Lighting for Architecture; The Outdoor Environment

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Combining many factors provides a comfortable & stimulating outdoor environment

How can we make best use of these using the new SLL LG6 Code?

Appropriate
• When, where and how should we light?

Empathy
“Alighting scheme that does not benefit society, in some way, should not be installed in the first place” (Alan Tulla – SLL LG6)

Safety
• Help meet CDM Regulation responsibilities through design
Legislation & Guidance

Heritage

Scheduled Monument

Emergency Lighting

HSG 38
Legislation & Guidance
Legislation & Guidance
Have you ever felt insecure?

Have you ever thought?
Health & Well Being

It’s not just your place you know! Let’s Share!
Guess, Brief, or Master Plan?

1 - Ensure 20 Lux on all task surfaces (not 19.5 or 22)
2 – Ensure 100% Uniformity on all task surfaces
3 – Ensure no shadows when viewed from any directions
4 – Ensure LED Light sources used

5 - Ensure all LED’s constant colour (≤1 Macadam ellipse)
6 - Ensure background uniformly lit to same level as task

Not quite uniform all over
Background has shadows

Perfect!
Guess, Brief, or Master Plan?

Cast of Characters

- Architect
- Lighting Designer
- Project Manager
- Contractor
- Manufacturer (Luminaires / Controls)
- Installer
- End User

Slide courtesy of Iain Ruxton
Guess, Brief, or Master Plan?

Communication

**Briefing**

Who?
Client, architect, lighting designers

What goes wrong?
Poor briefs
Poor budgets
Poor understanding of briefs

**Tender and Construction**

**Handover**
Guess, Brief, or Master Plan?
Study the site, All Conditions and Users
Physical Characteristics

- Red Light
  - Red Surface
  - Warm Light
  - White Surface
  - Blue Surface

- White Light
  - Red Effect
  - Red Light
  - Red Surface
  - Red Effect

- Blue Surface
  - Warm Light
  - Red Effect

- Warm Light
  - Red Effect
  - Red Light
  - Red Surface

- Red Light
  - Red Effect
  - Red Light
  - Red Surface
Physical Characteristics

Small shadows – wash effect

Deeper shadows reveal more detail
Technique
Quality of Life & Lumen Maintenance is sum of:
Light Source + Optic + Cooling + Luminaire + Driver

**LxxB50**

*(Rated Median Useful Life)*

*(Note – the table below shows component only, tc 65°C)*

<table>
<thead>
<tr>
<th>Luminous flux</th>
<th>Operating time STARK LLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>80 %</td>
<td>32,000 h</td>
</tr>
<tr>
<td>70 %</td>
<td>50,000 h</td>
</tr>
<tr>
<td>50 %</td>
<td>92,000 h</td>
</tr>
</tbody>
</table>
Lifetime Metrics

Maintenance Factor Calculation LED Luminaire - Example

![Graph of Maintenance Factor Calculation for LED Luminaire Example]

Same LED Luminaire - Spot Replacement (Example)

![Graph of Same LED Luminaire Spot Replacement Example]
Lifetime Metrics

Isaro LED

- Rated median useful life*: 100000h L90 at 25°C
- Ballast: 1x EL2
- Luminaire input power*: 79 W
- Dimming: DIM_LED
- LOR: 1.00 ULOR: 0.00 DLOR: 1.00

Omega LED

- Correlated colour temperature*: 4000 Kelvin
- Rated median useful life*: 50000h L90 at 25°C
- Ballast: 1x HF Tridonic LCI TEC
- Luminaire input power*: 41 W Lambda = 0.95
- Dimming: Fixed output
- Maintenance category: D
Maintenance
Maintenance
Pollution

The ...ble's

Sustainable Replaceable Maintanable Reliable Disposable Recyclable Affordable

(including Light Source)
Guidance on Regulations

The Construction (Design and Management) Regulations 2015 (CDM 2015) came into force on 6 April 2015, replacing CDM 2007. This publication provides guidance on the legal requirements for CDM 2015 and is available to help anyone with duties under the Regulations. It describes:

- the law that applies to the whole construction process on all construction projects, from concept to completion; and
- what each dutyholder must or should do to comply with the law to ensure projects are carried out in a way that secures health and safety.
Client now has a duty of care check due diligence in design and implementation

Responsible Person
Client – Default Principal

Until
Principal Designer
Appointed (in writing)
(until On Site)

When
Principal Contractor
Appointed (in writing)
CDM – Design Responsibilities

**Safe**
- Design
- Build / Install
- Commission
- Operate / Maintain
- Control

Promotes Teamwork,
- Partnership, BIM Processes
- Large and Small projects
Note – You are a “Designer“........
if advising,
in sales or lighting design,
or any design or application

Duties are to
Eliminate Risk
Reduce Risk
Minimise residual risk
Ensure competent

(ie – ICEL Competent Engineer - emergency lighting)
CDM – Design Responsibilities
Controls

Reliable Savings Effects

Interfaces

   People       Scenes
   Times        Conditions
   Atmosphere   Special (Theatrical / AV link)
   Hardware     Connectivity

IoT (IoA)
Controls

Systems
Complex
or
Standalone
Risk?
long term functionality?
Simple
Integral
Part Night Switching
Dual Power / Dimming
Product Selection
Proving or Selling? - Presentation and Trial
Install, Aim, Commission
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