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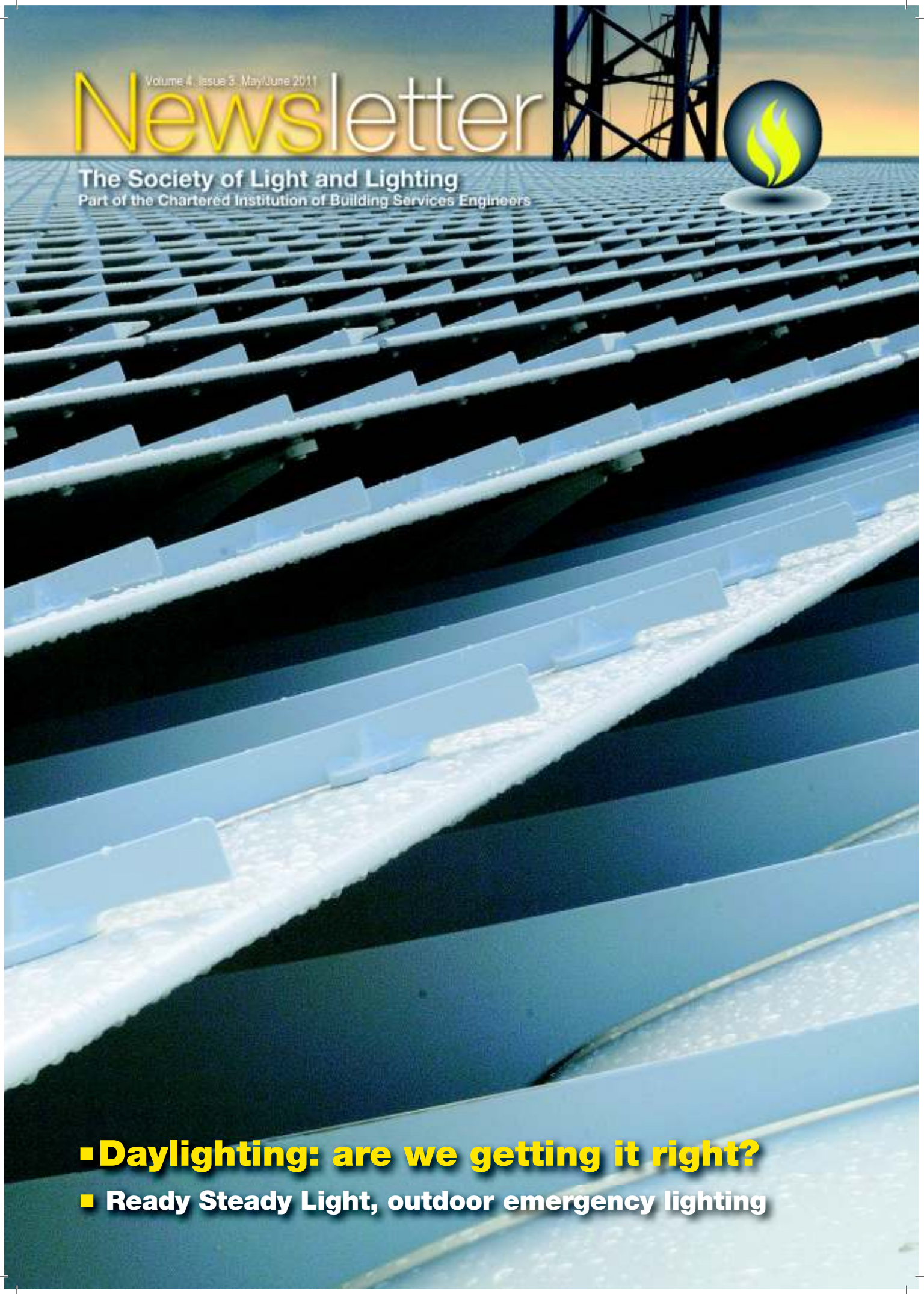
Newsletter

The Society of Light and Lighting
Part of the Chartered Institution of Building Services Engineers



- **Daylighting: are we getting it right?**
- **Ready Steady Light, outdoor emergency lighting**

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Editorial

In the recent SLL event on daylighting (see p6), Barrie Wilde mentioned that in 52 years of lighting design he had been called upon no more than 10 times to sit with the architectural design team at the conceptual stages of a building development. Which, to say the least, is something of an indictment of our building design process.

Although the human race always regards itself as marching onwards and upwards to ever higher levels of civilisation, our propensity is actually to take two steps back for every step forwards and frequently to forget the lessons we have already learnt. Our neglect of daylight use in buildings is a classic example.

The ancient Greeks built solar cities, the Romans legislated for the public right to sunlight, and numerous medical professionals from Florence Nightingale to Nobel Prize winner Niles Finsen recognised it not only as a healing aid, but also an anti-bacterial agent (Finsen was awarded the Physiology prize for his success in treating tuberculosis with concentrated ultra-violet light).

In the early part of the 20th century architects actively championed the inclusion of daylight ingress in their designs, according to Dr Richard Hobday, who has written several books on the healing properties of sunlight. 'Architects produced houses, schools, hospitals, public baths and other facilities that were sunlit to promote health and hygiene. None more so than the pioneers of Modernism.' In his manifesto, The Athens Charter, Le Corbusier proclaimed that, 'To bring in the sun, that is the new and the most imperative duty of the architect.'

