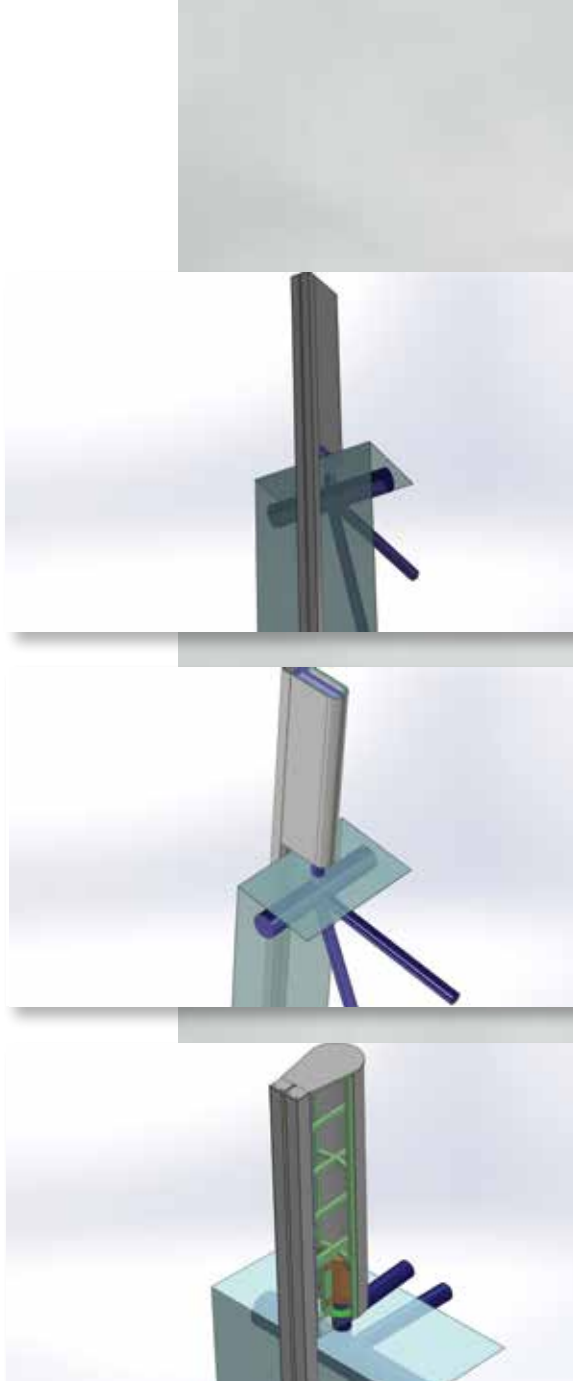
Pat Henry of MDS Architecture was the architect on the project and created a striking lighting feature to crown the top of the structure. Regent Lighting Solutions worked with him on the design and creation of the 'Tiara'.

The Tiara consists of 12 LED light fittings that stand proud of the glass façade at the front of the building – and range in height from around 6.7 m each to form the shape of the tiara – and a further 36 fittings that form part of the cladding crown around the circumference of Atrium on 5th.

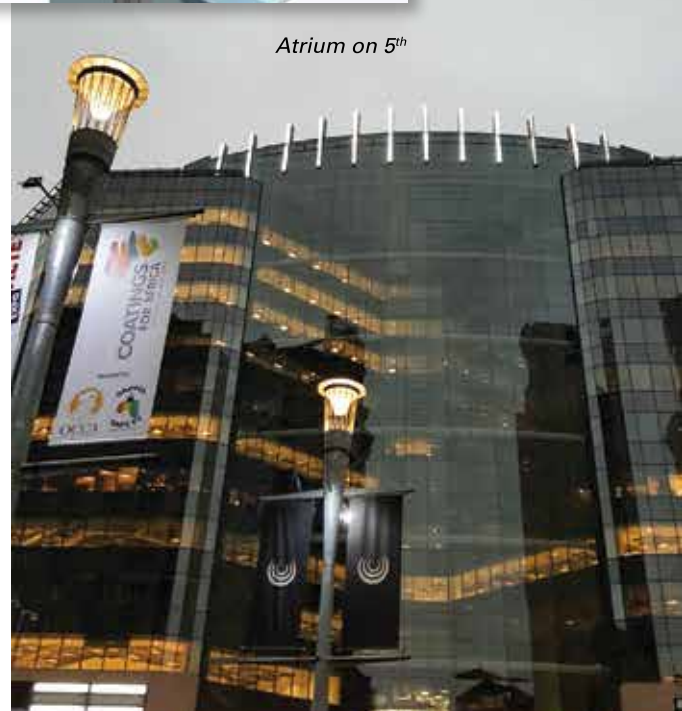
The tubular fittings of the Tiara struts, which are made from aluminium, fit into a tubular steel frame that is attached to the glass by means of a special bracket that makes up most of the fitting. In comparison, the actual area of light is small.

The designer, Jose Loureiro and consultant Robert Alexander had to work closely with the architect and then the structural engineer to monitor how the uprights were being built and ensure that Regent's light fitting would fit. The extrusions had to be according to spec, and the whole design had to accommodate the wind loads that would be faced at the top of the edifice.

The project has been completed and the Tiara adds the final touch to this landmark building. LID



Atrium on 5th



Intelligence takes many forms

by Craig DiLouie, education director, Lighting Controls Association

While the LED light source has received a lot of attention in recent years, another revolution in lighting systems has been quietly developing – intelligent lighting control. The future of lighting may be solid-state, but it will be highly controlled.

Fully realised, intelligent control allows control zoning as granular as individual luminaires, detailed functional programming, zoning and rezoning independent of wiring, layering of control strategies and two-way communication. Which means lighting that is highly flexible and responsive can be controlled in layers of strategies, which can be changed as needed, and provides energy and maintenance information.

An intelligent lighting control system is comprised of dimmable ballasts or drivers, accessory devices such as switches and sensors, power controllers (which may be the ballast, driver or local controller) and supporting hardware used for communication and data storage.

The lighting controller – the processor, or intelligence – may reside within the control devices, intelligent panelboard or central server. The power controllers may be connected via dedicated control wiring or radio signals to build a network in which each controller has a unique IP address. These controllers can be programmed and controlled individually and/or in groups. Manufacturers use a variety of configurations, so it pays to get to know each system.

