

Volume 5, Issue 2, March/April 2012

Newsletter

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



The St Botolph Building

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■ **The Code for Lighting debate**

■ **Why visual performance research matters**



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The new SLL Code for Lighting is scheduled for release at the end of this month and it is fair to say that it has probably never before received such an excitable reaction. In the old, pre-CD days it would thump on to the desk, the unquestioned bible of lighting. That the latest edition has provoked discussion is not strictly just down to the content of the Code itself but to the fact that it arrives at a time when there is considerable debate about how we should approach and measure lighting in the 21st century.

Last December, the SLL organised its own debate, Follow the Code? as a precursor to the launch (see P5). The three participants, Mike Simpson, Tim Downey and Jeff Shaw, reflected in simple terms the three main viewpoints: the Code is necessary if bad lighting is to be prevented as by far the majority of schemes are specified by non-specialists; that it is useful but should be regarded as limited, and that the whole premise is increasingly irrelevant.

As an independent lighting designer,



Downey is part of the contingent which is determined to push the argument for radical change that Kit Cuttle began three years ago (see P10 for his contribution to the Code debate). This impetus for change is clearly strong. We live in interesting lighting times.

Jill Entwistle
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LETTERS...**LETTERS**...LETTERS...LETTERS...LETTERS...LETTERS...

Reading through various articles within the Jan/Feb 2012 Newsletter, prompted me to write regarding the industry's focus on advancing LED technologies.

During the past couple of years the lighting industry has seen a significant rise in the development of alternative lighting technology, primarily driven by the government's agenda for low carbon buildings, reflected in the continual and demanding challenges within Building Regulations Part L.

The introduction of LED technology is seen as the panacea for future lighting and the industry's drive towards promoting greater lm/W output for both new and retrofitted lighting installations.

In my professional role as a building services engineer, engaged in providing

holistic engineering solutions, there appears to be limited data published surrounding the performance of LEDs, in particular, electrical services characteristics with the potential for a surge of in-rush current that may be present during switching of multiple LED lighting circuits and the overall impact on the entire incoming supply and energy distribution network.

I would welcome any feedback on the topic, or research undertaken by the LED lighting industry, or experiences encountered by members of the application of large-scale LED lighting technologies.

Suki Bhamra
MSc, IEng, MIET, MCIBSE, AMSLL

Front cover: The St Botolph Building, City of London, by Speirs and Major, shortlisted for the 2012 Lighting Design Awards. Photography: James Newton

As regular readers will know, I have been part of the SLL team campaigning for change to Part L of the Building Regulations. The basis for our efforts has been to engineer a move away from luminaire and lamp efficacy into systems-based energy targets, with greater emphasis on controls.

In previous incarnations of Part L, areas have been described as 'desk-based', 'display' and 'general' for everything else, with the metric for everything other than desk-based being lamp-lumen efficacy. This effectively meant that it did not matter how inefficient a luminaire was – as long as the lamp was efficient then it complied. In the proposals for 2013 (see P4), we now have luminaire efficacy for all areas; this in itself is quite a step and should not be overlooked.

In addition to this progress is a much more advanced set of controls strategies. The move away from occupancy and daylight controls being the only deliverable and measured controls is very significant; the controls package can now deliver up to 30 per cent reduction on the original luminaire efficacy, so there's no excuse not to use appropriate luminaires for the application, as long as they are controlled properly.

Furthermore, there is now a second method for achieving compliance: one using Leni (Lighting Energy Numeric Indicator). This inclusion is huge and what we have been fighting for.

Leni in itself is just a metric, just a measure, but the philosophy behind it is the difference. Leni measures predicted energy in use, not how efficient a luminaire is – hopefully with its new set of controls – but actual, real, predicted energy use. This is all about the system, not just the luminaire.

Leni embraces daylight, occupancy, operating hours and activity, and pins the controls package to predict lighting energy use for the building. It knows that the same building in Inverness will have to use a little more lighting energy than an identikit building in Brighton because the daylight availability differs.

I know from speaking with people



over the past year that there are those who champion it and those who think it is too cumbersome, especially for smaller projects. Admittedly the formula is complex but all free lighting calculation software packages already include a Leni calculation option so that shouldn't be an excuse not to implement it.





The table of targets also seems more complex than we might have wished for but we are working towards harmonisation with the SBEM calculation and this will lead us to it. It's a first step along the journey and we should embrace the move made by DCLG in introducing Leni as an option. I would like to thank Paul DeCort and his team for the time they gave us to make this happen.

The proposed measures are a great step forward and should be embraced by the whole industry. I honestly believe they can lead to change for the better and will at last serve the purpose of Part L: reducing energy use.

Question 42 on the consultation asks if Leni should be included in the 2013 document; I hope you will agree there are compelling reasons to say yes. Go to www.sll.org.uk/part-l for the consultation papers and response forms.

Please take the time to respond, your voice really will be heard and you will make a difference. We only have until 27 March – it's time to shape the future.