But no, we turned our back on the sun, preferring to angst about glare and heat gain (as if it was beyond our engineering wit to cope with these factors) and resorted instead to an artificial substitute.

Apart from anything else, common sense tells us that we feel much better in

a daylit environment than in a windowless room, and it seems perverse in the extreme to use an expensive, carbon-generating resource while ignoring a free and natural source of illumination.

However, the point now is that the pressure to save energy is and will be the biggest driver to exploiting daylight much more extensively. The question is how do we knit daylight design expertise into the building design process at the crucial early stage, when issues such as orientation, massing and glazing can be addressed? It is easier with multi-disciplinary practices such as Arup, and also BDP, which has for some years cross-pollinated the relevant disciplines.

Former head of BDP Lighting Martin Lupton has argued in a previous Newsletter that this actually represents an opportunity for the lighting profession to extend its remit and value. 'We need to be the ones banging the drum about the importance of natural light,' he said.

Utlimately, though, it is down to architects and developers to embrace specialist daylighting expertise as they have begun to recognise the need for professional electric lighting designers..

Jill Entwistle
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Front cover: Arup's 'flying carpet' daylight control system for the Art Institute of Chicago. See Daylight: are we getting it right? (p6,7&8)

This time last year the Approved Documents for the latest revisions to the Building Regulations were released. We saw a rise in the headline numbers, but most people I spoke to both at the time and since have been disappointed with them and with good cause.

The core purpose of Part L is to 'further the conservation of fuel and power', but it can be argued that the current regulations fail in this fundamental objective. We are a decade into the 21st century and yet we find ourselves in a situation where photocells and PIRs are treated as 'advanced' controls. I think most lighting designers would have a very different definition.

The current lack of emphasis on controls is perhaps the biggest flaw; it potentially allows luminaires, whether they are 55lm/W or higher, to be left on at 2am in a deserted building. We all know the most efficient luminaire is the one that is switched off, so how can a measure of luminaire performance on its own be a measure of efficiency? Of course it can't, which is why we need to make changes.

'We need to demonstrate that energy consumption of a system is a far better metric than the one we have'

The good news is that the Department for Communities and Local Government (DCLG), the government department responsible for the Building Regulations, is receptive to change. I have attended a number of meetings with them to discuss alternative measures and through the Lighting Liaison Group, we are in a position to influence the measure of efficiency in future editions.

The thinking across the industry seems to be that we must move to a systems-based measure that fully reflects the use of controls. We already have a

measurement tool at our disposal in LENI (Lighting Energy Numeric Indicator) which allows us to predict and benchmark the energy efficiency of lighting installations.

In December of this year, the consultation will be released for the 2013 and 2016 regulations. However, after the consultation has been released, we will not be able to change the method of measurement, only the detail, so if we want to move to systems-based targets, we need to get them incorporated into the consultation document.

To achieve this, we need to provide DCLG with evidence to support our argument in the form of case studies. They can be designs still on the drawing board showing predicted LENI values or installed projects with measured consumption, but we need to demonstrate that energy consumption of a system is a far better metric than the one we currently have.

More information can be found at www.sll.org.uk, along with a template for the information we require. I would urge you all to get involved and encourage your companies and clients to do likewise.

Finally, because we need to influence the consultation document, we only have until June to act so please send in your case studies as soon as possible. This will be the only opportunity we have to change the metric until after 2016.

Liz Peck
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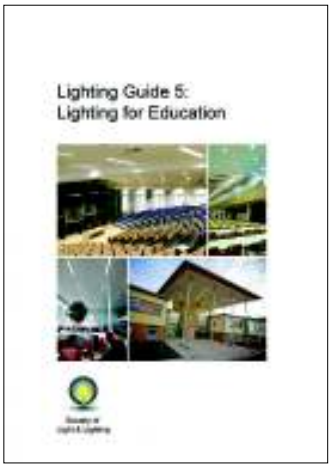
Arup's flying carpet daylight control for The Modern Wing of the Art Institute of Chicago

Latest SLL guide to be launched

The latest edition of SLL Lighting Guide 5: Lighting for Education, will be officially launched at the awards, presidential address and AGM evening on 24 May. 'The revision of LG5 brings it up to date with the latest standards and practices in lighting, energy and, most importantly, learning,' said Iain Macrae, SLL vice-president and chairman of the task group.

'It focuses not on technology, but on lighting where true learning takes place – between people. We have moved away from lighting for display screen technology to providing light for students and teachers.'

LG5 covers all educational spaces including lecture theatres, and conference, special-purpose and multi-purpose rooms. As well as covering lighting equipment and its positioning, it also looks at factors such as the decoration and finishes of rooms, sightlines, positioning of lighting controls and access doors, all of which need to be taken into account from the earliest planning stages.



A good run for your money

Former chairman of the CIBSE Lighting Division (as the SLL was) Mark Wood-Robinson is probably out pounding the streets as you read this in preparation for his third Bristol 10K run. He turned 80 at the end of last year but apparently only a dodgy knee stands between him and the finishing line.