The solution may be luminaire-, room- or building-/campus-based. The majority of intelligent lighting control systems being installed today are room-based. Lighting controls across the room or within each luminaire act as independent control systems.

A typical solution includes plug-and-play sensors, switches and relay-based power controllers to switch and dim loads. Some systems are based on two-output controllers for control of two zones. Some feature wiring allows rooms to be linked within a scalable building network. They typically offer preconfigured sequences of operation that

optimise energy savings and ensure energy code compliance. The advantage of this type of system is its simplicity, and it is scalable.

For years, standalone controls have been available as an onboard option for luminaires. The latest generation of luminaire-based controls pairs onboard sensors and a controllable driver with LED luminaires that communicate with each other wirelessly and can be preconfigured to simplify commissioning.

Building-/campus-based solutions may use locally distributed intelligent panelboards or centralised server-based control. An intelligent panelboard simplifies system design and installation by integrating branch circuit protection and lighting control functions in a single panel enclosure. These systems are well suited for medium to large interior spaces and exterior applications, and may be supplemented by room-based systems to implement control strategies in smaller spaces. Integrated metering options, including panel and branch circuit metering, onboard Ethernet communications and web tools, allow use of common web browsers to configure, program, monitor and control loads. They can integrate with building automation using onboard BACnet communications.

Server-based approach

Centralised server-based systems are comprised of devices communicating with a central server. This type of system provides a single point of control for a building or campus, facilitates ongoing lighting management and can collect energy information. A network solution provides more granular control at the luminaire level, permits programming of complex control strategies and can conduct monitoring for maintenance. This option may offer the best opportunity for energy savings and information, though it typically poses a higher cost and greater complexity.

Looking more closely at server-based systems, the network must be connected within a topology. These systems may be wired, wired with wireless accessory devices or wireless. A variety of wired

topologies are used, with the most common being a bus (basically the same as a computer network). All control devices are connected using a single pair of low voltage wires or using Ethernet or proprietary cabling. For greater flexibility, some wired systems incorporate wireless accessory devices (for example, switches and sensors) that communicate with the system using one or more central gateways. Alternatively, the system may be completely wireless, with the majority using a self-healing mesh or star topology.

The system is designed in accordance with a common protocol. The protocol may be open, such as DALI and ZigBee, allowing products from different manufacturers to mix in the same network. Or it may be proprietary to a manufacturer. For the control system to integrate with a building automation system (BAS), the two systems must share the same native protocol (such as BACnet); alternatively, one can use a gateway and/or programming that can translate data crossing between the systems.

The system is set up and operated using software that resides on the server and is accessed remotely from a workstation. The programmer can create zones, discover devices, assign the devices to zones, set up schedules and control profiles, create user/access levels and calibrate sensors. The operator can change any of this during the life of the system. The system operator accesses the server remotely from a webpage or program on a computer.

Intelligent lighting control systems are changing lighting as we know it from fixed, dumb systems into highly flexible, responsive and controllable systems. These solutions will continue to gain in popularity as energy codes become increasingly complex and LED lighting becomes increasingly common.

AJ Glaser, chairman of LCA, contributed to this article, which appeared in the May 2015 issue of LD+A, and is reprinted with the kind permission of the Illuminating Engineering Society of North America. **LD**

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Lighting control with the click of a mouse

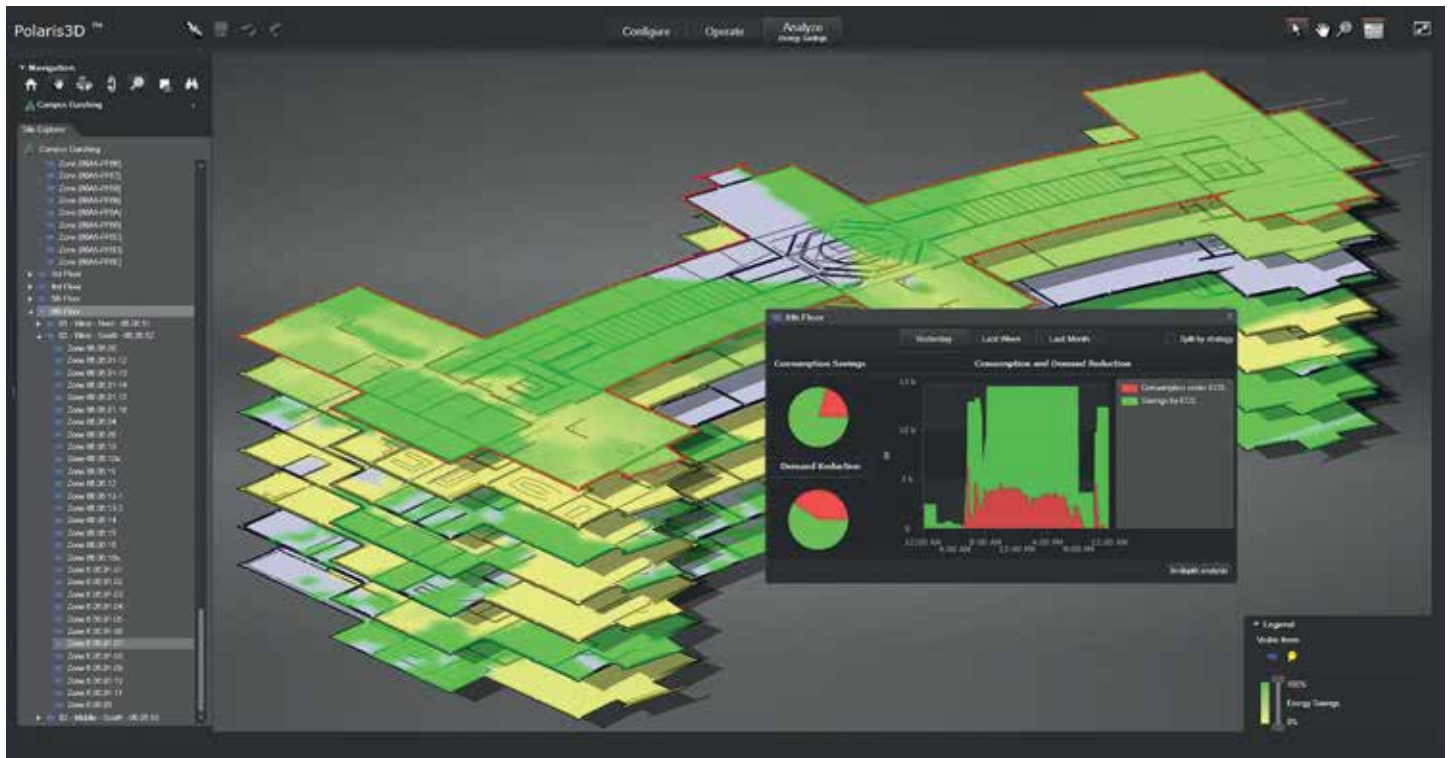
Much of the development in the field of lighting is taking place in light management with the creation of intelligent lighting solutions that offer advanced levels of energy efficiency, flexibility and personalisation. In line with this move to operational effectiveness, Lighting Innovations and Osram have teamed up to offer the South African market Encelium, an advanced lighting control system that also provides energy savings of up to 75%.