Liz Peck
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Part L crunch time

The consultation document for the 2013 edition of the Building Regulations, including Part L which affects lighting, has been released. One of the most significant innovations is the suggestion that Leni (Lighting Energy Numeric Indicator) becomes a second method for achieving compliance, a move that the SLL, together with the IALD, ILP, LIA and PLDA, has campaigned hard for.

'It is very good news that Leni has been included in the Part L draft,' said SLL president Peter Raynham. He added, however, that there were 'one or two caveats'.

'The principal one is that they have also included luminaire lumens per circuit-watt as an alternative to Leni and the worry is that they may drop Leni in the final version,' said Raynham.

'The second concern is largely of our own making, in that they have just adopted the Leni targets that we suggested to them. To keep everybody on side with the use of these targets we have based them around a set of building and task combinations derived from SBEM and then made a series of assumptions to get some idea of how much energy is likely to be used.

Theoretically this all makes sense but there has only been a limited amount of checking of the values against actual schemes.'

It was therefore important, said Raynham, that as many people as possible respond to the consultation and lobby for Leni to be the metric used and, additionally, for them to check values in the table against schemes they have recently done.

The proposals for the 2013 edition of Part L also include luminaire efficacy for all areas, whereas the previous metric for everything other than desk-based areas was lamp-lumen efficacy, which potentially allowed inefficient fittings. It's also proposed that the initial efficacy should be increased from 55 to 60 luminaire lumens per circuit-watt.

Control strategies have been expanded beyond permutations of occupancy and daylight linking, and the controls package could now deliver up to a 30 per cent reduction on the original luminaire efficacy.

Go to www.sll.org.uk/part-l for both the consultation documents and the appropriate response forms. The deadline is 27 March 2012.

		Initial luminaire lumens/circuit-watt
		60
Controls	Control factor	Reduced luminaire lumens/circuit-watt
a daylit space with photo-switching with or without override	0.90	54
b daylit space with photo-switching and dimming with or without override	0.85	51
c unoccupied space with manual on and off	0.90	54
d unoccupied space with manual on and auto off	0.85	51
e space not daylit, dimmed for constant illuminance	0.90	54
a + c	0.80	48
a + d	0.75	45
b + c	0.75	45
b + d	0.70	42
e + c	0.80	48
e + d	0.75	45

2013 Part L proposal: recommended minimum lighting efficacy with controls in new and existing buildings. The 2010 version mentioned only a and c

Workshop glows west

More than 30 architects, engineers, lighting designers and contractors competed in four teams in the Let There be Light workshop at St Mary Redcliffe church in Bristol last month.

Organised by the SLL with CIBSE, the goal was to create the best lit effect on the church exterior within an hour, using the theme Light is Evolution. Each team was given fittings supplied by Erco, iGuzzini and One Eighty Light.

'It was a great opportunity for lighters to wander around with all sorts and sizes of light and see exactly what they could do on a real building – much more intuitive than even the best computer rendering,' said judge Paul Ruffles, SLL past president and principal of Lighting Design and Technology. Fagerhult sponsored the post-event gathering.

On the lighter side...

Perhaps someone would like to do a Leni calc on the Trafalgar Sun, a one-day art installation in London's Trafalgar Square that formed part of a promotional wheeze by juice company Tropicana. Created by artistic collective Greyworld, the inflatable sun is 30,000 times bigger than a football, weighs more than 2500kgs and uses 260kW.

Belting out four million lumens at its core, the equivalent of 60,000 GLS lamps, it features 56 5kW tungsten lamps, installed on seven circular trusses. The skin of the inflatable was a nylon flame-retardant material. 'Combined with the light from the lamps it gave a really good early morning sun colour,' says Andrew Shoben of Greyworld. 'We needed some serious ventilation to prevent overheating.'

The stunt was part of Tropicana's Brighter Mornings campaign and had passers-by basking in deck chairs in January.



Follow the code?

Based on the SLL event, and with the launch of the new version this month, the three presenters argue for and against the Code for Lighting

Mike Simpson: The case for codes

The Code for Lighting was first published in 1936 and there have been updated editions roughly every 10 years. The current Code represents the distillation of some 2000 years of lighting experience from the various authors.

The first thing to say is that it is not just a schedule of lighting levels. More than three quarters of the current pages are dedicated to good lighting advice which comes from experienced practitioners and will help the inexperienced designer produce a workable design. There is advice on creating visual effects, assessing task performance, minimising glare, revealing texture and form, and ensuring good maintenance over life.

In short, if you follow the Code you won't produce a bad design. It will lead you through the design process from identifying the objective for the lighting, creating the specification, planning and verification. And it will help to set realistic tolerances on the result so a design that calculates to 499 lux against a standard of 500 lux isn't rejected.

Alongside the Code for Lighting we should also consider the other guides and standards that have been published over the years and cover the whole spectrum of light and its application. In the UK we have 300 independent lighting designers, 3500 distributors and 25,000 electrical contractors, so who are these codes and standards written for?

We would expect specialist lighting designers to know pretty much what is in the Code as part of their training, practice and experience, with maybe the occasional check for a lux level (who can be expected to remember the correct level for keg and bottle washing?).