His cause is For-Ethiopia. 'It's a really worthwhile but relatively small organisation that punches well above its weight in that needy country,' he says. 'It is involved with many projects including providing wells for fresh water, building schools and health facilities.' We urge you to sponsor him at: www.virginmoneygiving.com/MarkWood-Robinson

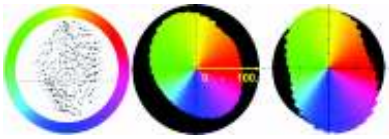
With the closure of the founder class of membership, an opportunity has arisen for the society to recognise those members who were members of the IES (MIES) who did not transfer to MSLL with the society's formation. If this applies to you, please contact the SLL on 020 8675 5211 or at sll@cibse.org to obtain a declaration form.

On the lighter side...

The EU executive recently ruled that, for tax purposes at least, works by artists Dan Flavin and Bill Viola are not art but mere electrical devices, and thus subject to a much higher VAT rate. According to an item in The Art Newspaper, the decision stems from a legal dispute that began in 2006 when UK gallery Haunch of Venison imported from the US six of Viola's disassembled video installations and prepared to import a Flavin light sculpture. The gallery sought to declare the works as art, subject to five per cent VAT. UK customs rejected that classification but a tribunal sided with the gallery on appeal. Now the European Commission has overturned the tribunal's ruling. This means that anyone importing video or light artworks to the EU will have to pay the standard VAT rate, making the works substantially more expensive. According to The Guardian, among the first to be affected may be St Paul's Cathedral which has commissioned two of Viola's altar pieces.
– Thanks to John Tappeneden

The Colour Group's Colour of Light meeting in March was part tribute to the late Margaret Halstead and part update on the latest thinking on the role and properties of light and colour.

Ronnier Luo gave an overview of a series of recent developments in colour rendering listing proposed metrics and the logic that underlies them. He also discussed the difficulty of getting a single metric that will cover all aspects of colour rendering.



Peter van der Burgt looked at how to present fuller information on the colour rendering properties of light sources. His work initially gave rise to the colour rendering vector diagram (above left) where the colour shifts caused by a given light source on a series of 215 colours were plotted, and then newer diagrams, the colour rendering icon and the colour saturation icon (above centre and right) were developed to simplify the presentation of the information.

Kevin Smet reported on a possible metric for colour quality based on our colour memory and how the appearance of objects under a given light source matches up to it. A clever approach, as it does away with the need to compare an object's colour under a test source with an object under a reference source.

John Mollen discussed daylight properties, Peter Boyce examined the impact of light source spectrum on task performance and Paul Miller looked at the problems associated with the measurement of light from sources with different spectral composition.

Steve Fotios gave a paper called Spatial Brightness, what he defines as the subjective assessment of the amount of light in a space. Teresa Goodman examined the new CIE system for mesopic photometry.

Mike Pointer summed the day up by saying that we had systems in place that meant that colour matching does not work, colour rendering does not work and we have a system of photometry that does not work, thus there was a great deal of work for the research community to do.

Peter Raynham

RSL: simply the best

Minimal approach creates maximum effect at this year's Ready Steady Light

'The overall level of creativity expressed by the teams was the best it has ever been.' That was the verdict of Kevin Theobald, president-elect of the IALD which sponsors the event, and one of the judges for the artistic prize with CIBSE's Julie Kane and Newsletter editor Jill Entwistle. Winner of the artistic award was the Bartlett 2 team with a well-balanced, white light scheme for the lakeside landscape known as Front of House.

Less is more was a common thread in this year's schemes with simpler but more tailored effects, fewer fittings and colour used very judiciously. 'Without the benefit of lighting controls, a number of the sites were extremely well balanced in focus and intensity,' said Theobald. 'The winning team created a beautifully balanced picture using minimal equipment with some sources cleverly fulfilling multiple tasks.'

The technical prize went to YLP's scheme for Behind the Principal which exploited shadow and colour temperature contrast for its effects. 'The winning technical scheme used just four luminaires, consumed minimal power and looked really great,' said SLL president Alan Tulla, one of the three technical judges, along with SLL vice-president Iain Macrae and the Bartlett's Peter Raynham.

DPA Lighting Oxford's white light scheme for the Old Courtyard impressed across the board, taking the peer prize as well as being highly commended for both artistic and technical awards.

Altogether 11 professional, manufacturer's and student teams took part at Rose Bruford College, Kent, in March. As usual they were allocated a random site and given three hours to devise and execute a lighting concept with a limited selection of lighting equipment donated by the sponsors. The college, which has made RSL part of its lighting course, gave its usual wholehearted support with Ben Tucker as student project manager. Bob Bohannon of Sill Lighting and Mike Simpson of Philips Lighting provided the technical support.

Kevin Theobald with the Bartlett 2 team, winner of the artistic prize

YLP team, technical award winner

Peer prize winner DPA Lighting

Participating teams
Arup Lighting, Bartlett 1, Bartlett 2, BDSP, DPA Lighting, Light Bureau, Light IQ, Rose Bruford, Urbis Lighting, YLP, Zumtobel Lighting

Sponsors
Philips, Sill, Urbis, Zumtobel, IALD

Technical award
Winner: YLP (Behind the Principal)
Highly commended: Light IQ (Old Stables) and DPA Lighting Oxford (Old Courtyard)

Artistic Award
Winner: Bartlett 2 (Front of House)
Highly commended: Arup Lighting (Behind the Labs); Light IQ (Old Stables) and DPA Lighting Oxford (Old Courtyard)

Peer prize
Winner: DPA Lighting Oxford (Old Courtyard)
Runners-up: Arup (Behind the Labs)/YLP (Behind the Principal)

Daylight: are we getting it right?