Encelium is a scalable, wireless or wired lighting control system that has been created to maximise energy saving. It includes hardware (based on DALI technology) and Polaris 3D software, which represents the core of the system. Being a web server based software platform, Polaris 3D allows real-time control by remote access and offers an enhanced 3D graphical interface to get all the details of the lighting installation under control through the click of a mouse.

The Encelium solution is a flexible and cost effective way of managing lighting. It is one of few lighting control systems that can gather data from a range of lighting component suppliers to tailor lighting usage with changing requirements. It uses six different strategies to achieve energy saving: time scheduling, occupancy detection, daylight harvesting, task tuning, personal control and load shedding. By using embedded algorithms and an easy configuration process, it is possible to mix the six strategies to optimise saving and customise the behaviour of Encelium according to application characteristics and customer needs.

In particular, the combination between 'time scheduling' and 'occupancy detection' allows users to eliminate typical behaviour linked to unmanaged buildings, where lights stay on for the whole working day (and sometimes even during the night), whether or not any or all employees are still at work.

In office complexes or buildings, it is not uncommon to find lighting designs that offer an over-illuminated environment (at 100% light flux). To avoid this, Encelium uses the 'task tuning' strategy, limiting the maximum light level of the luminaires to achieve the right illumination, but leaving full freedom in the lighting design. Just by using this strategy, it is possible to reduce power consumption



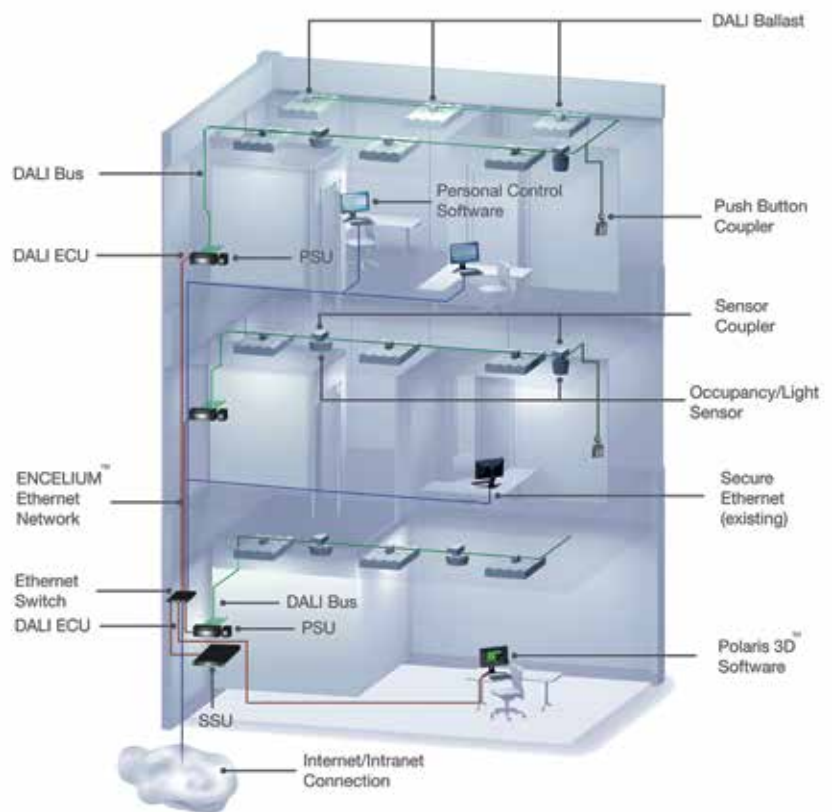
by 15-20% immediately. The 'dimming buffer' can be used to guarantee the minimum illumination level required by law and to compensate for the aging effect that decreases the luminous flux.

Finally, by using 'daylight harvesting' and 'personal control' strategies, Encelium is able to improve personal comfort by fine tuning lighting levels according to the contribution of natural light, or according to the wishes of the occupants.