But for many of the contractors, distributors and even consulting engineers, lighting is only a small part of their

work and perhaps they only need to work out how many luminaires are needed once every few weeks. For them the Code provides invaluable guidance and will ensure that an acceptable design is achieved. Clearly it would be impossible for every design that needs to be done to be carried out by a lighting specialist.

Apart from emergency lighting there are no other areas where regulations dictate a specific lighting level. The designer is left to follow good practice. So they can follow the Code or choose to use their own experience. However, consider the scenario where the designer is standing in a court room defending his or her design in the event of a fatality. When asked 'what was your design based on?', you can have two answers: 'I made a personal judgement' or 'I followed good practice guides issued by a professional organisation'. I think there are very few of us who would feel comfortable with the first answer.

In conclusion, I would argue that codes and standards continue to be useful tools for the specialist and non-specialist alike. Although one could argue that following them rigidly may not produce a truly beautiful solution, it will ensure that we don't have really bad installations.



Mike Simpson is technical and design director of Philips Lighting, and former president of the SLL and CIBSE

Tim Downey: The case for a rethink

While it is accepted that standards are necessary for general lighting practice, it is not uncommon for designers to disregard these standards as too limiting – and also for others to apply them with an unbending rigour that conflicts with common sense and their clients' wishes. We also have a growing plethora of regulations governing energy efficiency, sustainability, health and safety, risk management and the like. In short, there is an ever-growing battery of

codes, standards and guidelines relating to the use and control of light – yet the very people the lighting is supposed to benefit are mostly forgotten.

Tabulating a series of tasks and assigning recommended illumination levels for those tasks is an incomplete concept – especially when one can see that those levels have been steadily increasing over the past 70-80 years. Why? I would contend that it is more through accepted social convention ▶

◀ that ‘brighter is better’ rather than any scientific evidence that more light is required for us to see better.

It is only now, in the face of spiralling energy costs, that we are trying to find ways of using less light – or more accurately, using less energy. This should, of course, mean the same thing, but the rapid advancements in light output from LEDs will soon mean that we can still install far too much light but with a decreased energy load. Our clients don’t want to know if we are designing according to the Code of Lighting; they want to know if we are complying with their target BREEAM rating.

We have, of course, seen a variety of attempts to broaden the codes to include interior environments and their users, but I respectfully offer that these editings concern themselves more with the edges of things than tackling the elephant in the room – a fact that Peter Raynham himself practically acknowledged in a recent interview for CIBSE Journal (see box below). When I raise this point in the company of electrical engineers, architects, interior designers, manufacturers and lighting designers, I get far more agreements than disagreement.

While regular updates to the Code are welcome, I believe a more radical approach is required; one that brings out into the open the clear link between lighting and surfaces, and breaks away from the old model of measuring light falling on to surfaces to one based on light emanating from surfaces and reaching the eye.

The origin of light measurement is the candela, the SI unit of luminous intensity. All other forms of light measurement, including the lux and the foot-candle, are derived from the candela. There is an undoubted link between light falling on a surface (lux) and the brightness of that surface (cd/sq m). For many years the accepted unit for measuring light has been the lux.

But this presents only part of the story – quantifying only the light falling on a surface and completely ignoring the surface itself. Since we cannot ‘see’ light, only the surface that is reflecting the light back to our eye, the lux measurement gives no clue as to the brightness of the surface being lit. So 400 lux on a white wall is the same as 400 lux on a dark wood-panelled wall – which is plainly absurd. The reality of this disconnect is lighting schemes engineered to meet a numerical value on the horizontal plane – with vertical illumination then added on top to deliver the required room-cavity recommendations.

Deriving a measurement from the candela, linked with a

‘...when we think of what the role of the Code is, it’s actually to stop bad lighting rather than to promote good lighting...’

‘...classically we would talk purely about lighting visual tasks and now we’ve realised that we have to look at people...’

Excerpts of interview between Jill Entwistle and Peter Raynham, SLL president and co-author of the new Code for Lighting, 2012 edition

‘We have, of course, seen a variety of attempts to broaden the codes to include interior environments and their users, but I respectfully offer that these editings concern themselves more with the edges of things than tackling the elephant in the room’

ratio of surface reflectance values, will provide the basis for a unit of measurement, which tells us how bright a surface is. From this we can surely easily define the brightness of an environment. I am not saying we do away with the lux measurement, rather that we need to establish a code based on what we see, rather than what we can measure. A good example could be a Cat A office with a lux-based lighting grid providing the essential lighting, with the Cat B fit-out designed with surface brightness values which correspond to the interior design.

We need a code that doesn’t just establish the acceptable minimum – it needs to set out guidelines on creating environments with ‘flair and creativity’. While assessment of these will inevitably be subjective, establishing a measure of ‘perceived adequacy of illumination’ as Kit Cuttle puts it, will provide a meaningful, measureable framework for evaluation on a people rather than task-based criterion.