Speakers John Mardaljevic, Barrie Wilde and Arfon Davies identify key issues based on their presentations at the SLL's recent event

John Mardaljevic: Daylighting compliance – are we still in the dark?

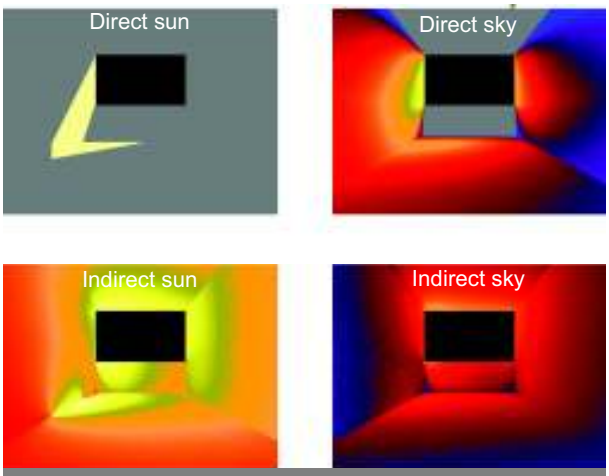
The need to reduce carbon emissions has led to the formulation of guides and recommendations to encourage the design and construction of low energy buildings, and also for the retrofit of existing buildings. All of these guides contain recommendations on daylighting that, until recently, were largely founded on the daylight factor or an equally simplistic schema such as glazing factors. The non-visual productivity, health and well-being effects related to daylight exposure are not yet fully understood, and it is not yet known what the preferred exposure levels should be, nor if existing guidelines would be effective for these quantities.

The daylight factor was formulated long before the computation of actual illumination levels became practical. So the inherent simplifications were, back then, a necessary expediency. What the DF communicates is in fact very different from the actual illumination levels that result from the full range of naturally occurring sun and sky conditions.

Extending the basis of the DF approach by incremental means has proved problematic. It is a straightforward matter in a daylight simulation to use non-overcast sky conditions – for example, the CIE clear sky luminance pattern with sun. To be useful for evaluation purposes, however, the luminous output of the sun and sky must be known since absolute values and not ratios (as is the case with the DF) must now be considered. (Extending the DF notion of ratios to non-overcast skies with sun results in essentially meaningless values and should be avoided.) Recommendations in recent guidelines produced by LEED, ASHRAE and Estidama (Abu Dhabi) include the option to demonstrate compliance using evaluations carried out under 'clear sky' conditions. For example: demonstrate, through computer simulation, that a minimum daylight illumination level of 25 footcandles has been achieved in a minimum of 75 per cent of all regularly occupied areas. Modelling must demonstrate 25 horizontal footcandles under clear sky conditions, at noon, on the equinox, at 30 inches above the floor (LEED v2.2).

While this appears reasonable at first glance, the LEED documentation gives no supplementary data for the evaluation.

'Users have taken this to mean a clear sky without sun – an illumination condition which is physically impossible'



The four components of internal illuminance at one instant under clear sky conditions with sun

In other words, no information regarding the diffuse horizontal illuminance that the sky should be normalised against. The user must trust the default value provided by the sky generator programme, though this is a coarse approximation with latitude and time of day dependence, but no basis whatsoever in local, prevailing climatic conditions.

Many users are unaware that the key input parameter for their simulation is of dubious provenance and automatically selected on their behalf. Nor is there any mention of what the sun luminance (usually derived from direct normal illuminance) should be. Indeed, there is no mention of the sun. Users have taken this to mean a clear sky without sun – an illumination condition which, in reality, is physically impossible.

While one imagines that there must be some rationale behind these 'clear sky' formulations, it has never been laid bare and I am bewildered as to what the reasoning might be. Consequently, these observations have strengthened my conviction that the daylight factor cannot be advanced by incremental means and that a truly meaningful daylighting evaluation for the purposes of compliance must be founded on the totality of sun and sky illumination determined over the course of a full year – in other words climate-based daylight modelling – rather than any 'snapshot' condition.

John Mardaljevic is a senior research fellow at the Institute of Energy and Sustainable Development, De Montfort University

Barrie Wilde: People design, numbers predict

As my subject is natural lighting for interior workspaces, my title could perhaps be criticised for stating the obvious. Of course natural lighting design is carried out by the architect/lighting designer (who may be one and the same) and as part of this design process predictive and analytical tools are used – be they physical or computer modeling.

But while it is important to use analytical and predictive calculations, they should be seen as only part of achieving an intended visual appearance and performance for the end users. All too often the predictive process becomes the design process as well, carried out to achieve some prescriptive 'daylight' quantity, usually a daylight factor obtained from best practice guidance such as BS 8206-2: 2008.

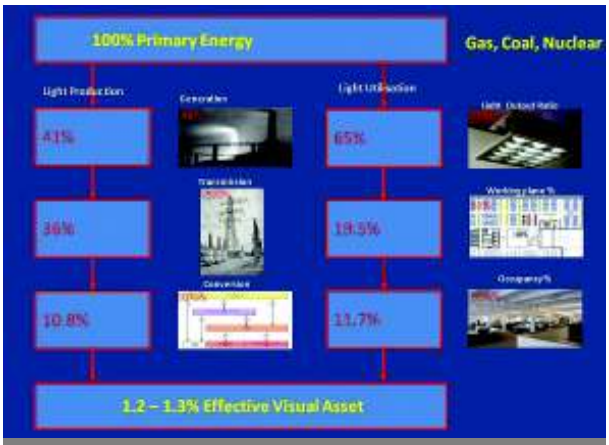
Let us remind ourselves of one of the key aims of BS 8206-2, according to the foreword: 'The standard describes good practice in daylighting design and presents criteria intended to enhance the well-being and satisfaction of people in buildings, recognising that the aims of good daylighting go beyond achieving minimum illumination for task performance.'