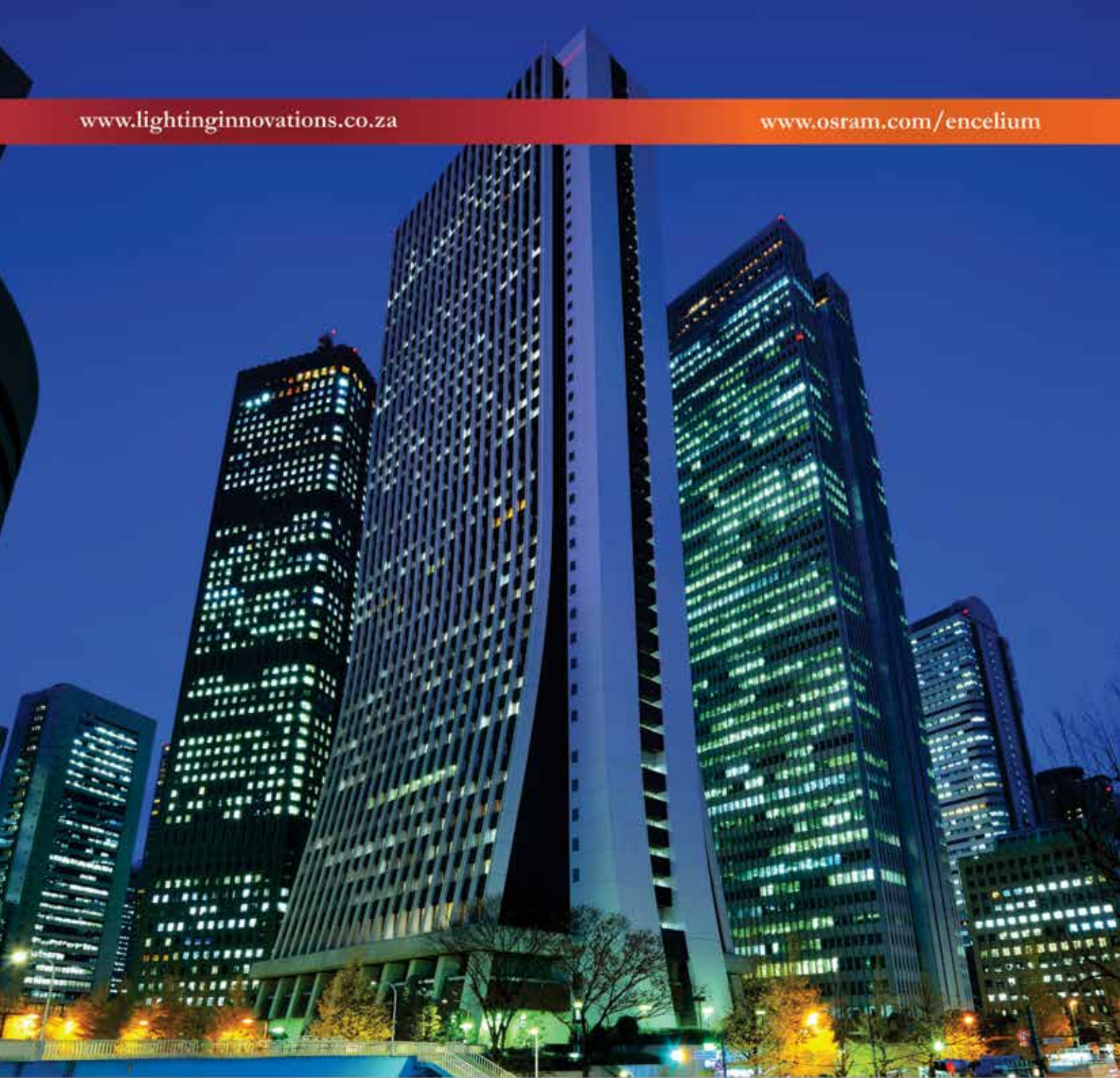
The architecture of Encelium is simple, and includes few hardware components. The system is based on a PC rack server (named SSU), connected by an Ethernet backbone to one or more field control units (named DALI ECU). Each DALI ECU provides four DALI lines able to manage up to 256 DALI outputs (like DALI ballasts, and DALI actuators). The same DALI lines coming from the DALI ECUs are used to connect the DALI inputs such as sensors (for presence and daylight detection) and push buttons. The number of DALI ECUs connected to the SSU is unlimited, ensuring the unlimited scalability of Encelium to manage big buildings, or even campuses with multi-building configurations.

With this architecture, it is possible to have all the input/output components managed by a simple two-wire non-polarised DALI bus, with a convenient solution for installation and cabling. Furthermore, since the Encelium hardware is based on a standard DALI technology, this allows the system to be compatible with any DALI certified ballast from any manufacturer. It is also possible to integrate Encelium in any external Building Management System (normally used for HVAC control, security, etc.) using a standard BACnet IP interface. Simplicity of installation is paired with simplicity of

Polaris 3D allows real-time control by remote access and offers an enhanced 3D graphical interface to get all the details of the lighting installation under control.



The architecture of Encelium is simple. The system is based on a PC rack server, connected by an Ethernet backbone to one or more field control units.



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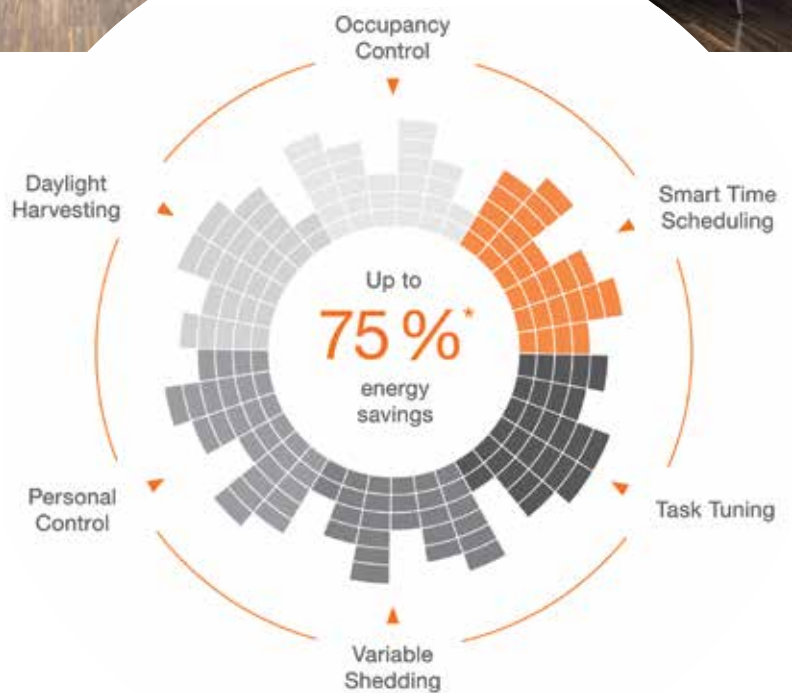


Encelium uses six strategies to achieve energy saving: time scheduling; occupancy detection; daylight harvesting; task tuning; personal control and load shedding.

operation of the Polaris 3D software used for the programming and daily management of the Encelium system. The advanced 3D graphical interface allows users, in a convenient way, to visualise all the main details linked to the lighting installation by a colour gradient view, providing the building overview in a nutshell. All the operations in the software are executed by drag and drop action, to avoid any low level programming.