We are on the brink of a massive change in how we illuminate our environments. Ceiling-mounted light fittings will gradually give way to translucent surfaces (ceilings, walls, floor, furniture) which means there will be more light coming from these surfaces than is falling on them. The lux unit is going to become increasingly irrelevant as we try and correlate how bright our environment is, together with how much energy we are using. We must change our way of measuring light to fall into line with how we see our environments – or the truth is that we will have an increasingly irrelevant, unused Code for Lighting. ■



Tim Downey is senior partner of independent lighting consultancy Studio Fractal

Jeff Shaw: The case for cautious acceptance

The first step in a discussion about the usefulness of the Code is to ask what it is. On a simple level, it represents established best practice, and interprets and leads one on from the standards, such as EN 12464. Concerning what it is for, the Code itself has something to say on this:

The lighting of an interior should fulfil three functions:

- Ensure the safety of people in the interior
- Facilitate the performance of visual tasks
- Aid the creation of an appropriate visual environment

We can all agree that these are worthy goals for any lighting scheme. One might suggest that there is much more to lighting design, and I would agree, but if the Code helps an inexperienced person to achieve the above three goals, then they will most likely not go too far wrong, even if they are unlikely to have produced anything awe-inspiring.

That is the key purpose of the Code. It ensures that someone who adheres to it is a 'safe pair of hands' who, at the very least, shall deliver a satisfactory scheme. I would be the first to agree that we should be aspiring to create more than 'satisfactory' lighting schemes. However, as Mike Simpson points out, we live in a world where a significant proportion of lighting installations are developed by those with little formal training in lighting design – electrical engineers, contractors, and so on. Surely the Code has a purpose in helping to ensure that these 'non-experts' are safe?

That is not to say that Code-compliant lighting schemes can't be better than satisfactory – I have seen many

exemplary schemes that do not diverge from the Code. But Code compliance does not necessarily always translate into good lighting. We are familiar with the gloomy office spaces resulting from over-simplified LG3 Category 2-compliant schemes. Another extreme example is the recent hotel in Las Vegas that created a 'death ray' (as the newspapers called it) by focusing reflected sunlight on the pool area – the building achieved LEED Gold certification and met all relevant codes and regulations. Unfortunately none of these explicitly said 'do not build a south-facing concave mirror in a desert', which is what the building effectively was.

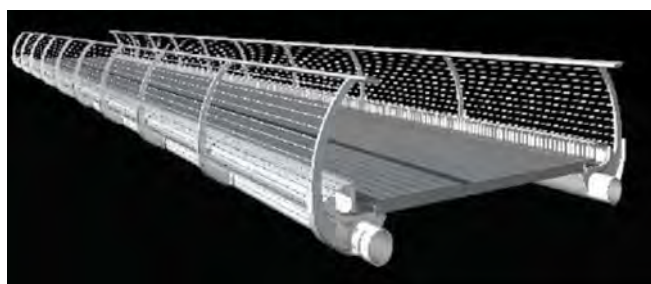
The Code can be limited. When designing the lighting for London's Millennium Bridge, we found it suggested targets for horizontal illuminance and uniformity. After research, experimentation and validation, Arup proposed that two key targets would be more appropriate – that the outline of the bridge deck would be clearly defined in contrast to the background and achieve sufficient vertical light on people's faces, the latter being crucial for facial recognition and therefore for people's feeling of safety when walking across the bridge. This led to a much more optimal lighting scheme.

The Code is also limited in terms of daylighting. UK-based designers work all over the world, including places where daylight factor is not always an appropriate measure. For example, Arup assisted in the design of a school in Ghana with no electric light. Daylight factor plots showed that the scheme was well below five per cent daylight factor on average (the Code suggests five per cent as a target for a 'well-daylit' space). However, taking local climatic data into account it was shown that, with the same scheme, almost all of the space has useful daylight levels (between 300 and 3000 lux) for more than 80 percent of daylight hours.

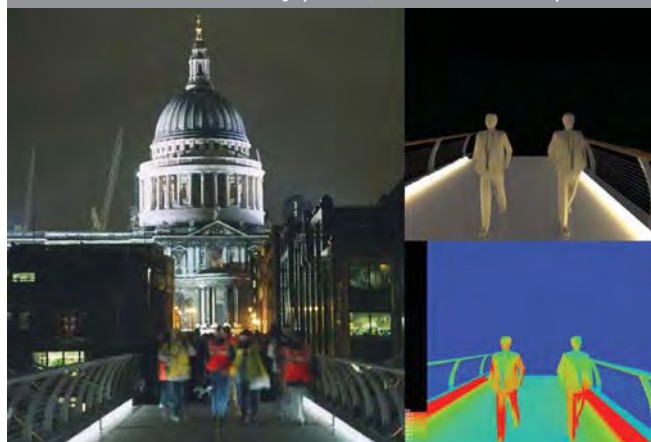
In conclusion, the Code has a useful purpose, but I would hope and expect that capable, expert lighting professionals use it as a guide but are not constrained by it. They should depart from it when required, but when they do they should be able to confidently justify it. This is one reason why it is important that lighting professionals are accredited and recognised as such – only a recognised expert can take this stance, while the inexperienced should follow the Code. ■



Jeff Shaw is associate director of Arup Lighting



The Code can be limited, argues Jeff Shaw, citing London's Millennium Bridge (below) where Arup found that lighting for people's faces (10 lux vertical) produced a much better solution than the recommended targets for horizontal illuminance and uniformity (above, 7.5 lux horizontal)



The 2012 Code for Lighting is expected to be available in printed and electronic format at the end of March. SLL members will also be able to access the Code through the CIBSE Knowledge Portal.