A moment's thought will soon identify that a room designed to produce an average daylight factor of two per cent will have areas where the daylight factor falls significantly below this value. Where is the enhancement to well-being and occupants' satisfaction in these areas? It has to be sought by the use of artificial lighting, with its consequential energy considerations.

It is not uncommon for the lighting designer (if indeed one is appointed) to be confronted with a building complete with its space planning and requested to 'light it'. A fait accompli where the lighting designer has little or no influence on the building massing, orientation, or other factors that may optimise the natural lighting. All the lighting designers and other building services engineers can do is produce best-fit designs, often requiring expensive engineering to design out problems arising from lack of consideration of natural lighting.

We have to start designing the natural lighting in all buildings with the visual appearance, amenity and performance in mind. We must keep reminding ourselves that 'numbers predict', they do not create. No mathematical formula has ever created any phenomenon, only predicted its possibility for existence. It is left to the 'artist' (in the broadest sense of the word) to create the visual scene intended.

'This need is more than fanciful, it is essential... something has to be done before we crash into the energy buffers'



From primary energy to visually effective light in offices

Surely in this age of digital photography, computers and advanced rendering and visualisation software we can do better than we are currently doing. At the same time we must start to change the analytical metrics and specification criteria. We must also bring this intellectual approach to all buildings, not just the newsworthy exemplars.

This need is more than fanciful – it is essential. As the energy flow chart (above) shows, lighting represents 30 per cent or more of electrical energy consumed in the workplace, and yet often delivers no more than 1.2-2 per cent of the original prime mover embedded energy as a visual asset (even for hi-tech Part L2A compliant spaces). Something has to be done before we crash into the energy buffers.

Using natural light better in the office will help to change the light production model depicted in this diagram. Changing the specification of light usage and the predominant current design ethos for 'general' lighting will further contribute to better lighting, probably higher productivity and a spatial appearance that really will enhance the well-being and satisfaction of people in buildings.

Barrie Wilde is a former president of the SLL and an independent lighting consultant

Arfon Davies: The geometrical journey and beyond

Awareness of daylight design as a specific and specialist area of lighting design continues to grow as it becomes increasingly apparent to all that daylighting will and must play a key role in achieving a wide range of sustainability and carbon reduction targets. There is no better illustration of this than the increasing desire from all areas of lighting design to learn more about daylighting.

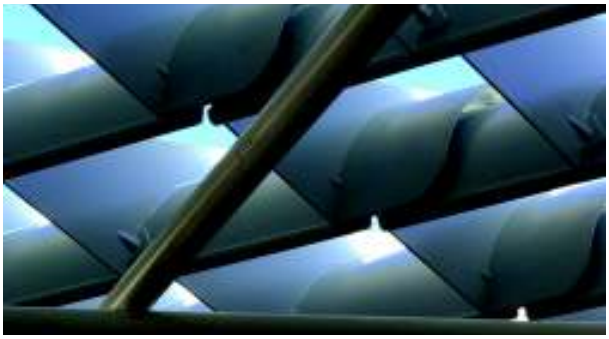
The techniques, technology and fundamentals of daylight design are mostly unique to this area of lighting design: electric lighting and daylighting are very different in this respect. The design processes are, however, very similar, as illustrated by a project at the Art Institute of Chicago.

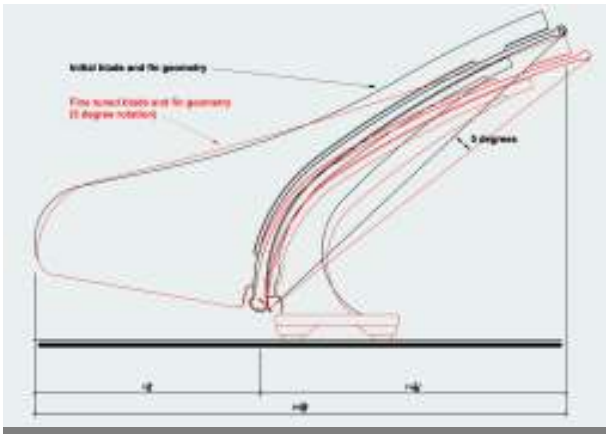
The Modern Wing is a substantial 24,620 square metre extension to the existing world-renowned museum and school, and a collaborative effort between Renzo Piano Building Workshop (RPBW) and the lighting studio at Arup. As with many of our other museum collaborations with RPBW, the use and manipulation of daylight played a key role in shaping this project, in particular the 'flying carpet' which forms the project's most striking and iconic architectural elements. In addition to providing solar shading, the primary function of the flying carpet – above the new galleries on the third floor – is to filter and diffuse daylight before it passes into these top-lit galleries.