By using the feedback capabilities of DALI, the Polaris3D software is capable of providing real-time information about the status of the luminaires showing, on one hand, any faulty devices (with the possibility of seeing if the fault is owing to the lamp or the ballast) and providing, on the other hand, a clear overview of lamp and ballast lifetimes. This functionality enables maintenance managers of buildings to have useful screenshots of lighting installation statuses (also accessible remotely by Internet connection), allowing them to plan maintenance for end-of-life lamps and ballasts. Furthermore, the maintenance managers will receive alarm messages in the case of faults and systems malfunction since they are being updated in real time about the status of their lighting installations.

The advanced control provided by Encelium is evident in its reporting functionalities. In particular, the Polaris 3D software offers the option to run analysis for the energy consumption of the lighting installation, with a granularity up to a single luminaire. This means that facility managers are, through the click of a mouse, able to take control



of energy consumption for the entire building; for each floor; or even for each room. By being able to visualise the contribution of each energy saving strategy to the overall saving strategy, facility managers are also able to further optimise the configuration of their systems to ensure continuous performance improvement.

As the energy crisis in our country continues and changing legislation dictates how we use energy in the future, Light Management Systems will become more and more important. LID

Managing light efficiently

"Reduced lighting usage lowers operating costs and helps to decrease Green House Gas (GHG) emissions. Additional savings include reduced lamp replacement and maintenance requirements and lower power demand during peak hours," says Luk Ivens, general manager, Legrand Southern Africa. Legrand's lighting management sensors are used to monitor the detection area for occupancy and to control lighting and HVAC circuits. Lighting is automatically switched on when human presence is sensed. Where sensors are equipped with a built-in light level sensor, lighting is kept off when sufficient natural light is available. When the area is vacated, the lighting automatically switches off after a pre-set time delay.



Legrand PIR ceiling mounted lighting management sensor. This switch sensor, with 180° infrared detection, is ideal for passageways.

Motion sensors, with an automatic switch on/off facility, are recommended for areas with little or no natural light, for example, in passageways, bathrooms and equipment rooms. The Passive Infrared (PIR) technology of motion sensors detects occupancy up to eight metres, by identifying the difference between heat emitted from the human body in motion and the background space.

Lighting management sensors – designed for shops, offices, healthcare buildings and warehouses – have a manual or automatic switch on/off, according to whether there is anyone present and natural light levels. These sensors have built-in adjustable lux sensors that keep the lighting switched off if there sufficient natural light. Detection by lighting management sensors is based on PIR technology and dual technology (DT), which ensures maximum sensitivity and coverage in applications for optimum reliability and energy saving. Legrand sensors work in occupancy mode, where lights are automatically switched on or off according to occupancy, or in vacancy mode for additional energy saving, where lights are manually switched on and automatically switched off when the person leaves the area. For enhanced flexibility, switch sensors can be combined with room controllers to manage a number of lighting and ventilation circuits. For example, in areas where daylight is unevenly distributed, a sensor can be combined with a row of luminaires to measure



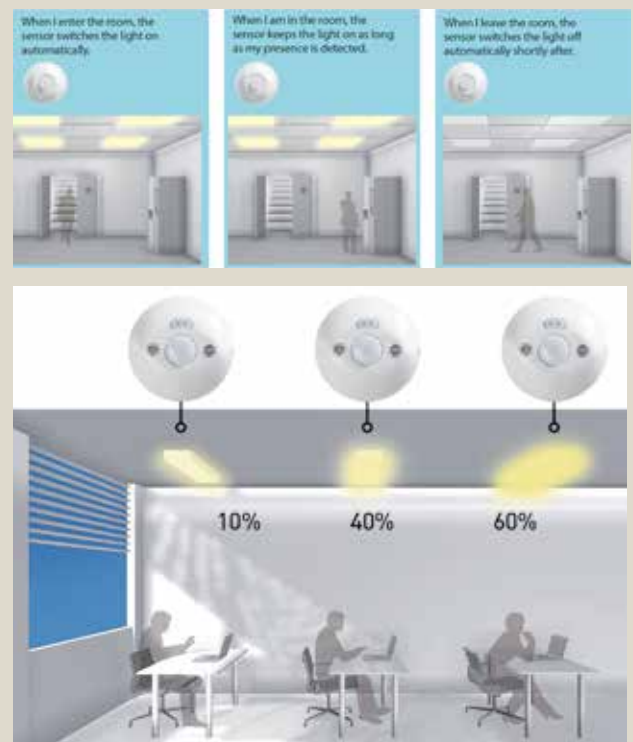
Legrand dual technology ceiling mounted lighting management sensor. This switch sensor is suitable for work areas with natural light, for example, meeting rooms, classrooms and open plan offices.

motion and light levels. The dimming controller regulates each row of luminaires and supplements the external light to obtain the required pre-set light levels.

Once the sensor and controls have been selected for each installation, Legrand offers a choice of local BUS/SCS control or the global BUS/KNX solution for lighting management. In addition to BUS/SCS, BUS/KNX wiring enables supervision and integration of other building applications, including emergency lighting, HVAC and fire alarms.

Legrand's lighting management systems have been designed and manufactured to meet quality, safety, energy efficiency and budget needs throughout the world. By installing lighting management and other automated controls, energy waste is avoided and the building consumes only the energy it needs, when it needs it.

**Legrand SA: + 27 11 444 7971 or
www.legrand.co.za**



Combination – sensor and room controllers

For enhanced flexibility, switch sensors can be combined with room controllers to manage a number of lighting and ventilation circuits. For example, in areas where daylight is unevenly distributed, a sensor can be combined with a row of luminaires to measure motion and light levels. The dimming controller regulates each row of luminaires and supplements the external light to obtain the required pre-set light level.

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Digital LED illumination for Cape Town monuments



Philips, a leader in LED lighting, kicked off its sixth consecutive Cape Town to Cairo roadshow by lighting up the Clock Tower, the Port Captain's building and the Swing Bridge, at the V&A Waterfront in Cape Town. This year's roadshow theme is 'Sustainability through innovation'.