The Follow the Code? event was held at the RSA in London on 13 December

Eyes on the road

Visual performance research must not be overlooked, argued Dr Mark Rea in his Trotter Paterson lecture

Visual performance, the speed and accuracy of processing visual information, has been studied since the 1930s with the primary purpose of establishing a scientific foundation for recommended illuminance levels for schools, factories and offices. At the time, electric lighting represented a significant financial investment for these applications, so setting the right light level was important.

Two different approaches were taken to research visual performance at that time, one by HC Weston in the UK and the other by Matthew Luckiesh in the USA. Perhaps not surprisingly, the recommended illuminance levels ended up very different in their respective countries. In 1959, for example, the recommended level for general illumination of interior spaces was 1000 lux in the USA, but only 300 lux in the UK. Individuals in both countries believed that the recommended illuminance levels had a 'scientific basis'. Arguments naturally ensued, but nothing really changed in either country until the energy crisis of the early 1970s.

In the mid-1970s the illuminance levels recommended in the USA came under attack as being unjustifiably high from newly formed federal government agencies devoted to reducing energy use in buildings. During the late 1970s and early 1980s, a great deal of applied research was undertaken to better understand visual performance and, thereby, to resolve the large discrepancy between the USA and the UK recommended levels. As a result, the model of relative visual performance (RVP) was developed showing the characteristic 'plateau and escarpment' behaviour of visual performance from threshold to

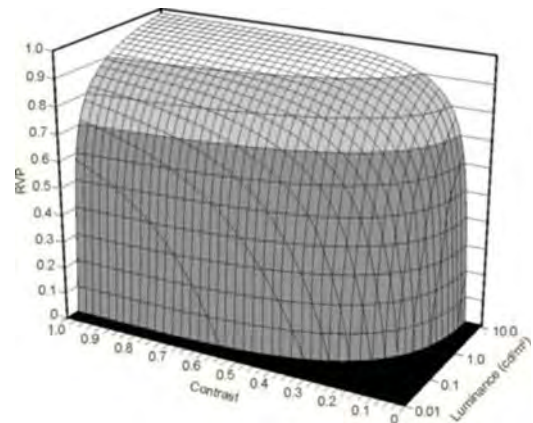


Fig 1 Model of relative visual performance (RVP) for target size of 15 μsr. Most visual tasks in schools/workplaces are on the white 'plateau' where changes in lighting have little effect on visual performance. Conversely, many visual tasks associated with streets and roadways at night are on the dark grey 'escarpment' or below the black threshold where lighting can make the difference between seeing and not seeing a potential hazard.

suprathreshold (Fig 1). In part because of the RVP model, the recommended illuminance levels for interior spaces in the USA were significantly reduced to levels much more like those that had been recommended in the UK in 1959.

One might reasonably suppose then that the study of visual performance is no longer important. Indeed, little visual performance research has been conducted over the past decade. However, reminiscent of the arguments of the 1970s over the energy used for lighting interiors, there is presently a great deal of debate over the benefits and costs for lighting streets and roadways at night. As before, an understanding of how visual performance is affected by lighting is critical to the debate.

Previous reports have suggested that roadway lighting can reduce car-to-car crashes at night by about 30 per cent. Our recent research shows that, on average, that number is closer to 10 per cent (Fig 2). Importantly, the research shows that the incremental improvements in visual performance provided by the lighting at different types of intersections correlate with the incremental reductions in night-time crashes at those intersections.

George Santayana is often quoted as saying, 'Those who cannot remember the past are condemned to repeat it'. We should not, therefore, forget the research into visual performance over the past century. The battlefield of debate has moved from benefits and costs of interior lighting to those associated with exterior lighting, but the science of visual performance pioneered by Luckiesh and Weston has not. ■

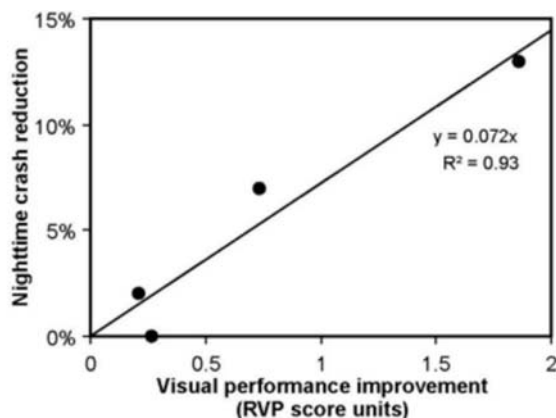


Fig 2 Correlation between the incremental reductions in crashes due to lighting (with and without) as a function of the incremental improvements in RVP due to lighting (with and without) for four different intersection types in the state of Minnesota (MS Rea, JD Bullough, Y Zhou. A method for assessing the visibility benefits of roadway lighting. LR&T 2010; 42(2): 215-241)