This ability to shape architecture is one of the reasons why daylight design is so rewarding – it allows lighting designers to work truly collaboratively with architects from the outset in ways that are rarely seen in electric lighting design. This stage of the daylight design process, which I define as the geometrical journey, is not the first step, but for me is the most exciting and thought provoking.

Before this it is necessary to complete the first two stages of the design process: to establish the brief and to determine the daylighting approach. Ensuring we fully understand what our client wants us to achieve is crucial. In museums, where control of daylight illuminance is often a key conservation concern, this is especially important. The second stage requires the daylighting approach to be determined: whether daylight will be actively or passively controlled, whether it will be introduced through skylights, clerestories or windows, and so on. The decisions made at this point have a significant impact on what happens during the next stage: design.

This design stage can be divided into three often-overlapping activities: the geometrical journey, analysis and finally fine tuning. The geometrical journey applies to all daylighting design: the location, quantity and orientation of fenestrations; elements that redirect daylight; shading systems, to name a few. For the Modern Wing project it was the flying carpet that was the focus of this geometrical journey. Analysis and mock-ups are key elements that allow this geometry to be refined, with fine tuning accommodating change from the client or architect. Once the design is





Detail of the flying carpet as installed (top) and drawing showing how the geometry was refined at fine-tuning stage

complete the remaining stages are very similar to those used in electric lighting projects: documenting the design (for daylighting this probably requires more integration with the architect's drawings and specifications); construction administration and finally commissioning. Construction administration is often protracted and it is essential that nothing is left to chance when it comes to daylighting systems: contractors' drawings and submittals must be thoroughly checked to ensure bits of geometry are not missing, glazing systems are as specified and, for museums, the required level of ultraviolet filtering is achieved.

Final commissioning on The Modern Wing involved several weeks on site ensuring all daylight and electric lighting control systems were functioning as specified and commissioned to the museum's satisfaction. The importance of educating the end user cannot be overemphasised. Our clients must understand and be comfortable with the systems we design before our daylight design process can be considered complete. ■

Arfon Davies is associate director of Arup Lighting

Daylight: are we getting it right? was organised by the SLL and held at the Chamber of Shipping in London on 15 March

Ensuring an exit strategy

The need for emergency lighting doesn't stop at the final exit door, argues Paul Ruffles

Many designers and installers think that their responsibility and the necessity for emergency lighting stop at the threshold of the final exit doors. However, this is not always true. But why should you have to consider emergency lighting in these areas? Surely once someone is outside the building, they are safe and there are other sources of illumination such as street lights or moonlight.

In some cases this may be so, but often the area beyond an exit door is not a place of safety – it may be an alleyway or on a side of the building normally not used by staff. There may also be times when the power failure that has necessitated the evacuation of a building is not within the building, but is an area-wide power blackout which may result in no street lights. There are sound reasons for placing an emergency light outside the final exit doors and sometimes beyond that when the land is still in the control of the building owner.

The first issue is what may actually be beyond the final exit door. Usually they open outwards and can be recessed into the building so that the opening doors do not injure anyone passing or block paths or passageways beyond. While the architect's plans show this recess as empty so that the door can open, in reality they can get filled by bin bags, trolleys or the occasional rough sleeper. All these obstructions will need to be cleared out of the way by the first person who tries to open the door from the inside; obviously a little light is going to greatly assist this task. Where there are steps or uneven pavements directly outside a door there is also good reason to provide adequate emergency lighting.

Once out of the door you would think people would head away from the building to allow others space to leave after them. But unless the building is actually on fire they often don't. People will frequently stop after they exit the building to look for friends or colleagues, make a call or just stand and wait for someone to tell them what to do. If the lighting outside the door is poor then more people may be tempted to cluster near to the door rather than venture out into the darkness. This can lead to congestion, trips and general irritation all round. Far better to have a well-lit space outside the door that allows people to orientate themselves in what may be a side of the building that is unfamiliar to them or even a loading bay.

Often in towns and cities a rear exit door may lead into a shared private alley that doesn't benefit from street lighting. In these cases the alley will need emergency lighting and also exit signage if there is a choice of direction to the actual street; you don't want people going the wrong way down the alley only to find themselves running into the bin store.

As a designer or installer you need to carefully examine the external layout of the building and those surrounding

Benoit Derrier, Wikimedia

Universitetet station, Stockholm underground: however clear the emergency exit, problems may lie beyond

it. Sometimes a final exit will open on to an adjacent roof or external staircase or bridge to another building. In these cases you will need to provide emergency lighting along the agreed route to the street or other place of safety. You may even decide that exit signs are needed externally if there is the possibility of an escaping person taking the wrong route.

If the adjacent building is in separate ownership then an agreement would already have been established to allow the exit route across or through the neighbouring owner's property; adding the necessary emergency lighting, exit signage, associated power feeds and access for testing and maintenance should form part of this legal agreement between the building owners.

For buildings where you have huge crowds inside, such as sports or entertainment arenas, there is a need to get people as far away from the building as fast as possible in an emergency. If the first people leaving can clearly see their way across the area outside to large and clearly lit assembly point signs they will start a flow, allowing space for the thousands who will be following them. If there is no area lighting beyond the final exits or if the power has failed to the local area lighting, then people exiting are likely to linger and not venture far out into the unlit surrounding, especially where there are stairs or bridges to cross. This can lead to backing up of escapees on internal stairways and possible panic.