As a contribution to enhancing the attractiveness of iconic monuments while reducing energy consumption across Africa (a project started during last year's roadshow), Philips has installed its latest Vaya LED lighting solutions combining warm and cool daylight colours to create an almost mythical atmosphere around the Clock Tower, the Port Captain's building and the Swing Bridge. The installed lighting has a lifetime of up to 50 000 hours and each luminaire has its own IP address; a precursor to the future of connected lighting in an environment steeped in history.

Lighting is thought to consume around 15% [1] of the total electricity output of an industrialised economy like South Africa's; it has been calculated that approximately half of a city's energy bill goes on lighting – for public offices, schools and outdoor environments. It is possible to make significant savings – on average 40% – simply by switching to energy-efficient lighting technologies.

With electricity use being a constant concern across the continent, workable and sustainable solutions are essential. Driven by an increase in urbanisation and transformation, a tremendous opportunity for economic and social development exists; however, large scale growth also presents challenges with regard to energy and energy efficiency is crucial to achieving smart cities of the future that are liveable, safe and aesthetically pleasing.



The V&A Waterfront is a popular destination for international and local visitors to Cape Town as well as for locals; and the illumination of the monuments at the Waterfront adds to the beautification of the area.

The stately, Victorian Gothic Clock Tower was built in 1883 and was the Port Captain's first office in the newly constructed Cape Town harbour. It housed the tide gauge mechanism which worked by a shaft connected to the sea. It also contained all the instruments that the Port Captain needed, such as a clock for ships to see the correct time, signal flags, Morse lamps and a telescope. With the rapid growth of the harbour, a beautiful gabled building was constructed in 1904 to house the Port Captain who till then operated from the Clock Tower.

Advantages of the Philips Vaya LED lighting solutions provided at these monuments include:

- Dynamic lighting that makes it possible to adjust the atmosphere of the site.
- A longer lifespan: around 50 000 hours compared to 12 000 with conventional lighting.
- A reduction in maintenance costs.

"The lighting of these monuments goes a long way to beautifying aspects of the waterfront," says

Colin Devinish, executive for operations, V&A Waterfront. "As a destination popular with international visitors and frequented by locals we constantly strive to improve and enhance this important part of South African history; collaborating with Philips was a win-win."

Cape Town is the first stop on Philips' annual pan-African Cape Town to Cairo roadshow, which will cover 12 000 km across 11 cities and eight countries over a period of four and a half months. The roadshow has gained significant momentum over the past five years, allowing Philips to get to the heart of some of the key issues facing Africa – advancing healthcare access, leading the LED lighting revolution, and providing products and solutions that meet the aspirational needs of the rising middle class.

This year too, while driving the conversation around sustainable energy solutions, Philips has pledged to illuminate iconic national monuments or provide road and street illumination with digital LED technology, leaving a permanent legacy while reducing energy consumption.

[1] Lighting Africa www.lightingafrica.org/

Philips: www.philips.com

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- Surge protection 10kV/10kA
- Designed to replace HID post top luminaires (up to 100W HPS)
- Provides energy savings of up to 70%
- Low glare lighting



Being sustainable today

The American International School of Johannesburg (AISJ) Aquatics Centre has won architectural awards in South Africa and the United States and BEKA Schröder was awarded the task of illuminating this outstanding aquatic facility.

As a preferred lighting solutions provider, the company worked alongside Rawlins Wales & Partners and Grosskopff Lombart Huyberegts and Associates to provide and implement a successful lighting design for the project, which required a lighting solution where ease of maintenance and access to the luminaires were prime criteria. This was successfully achieved whilst providing the correct lighting levels and taking into account a solution that would suit the environment aesthetically. The robust BEKAMAX floodlight range mounted on specially manufactured brackets was used for this purpose.

Minimising its ecological footprint is a priority for BEKA Schröder on any installation. At the forefront of the major driving force for the switch to LED lighting, the company is committed to offering lighting solutions that drastically reduce energy consumption. By combining the best of LED technology with a wide range of control systems, solutions offer energy savings of up to 85% and reduce the

payback time on new installations.

'Commitment to tomorrow by being sustainable today' is an ethos BEKA Schröder believes is shared by many of its clients and the company is confident that this philosophy will dictate the specification of lighting solutions from here on. And, the process is ongoing and fast moving. For example, BEKA Schröder can already offer an LED solution on the aquatic application that would save 25% more energy by replacing the existing luminaires with the new and highly efficient OMNIstar modular LED floodlight range. The long term maintenance reduction achieved by using LED technology, and the possibility of light controls would mean further energy savings.



OMNIstar, the highly efficient modular LED floodlight range.

**BEKA Schröder: +27 11 238 0034 or
www.beka-schreder.co.za**



Another lamp joins the series

With Louis Poulsen's successful relaunch of Poul Henningsen's design icons, another excellent lamp is being added to the collection.

Warm materials are currently a must in interior design, and this table lamp is sure to add warmth and comfort to any interior. The lamp comes with two top shades – an opal glass shade, which together with the two bottom glass shades provides soft comfortable diffuse light, and a polished solid copper shade with a white painted inner surface, which provides softly concentrated downward directed light on the table surface.

"Every home should have multiple points of light in each room," notes Louis Poulsen's showroom manager, Lisbeth Mansfeldt, who provides advice to private consumers. "Too many homes have too few points of light, resulting in an uncomfortable light. With extra light points you create small oases and emphasise the room's dimensions in a better and more atmospheric way."

Table lamps are easy to move around, and provide pleasant low intensity lighting, creating still life scenes on side tables, bookcases or sideboards. The PH 3½-2½ copper table lamp comes with a high gloss surface, but the copper will develop a patina unique to its given setting, adding further personality, if desired.

Many people want their copper lamps to develop a patina and Louis Poulsen has therefore chosen not to surface treat or lacquer the copper on this and many of its other copper light fixtures. The patination process begins from the moment of assembly, and proceeds during production and distribution. When a product is taken out of the box, it may

thus have already begun oxidising. Louis Poulsen provides a set of white cotton gloves with each light fixture, so people can avoid leaving fingerprints during installation.

This limited edition can only be ordered during April, May and June, giving people the opportunity to supplement their collection of PH fixtures. Those who have not yet started can obtain a piece of Danish design history, which despite its age, will have a modern and atmospheric appearance for several generations.