Whatever happened to visual performance?, the Trotter Paterson memorial lecture, was given on 31 January at the Institute of Education, University of London. The full version of the paper will appear in a future edition of LR&T. Dr Mark Rea is director of the Lighting Research Center at Rensselaer Polytechnic Institute and a professor in Architecture and Cognitive Sciences

Streets ahead

Iain Carlile reviews the latest online papers focusing on road lighting

Around 30 papers are now online in advance of being published, covering a diverse range of topics from human factors to light source characteristics and applications. Following Mark Rea's recent Trotter Patterson Lecture on road lighting – and the high media profile street lighting is currently receiving – it is a timely moment to look at the latest research in this area. At time of writing there were five papers that explore various facets of street lighting.

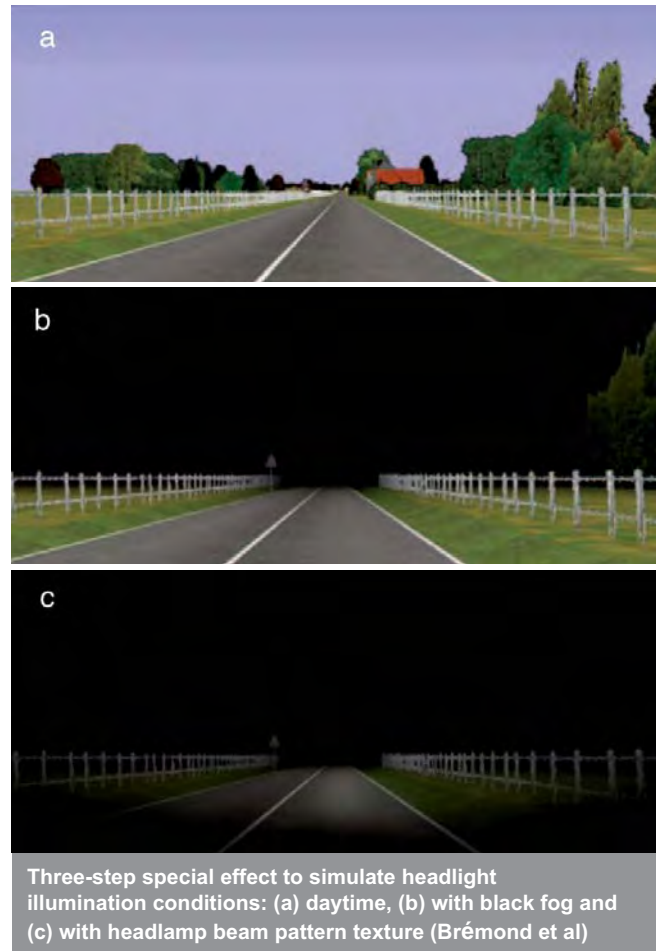
Of interest to all practitioners involved in the specification of residential street lighting, Fotios and Goodman's paper presents a proposed UK guidance for lighting in residential roads, considering visual tasks relevant to pedestrians. Using a low pressure sodium lamp as a benchmark for residential UK streets, they propose that if a lamp has an $R_a \geq 60$, then the average illuminance can be reduced by an amount determined by the new CIE system for mesopic photometry and the scotopic/photopic ratio of the lamp.

M Viikari et al present the results from a questionnaire given to 100 drivers in Finland aged between 20-79 years old. The results showed that generally all of the respondents valued road lighting, especially in terms of traffic safety. Around half the respondents said they would be prepared to have reduced lighting quality on motorways, under certain driving conditions, to make energy savings, but they were generally not prepared to accept a reduction in lighting quality in urban areas to save energy.

Online papers currently available in the field of street lighting:

- Proposed UK guidance for lighting in residential roads. *S Fotios, T Goodman*
Published online: 11/01/12
- Road lighting in change: user advice for designers. *M Viikari, M Puolakka, L Halonen, A Rantakallia*
Published online: 08/11/11
- A proposed method for the calculation of light emitting diode road lighting. *S Zalewski*
Published online: 01/02/12
- Target visibility level and detection distance of a driving simulator. *R Brémond, V Bodard, E Dumont, A Nouailles-Mayeur* Published online: 01/02/12
- Dynamic measurement of traffic sign luminance as perceived by a driver. *JA Gutierrez, D Ortiz de Lejarazu, JA Real, A Mansilla, J Vizmano*
Published online: 21/10/11
- Low-rate wireless personal area networks applied to street lighting. *F Domingo-Perez, A Gil-de-Castro, JM Flores-Arias, FJ Bellido-Outerino, A Moreno-Munoz*
Published online: 14/12/11

Go to OnlineFirst section of LR&T website (<http://lrt.sagepub.com>). SLL members can access both online papers and all current and past issues of LR&T



Three-step special effect to simulate headlight illumination conditions: (a) daytime, (b) with black fog and (c) with headlamp beam pattern texture (Brémond et al)

Zalewski's paper notes that serious errors can occur when calculating luminance distribution for LED road lighting as per the methods in EN 13201. The paper therefore proposes different calculation methods for designs using LED road lighting and calls for a change in the current European standards.