If there is generator-fed standby lighting for the arena this should be extended outside so people can move safely away once the event ends or the building has to be evacuated. Where the surrounding land is in the same ownership as the arena then lighting provision is relatively simple. Where this isn't so, then lighting will need to be provided by floodlighting from the building or property perimeter, or extended on to adjacent land with agreement of the land owners.

Paul Ruffles is principal of Lighting and Design Technology and a member of the SLL's technical and publications committee

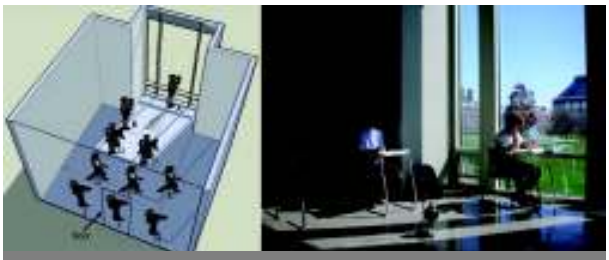
Outside edge

Exterior lighting is the main theme of the latest issue. Iain Carlile summarises recent research in this area, plus studies on human factors and HDR

In his opinion piece, J Schanda suggests that vision may not be tetrachromatic. Following on from his previous work, he notes that properly designed experiments to investigate signals from the intrinsically photosensitive retinal ganglion cells (ipRGC), may identify that luminance and correlated colour temperature (CCT) are not enough to describe all the signals that the human retina sends to the brain. A fifth light sensitive cell's contribution has to be taken into consideration as well, he argues.

In the first of the exterior lighting papers, MS Rea et al outline their development of a model of brightness perception of outdoor scenes, in which the amount and spectrum of the light source are combined to predict the scene brightness. As the authors note, this is a tentative model that can serve as a starting point for efficiently testing future hypotheses regarding brightness perception.

A paper of interest to practitioners involved in the design of exterior lighting installations looks at the factors that influence a person's assessment of the lighting along an urban footpath. Although a limited study (looking at one lighting condition along a footpath in Sweden), it provides some interesting findings that reinforce the need for designers to consider all the different users (visually impaired, elderly, young women and so on).



From Wang and Boubekri's paper which aims to improve daylighting design guidelines using a behavioural approach

Another exterior study explores the relationship between a target's luminance, its near-background luminance and the adaptation luminance in order to calculate the target's visibility level. The aim is to predict a driver's target detection performance. The final daylight contribution is a letter from Steve Fotios and Peter Raynham. They propose a new method for measuring the impact of lighting on the ability to recognise people's facial expressions and thereby increase the feeling of safety in pedestrians.

Daylight and sunlight are other topics. M Kocifaj looks at the effect of ground reflectance on the overcast sky luminance and presents an approach for use in the rapid modelling of daylight availability. N Wang and M Boubekri report on a study that aims to establish a method of improving daylighting design guidelines by using a behavioural approach. The authors present a number of design recommendations for sunlit offices based on their findings. This study was carried out at a latitude of 40 degrees N and the authors note that people in different climate zones may have different preferences to those of the study group.

The final daylight design study investigates the use of Radiance-Matlab visualisation as a method for optimising the facade design of offices.

In the sphere of human factors, SA Fotios and C Cheal's paper on brightness matching explores the effects of coloured objects in the visual field when making brightness matching tests under lamps of different spectral power distribution. Interestingly, the results show that the presence of coloured objects or surfaces do not significantly affect the outcome of brightness matching trials.

Finally, high dynamic range (HDR) photography is a useful luminance measurement tool but relies on the photometric calibration of the camera and lens. H Cai and TM Chung's method of calibration could ensure higher image quality. Further development could mean a quick, accurate tool for luminance measurement of a scene.

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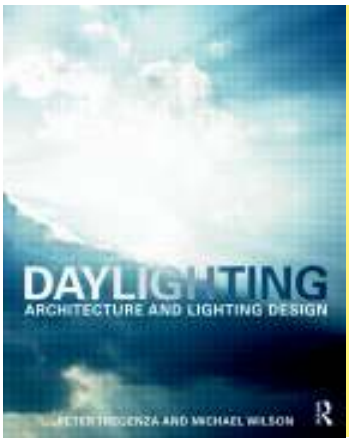
Broad daylight

Martin Lupton finds the latest book on natural light both wide ranging and widely appealing



Daylighting: Architecture and Lighting Design
by Peter Tregenza and Michael Wilson
Routledge, £39.99
Paperback (304pp)
154 colour line drawings, 18 black and white tables, 145 colour photographs
ISBN: 9780419257004

Anyone who believes that better use of daylight in combination with controllable electric light is critical to delivering a sustainable lit environment (and let's be honest, why wouldn't you?) should have a copy of this book at their side. Although it is prefaced with the qualification that it is essentially a technical book that hopes to trigger the imagination, Daylighting: Architecture and Design is a book written in such an accessible way that it should have an incredibly broad appeal, for everyone from students and researchers to engineers, lighting designers and architects. All of the relevant design theory is covered but it is combined with simple, clear examples and rules of thumb that ensures it maintains the reader's interest and attention.

There are two excellent themes that run through the book. First, the essential variability of daylight – there isn't a one-size-fits-all solution and the very nature of this variability is the essence of natural light and fundamental to life, so should be embraced and embodied into the design process. The second theme is the centrality of people to lighting design. This is an inspiring way to start a handbook of design guidance. Nowhere in the design process is this approach more relevant and it seems appropriate to quote the authors' thoughts on daylight design: 'It is concern for the human body's dependence on daylight, for what gives joy and interest, for the creation of "place", for a building's effect on its surroundings."