The PH 3½-2½ copper table lamp is 46 cm tall; a practical height providing good working light with either type of shade. The three-layer opal glass shades are polished on the outside and sandblasted on the inside. The switch is located on the cord.

PH 3½-2½ copper table lamps will be made in response to incoming orders, and only the exact number ordered will be produced.

**For further information, contact
Louis Poulsen: info@louis Poulsen.com**





Africa LED expo

Africa LED expo, an international exhibition designed to highlight developments and innovations in the LED lighting industry, will take place from 22-24 July 2015 in Hall 1 at the Gallagher Convention Centre, Johannesburg.

Exhibitors will share knowledge and demonstrate products so that best practices can be communicated to stakeholders and visitors can attend lighting lectures at the conference hosted at the exhibition.

The event will focus on architectural lighting; decorative lighting; commercial lighting, entertainment/gaming lighting and industrial lighting. Visitors to the expo will include architects; lighting designers; commercial property owners; electrical engineers;

ad agencies; the hospitality industry; casino/gaming industry and illumination professionals.

The expo is to be co-located with Sign Africa since there is a distinct synergy with the application of respective products such as printed wall coverings, printed window graphics, way-finding signage, Plexiglass, Perspex and other composite materials used with signage and building design.

Entry to the exhibition is free. Register online to receive confirmation and gain quick, easy access to the event.

**Africa LED Expo: www.africaledexpo.com
or email info@africaledexpo.com**

GLP Spot Ones for Harbin Music Hall

The Chinese city of Harbin is well-known for its music and for hosting the Harbin Summer Music Festival (among other events), which is 40 years old.

Now, the new Harbin Music Hall has been developed to host this famous event. Conceived in 2010, the spectacular building was designed by Japanese designer, Arata Isozaki. The shape of the design resembles floating ice crystals – demonstrating the art of ice engraving.

With a floor space of 20 000 m² and surrounding areas occupying a further 13 000 m², the main hall contains 1 200 seats, while the smaller studio room has capacity for around 400 seats. Peripheral areas include changing rooms for artists, restaurants, coffee houses and rest rooms.

The technical infrastructure at the Harbin Music Hall is based on high level concert spec and among the lamp brands specified by installers Guangzhou Ruisheng Lighting & Audio Equipment, working under consultants Arata Isozaki & Associates of Shanghai, were GLP's (German Light Products) Spot Ones. The fixtures were supplied by China-RS, GLP distributor for China and Macau, which was also responsible for the audio and lighting design.

The impression Spot One caused a sensation when it was launched as the first LED spot fixture of its kind – harnessing the output of enough LED sources and being run through the optical system of a spot fixture to create an even beam for RGB colour mixing. The fixture features an RGB LED engine with 8 or 16 bit control over each colour, allowing for incredibly delicate colour changes or instantaneous colour bumps, with a vast colour spectrum ranging from soft pastel colours to deep saturated shades.

The grand hall uses no fewer than 42 Spot One fixtures: 24 on the overhead truss, six more as a floor package, while in the small hall, eight Spot Ones have been deployed in the overhead truss and a further four as a floor package.

The construction of the music hall has been geared up to welcome the 2015 New Year's Concert of Harbin, featuring Harbin Symphony Orchestra, China's oldest symphony orchestra. Meanwhile, Harbin's previous music hall, which was established in 1990, has now been transferred to private investors for commercial business development. German Light Products GmbH is a leading manufacturer of cutting edge lighting technology equipment and in recent years has been at the forefront of LED technology in the use of entertainment lighting.

**GLP German Light Products GmbH:
www.glp.de**



Major Tech's new showroom

Major Tech has recently completed a new, modern and functional lighting showroom to display the company's extended lighting offer.

"Take time to browse through our lighting showroom and let our experienced sales people explain what is on offer in terms of illumination, light sources, dimming capabilities and other practical considerations so that you can make an informed lighting choice," says the company's Werner Grobbelaar.

"Our range includes modern pendants, bollards, downlights, sconces and step lights, but the focus is not on practicalities alone. Lighting does not have to dull or boring and we have several lighting options available – our range of contemporary pendant lights offers more than adequate task lighting so they're not only practical and functional but are also stylish," he says adding that they can be used successfully in homes, offices, bars, restaurants and hotels.

"Apart from offering ample illumination, they bring a balance of beauty and contemporary style. The acrylic lens pendant lights have 3 W LEDs and are available in cool white, warm white and RGB."

He explains that the RGB fittings are supplied with a remote control to change the colour manually or to select the desired colour changing program.

"The cool white and warm white versions are available with a dimmable function and in various shapes and sizes to suit different environments," he says, "and the beauty of LED is that there is no projected forward heat and the fixture always remains cool to the touch."

Features include:

- Machined and extruded aluminium housing.
- Impact-resistant clear acrylic lens.
- LED colours available: warm white, cool white and RGB (P2SA-30RGB / P2SA-31RGB).
- 100 cm cable supplied with light.
- Easy access to LEDs and drivers in cover plate.
- Different styles to suit various requirements and applications.
- Multi-volt: 85 V ac to 265 V ac.
- Easy to install with fixing bolts included.

Getting the lighting requirements right first time round saves money in the long run.

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To take a stroll through **Majortech's** new showroom, simply download the QR Code Reader App from Android Market or the App Store, scan the QR code and watch the video.



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Old masters in a new light

The *Fränkische Galerie* (Franconian Gallery) is housed in the Rosenberg fortress that dominates the historic district of Kronach in Germany. Its collection comprises some 200 masterpieces of painting and sculpture from the Late Gothic and Early Renaissance periods – including paintings by Lucas Cranach the Elder (1472–1553), who was born in Kronach. As part of a recent upgrade of the exhibition rooms, Katrin Söncksen from the lighting design office *lichttransfer* in Berlin devised an energy-efficient lighting concept that is configured precisely to the requirements of the artwork while creating focal points.

Much like a subtle guidance system, the light directs visitors through the exhibition rooms in the museum. A choreography of high-contrast accent lighting stages the individual objects in each room as required for an optimised visual experience.