The Visibility Level (VL) is a quality index in road lighting design cited in a number of national and international standards. Brémond et al's paper compares the recommended VL values with the visual performance results from a driving simulation and finds a good agreement between the two. Meanwhile Gutierrez et al demonstrate a method for dynamically measuring the luminance of a road sign as perceived by the driver of a car.

Finally Domingo-Perez et al present a method of using a wireless network and a Dali protocol for the remote management of a street lighting installation. Of potential interest to designers not just of street lighting, but also public realm lighting, is the number of different light sources that can use a Dali ballast and therefore bring these under the control of the proposed remote management system. ■

Code dependency

Do we have the right concept never mind the right values? asks Kit Cuttle

The Concise Oxford English Dictionary defines 'code' as a 'systematic collection of statutes, body of laws so arranged to avoid inconsistency and overlapping, set of rules on any subject', so it has come as a surprise to find that the latest issue of the SLL Code has abandoned that familiar role to become a vehicle for discussion of institutional, or even personal, views on lighting topics. Apparently the decision to retain the Code title, now that its role has been superseded by EN 12464-1, was made 'to avoid confusion', but I suspect that I am not alone in finding that decision confusing.

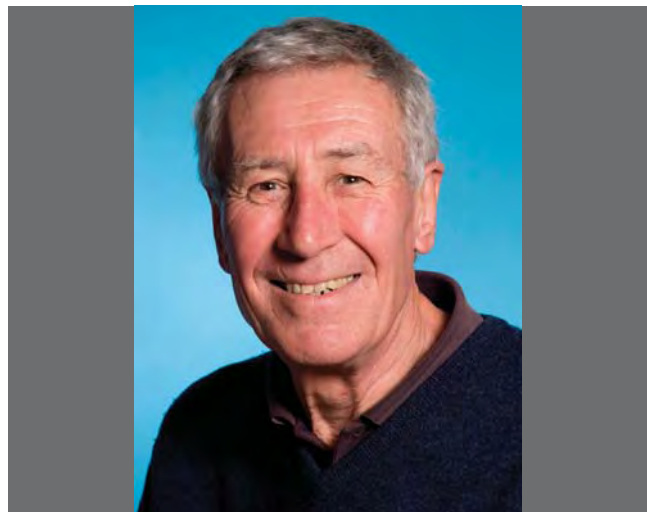
For me, quite the most striking innovation is the introduction of minimum mean cylindrical illuminance values. Presumably this is not to be seen as statute or law but rather as a contribution to discussion, for as the Code's author states, 'We have what I guess is probably a finger in the wind value and we will know in five years' time whether it's a good value to use or not'. We have, regrettably, come a long way from the era in which new metrics had their origins in research, but surely five years of experimentation with lighting practice seems very risky. How many people may be subjected to unsatisfactory visual conditions, and for how long? I raise this point as I do not feel as much concerned about whether we have the right values as whether we have the right concept.

If mean cylindrical illuminance is to become recognised as a metric of lighting quality, where may that lead? The obvious way for anyone planning a lighting installation to ensure that the value will be acceptably high is to select luminaires that emit high proportions of their flux at angles which coincide with high levels of disability and discomfort glare. Actually the only comforting factor that I can find here is that it should not take anything like five years to discover that this is not a good idea.

I have recently offered proposals for discussion in this area, the basis of which is that we should redefine the fundamental criterion for general lighting practice as 'perceived illumination adequacy', for which 'mean room surface exitance' could be the specifying metric^{1,2}. Unlike mean cylindrical illuminance, mean room surface exitance takes account only of light that has undergone at least one reflection from room surfaces, and so it directs lighting designers towards solutions that address the issue of how lighting influences the appearance of an illuminated space.

I contend that the primary function of lighting standards should be to ensure that each type of space appears to be adequately illuminated. There has been recognition for some while that specifying minimum work plane illuminance values fails to achieve this, which has led to various 'add-ons' appearing in successive Codes, and minimum mean cylindrical illuminance is yet one more such supplement. A fundamental rethink is overdue.

We should recognise that while the Code was becoming bigger and heavier with each iteration, its effectiveness for guiding general lighting practice was declining. The current situation provides an opportunity to make a clear distinction between standards that are specified in quantitative terms



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and advice that is better offered in the form of guidelines.

The content of the standard EN 12464-1 should be directed towards ensuring adequacy and fitness for purpose, and we should use our influence to restrict its scope to quantitative specifications that can be verified on site. Meanwhile SLL guidelines should address all levels of the design process, starting with recommendations for devising spatial and spectral distributions of light which express the function of a space, achieve an illumination hierarchy, and reveal object attributes.