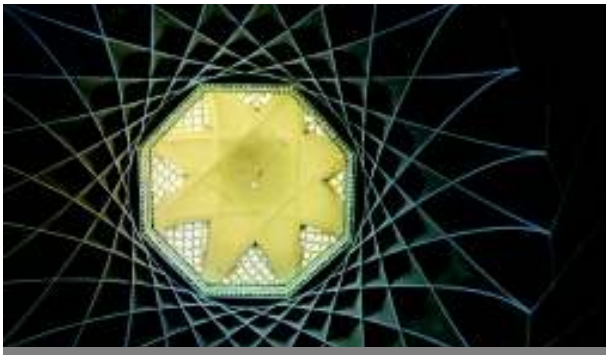
The book starts with an excellent discussion on the criteria of good daylight and contextualises this question into many general terms, including those of culture, climate, quantity, expectations, comfort and vision, before focusing on more specific applications. The second chapter is a brief definition and introduction to all of the relevant lighting and daylighting terminology and physics. Again the authors manage to present even this information in an accessible, clear and coherent way.

Cathedral of Santiago de Compostela: the felicitous effects of shadowing

The next two chapters deal with the daylight climate and building form. The form chapters feature a short but interesting series of inspiration images that capture some of the characteristics of daylight and sunlight. The book also does not shy away from talking about electric light and recognises that it is the appropriate and well-designed use of a combination of daylight and electric light that will provide the best lit environments and energy savings. At the end of each relevant section there is either a set of 'conclusions for design' or a summary of the main technical points that will serve as a useful day-to-day checklist.

The first two-thirds of the book finish with chapters covering daylight illuminance, methods of collecting and delivering daylight into rooms, and various numerical models. These chapters manage to pull together a great amount of theory, information, illustrations, graphs and charts into a single place, which will no doubt make this book one of the most useful on the subject. Chapter 11 contains masses of further reading and references, and the final third of the book is full of worksheets, algorithms and equations to help the practising daylight designer.

In summary, this book is an essential tool for anyone serious about this subject. It would also be of interest to many others involved in the process. There is information, facts, rules of thumb and data in this book that I know I will be using in the process of persuading others about the value of good daylight design. ■



Dolat-Abad Garden, Yazd, Iran: structure, daylight and decoration become inseparable elements

2011

17-19 May
Lightfair International
Venue: Pennsylvania Convention Center, Pennsylvania
www.lightfair.com

18 May
IALD Lighting Design Awards
Venue: Crystal Tea Room, 100 S Penn Square, Philadelphia
www.iald.org

19 May
Lighting Masterclass
The Low Carbon Challenge
Speakers: Brian Charman, Chris Wilkes, Iain Macrae, Stewart Langdown, Tad Trylski
Time: 10am-4.30pm
Location: RIBA, 66 Portland Place, London W1
www.sll.org.uk

24 May
Awards, presidential address, AGM and reception
Venue: Roberts Building, UCL
Time: 5.30-9pm
www.sll.org.uk

24 May
LIF Annual Lunch Event and AGM (plus morning workshop)
Venue: Drapers' Hall, London EC2
www.lif.co.uk

7-10 June
Interaction of colour and light in the arts and sciences
Venue: Zurich University of the Arts Switzerland
www.aic2011.org

9-12 June
Guangzhou International Lighting Exhibition
Venue: China Import and Export Fair Complex, Guangzhou
www.light.messefrankfurt.com.cn

6 July
Joined Up Lighting
Lighting for circadian systems: short term benefit or long term danger?
Venue: BDP Lighting, Brewhouse Yard, London EC1
Time: 2.30
www.ile-events.org.uk

18 May: IALD Lighting Design Awards, Philadelphia

7 July
Lighting Association Annual Conference, Gala Dinner and Lighting Awards
Location: Stratford-upon-Avon
www.lightingassociation.com

11-14 September
Plasa 2011
Venue" Earls Court, London
www.plasashow.com

17 September
Social Light Movement Workshop
(Collaboration between City of Liege, LUCI and founders of Social Light Movement)
Location: Liege, Belgium
E sharon@lightcollective.net

28-30 September
ILP Annual Conference
Sustainability in Lighting
Venue: Majestic Hotel, Harrogate\
www.theilp.org.uk

11 October
SLL event
LEDs: CRI for help
Venue: tbc
www.sll.org.uk

9 November
Lux Awards 2011
Venue: Chelsea Football Club, London SW6
www.luxawards.co.uk

9-10 November
LuxLive 2011
(Organised by Lux magazine and LIF)
Venue: Earls Court, London
www.luxmagazine.co.uk

13 December
SLL event
Follow the code?
Venue: tbc
www.sll.org.uk

Lighting Masterclasses: Masterclasses are kindly sponsored by Erco, Holophane, Philips, Thorn and Tridonic. For venues and booking details, see **www.sll.org.uk**

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Mid Career College: the college runs various courses across the whole spectrum of lighting and at sites across the UK. Full details at: **www.cibsetraining.co.uk/mcc**

LIF courses: details from John Hugill, 0208 529 6909, or email **training@lif.co.uk**