The lighting designers opted for ERCO's 12 W Optec LED spotlight here, which offers interchangeable Spherolit lenses and diverse light distributions for fine and precise adjustment to the characteristic features of each exhibit: The filigree motifs of the panel paintings and winged altars are rendered realistically and without reflective glare in exceptionally soft light.

Brilliant light enhances the three-dimensional effect of the wood sculptures and previously indistinguishable colour versions are made perceptible. The colour scheme of the rooms in a light shade of grey enhances the intensity of the exhibits illuminated in warm white light. Optec proved a sustainable alternative in terms of low energy consumption and exceptionally long life, but also from a conservational aspect: At 3000 K, the warm white LED light is free of ultraviolet and infrared components. This reduces the damage potential of the lighting significantly and makes it better suited than halogen lamps with UV filters.

Erco: www.erco.com



Photographs by: Alexandra Lechner.



Milan efficient, safe and eco-sustainable

Milan, the second largest city in Italy, has reinvented itself to appear in a more efficient, eco-sustainable and safer light. It is the first large city in Europe to take the decision to upgrade, on a large scale, its road lighting to LED. AEC Illuminazione, which won the tender from the regional energy supplier (A2A S.p.A.), has installed 100 000 ITALO lanterns.

Significant savings in energy and maintenance costs, state-of-the-art luminaire design and a distinctly improved quality of light for the streets and lanes of the urban metropolis, won AEC Illuminazione the contract. The 'Milan LED' project has profered a 51,8% reduction in energy costs and a 31% general cost cutting. Milan's city hall stands to save 10 million euros on energy in the first year alone.

Milan has implemented a true city restyling so everything is in line with the most modern Smart City. When a city chooses LED luminaires,

it makes an ecological choice. LEDs have allowed Milan to obtain many advantages in terms of eco-sustainability: the city will release 23 650 less tons of CO₂ and use some 60 000 less lamps each year – this means that nine tons of RAEE refuse will be saved a year. In addition, all the mercury and other polluting materials used in the previous lamps have been removed.

ITALO luminaires emit comfort and homogenous light for ideal visual conditions. The use of new LED technology has led to an increase in reliability, safety and efficiency and the luminaires have completely changed the urban landscape of Milan in full compliance with reference standards on light pollution. The LEDs concentrate the light emission towards streets and pavements without any upward emission.

www.aecilluminazione.com



LED

30 000 Hours



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B22 & E27 bases
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80%
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or Cool White

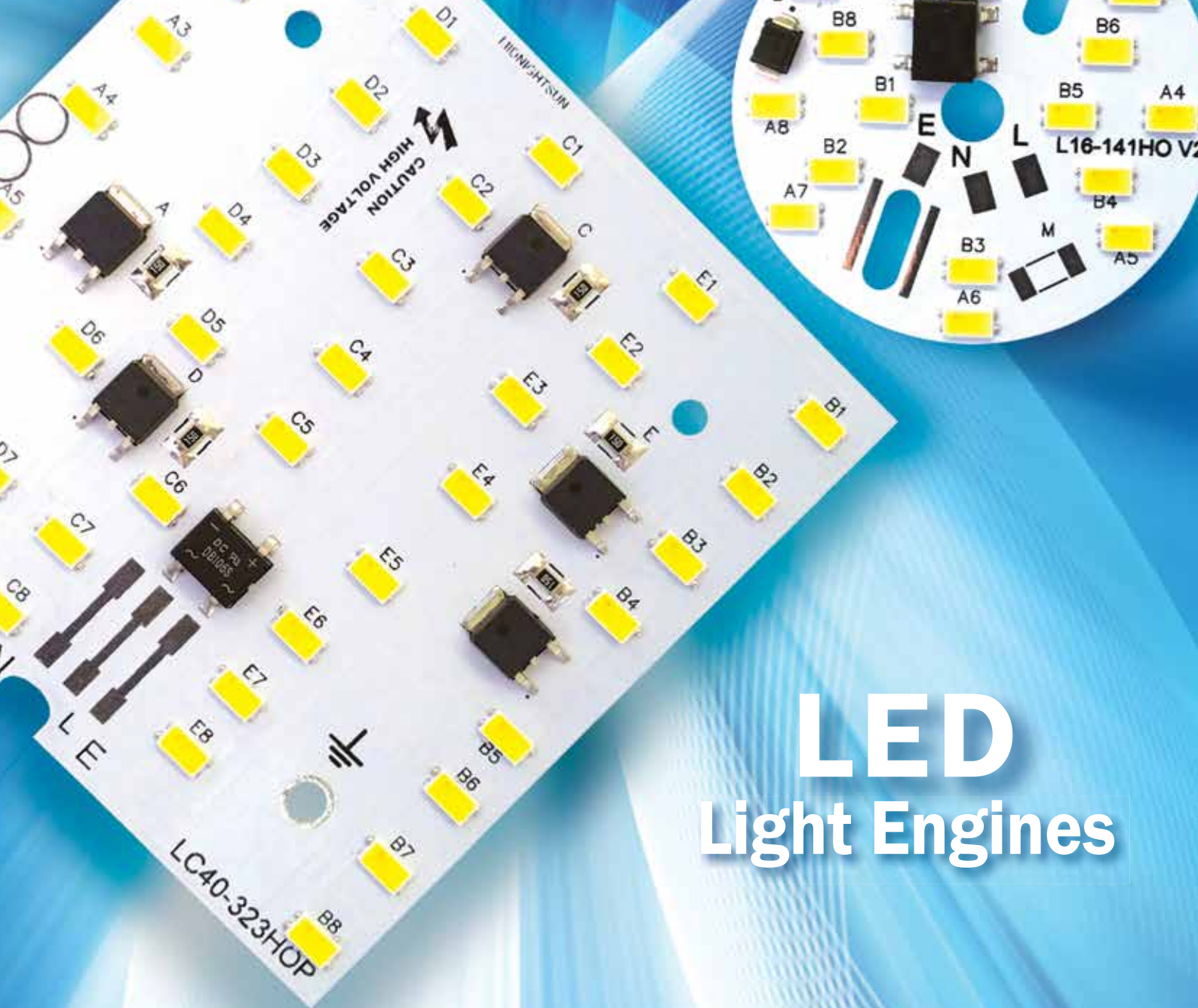


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