Such an approach would enable us to extend the scope of our authority well beyond lighting for workplaces by providing a rational basis for lighting design that would include locations such as retail, recreational and educational spaces. That done, the Code would have had its day. ■

Kit Cuttle is an author and lighting academic

1. Cuttle C. Perceived Adequacy of Illumination: a new basis for lighting practice. Proceedings of the third PLDC Professional Lighting Design Convention, Madrid, 2011. 81-83.
2. Cuttle C. Towards the Third Stage of the Lighting Profession. Lighting Research & Technology, 2010; 42(1):73-93.

A moving experience

Lighting is a key navigational tool in Speirs and Major's shortlisted scheme for the Lighting Design Awards

The lighting scope covered the internal public areas – reception, central lift core, outer stair cores and atrium – where everything is designed to aid the fast, efficient transfer of workers around the building. Elements include two large entrances, a vast reception, split reception levels to allow the loading of the hi-tech lift system, plus a massive lift lobby and bridge structure. The lighting creates a journey, following the movement from entrances to individual office receptions, highlighting key elements to help with wayfinding, while also underlining the dramatic nature of the spaces and structures.

The revolving doors and reception desks are strongly highlighted by CMH sources, but from that point the visitor faces the vast atrium space which gave rise to two concerns. 'The first was that such a deep plan space might appear gloomy and uninviting – particularly in the compressed spaces to its rear – and, secondly, that the lower ground floor lifts might be underused – going downstairs to go upstairs was likely to be counterintuitive,' says associate director of Speirs and Major Andrew Howis.

The solution was to provide lit vertical surfaces, both the outer perimeter to counteract gloominess, and a brighter perimeter to the lower ground space to create a visual draw. With the architect, Speirs and Major developed a cladding system of fins with integrated lighting – 2500 custom LED fittings and 8km of extrusion – and a textured detail panel for the light to wash. 'Rather than simply wash the walls, we wanted to clad the reception in light,' says Howis. 'Extreme efforts were made to integrate the light seamlessly and to achieve absolute visual consistency.'

The concern for the central core was that the huge structure would create an imposing and heavy presence. 'Early in the design process we persuaded the architect and client to add glazed floors, which we then uplit using a custom-designed integrated T5 profile system,' says Howis. 'The result is a glowing, animated structure which has become the heart of the building.'

While warm white T5 downlighting is provided throughout, the cool white light used to highlight the reception cladding creates the bold, dominant entrance image. The lift cars, the next stage of the journey, are treated as more personal, human spaces, and lit in contrasting warm tungsten light (switched off when cars are unoccupied). ■



Photography: James Newton



'Rather than simply wash the walls, we wanted to clad the reception in light'
– Andrew Howis, Speirs and Major



Project: The St Botolph Building, City of London, a new build speculative office development offering 52,000 sq m of lettable space over 14 storeys

Lighting design (public areas): Speirs and Major

Client: Minerva

Architect: Grimshaw

Electrical engineer: Roger Preston and Partners

Main contractor: Skanska

Electrical contractor: Skanska Rashleigh Weatherfoil

Key suppliers: ACDC Lighting, Erco, Zumtobel

20 March: Ready Steady Light, Rose Bruford College, Sidcup, Kent



2012

20 March

Ready Steady Light
(plus 19 March, Junior RSL)
Location: Rose Bruford College
Sidcup, Kent
www.sll.org.uk

21 March

Lighting Design Awards
Venue: London Hilton, Park Lane
www.lightingawards.com

26-27 March

Discovering Form through
Light and Colour
(Symposium organised in
association with the Colour Group)
Venue: Calouste Gulbenkian
Foundation, Lisbon
www.colour.org.uk

29 March

Lighting Masterclass
One Building a Minute
Speakers: Brian Charman, Iain
Macrae, Peter Le Manquais,
Stewart Langdown, Helen Loomes
Plus IALD guest speaker
Time: 10am-4.30pm
Location: St James Park, Newcastle
www.sll.org.uk

15-20 April

Light and Building
Venue: Messe Frankfurt
www.light-building.messefrankfurt.com

26 April

Lighting Masterclass
One Building a Minute
(see 29 March)
Location: Space Centre, Leicester
www.sll.org.uk

3 May

Lightscene
(Exhibition, organised by the ILP)
Venue: Westerwood Hotel,
near Glasgow
www.theilp.org.uk

29 May

SLL AGM, presidential address
and awards reception
Venue: tbc
www.sll.org.uk

24 May

Lighting Masterclass
One Building a Minute
(see 29 March)
Location: City Hall, London
www.sll.org.uk

9-12 June

Guangzhou International Lighting
Exhibition 2012
Venue: China Import and Export
Fair Complex, Guangzhou, China
www.light.messefrankfurt.com.cn

19-21 June

Lumenet 2012
Workshop for PhD students

Location: Arts Tower, School of
Architecture, University of Sheffield
E: lumenet2012@sheffield.ac.uk

3-4 October

Professional Lighting Summit
(Organised by the ILP)
Location: Grand Hotel, Brighton
www.theilp.org.uk



PHILIPS

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WILA

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Lighting Masterclasses:

Masterclasses are kindly
sponsored by Philips, Thorn,
Trilux, Tridonic and Wila. For
venues and booking details,
see www.sll.org.uk

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