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# The Ambient Lighting Manifesto

The following article by four lighting industry experts calls for a paradigm shift in lighting practice so that priority is given to lighting the space rather than focusing on visual tasks.

## A paradigm shift in lighting practice

By Peter Boyce, Kit Cuttle, Kevin Kelly and Peter Raynham

Progress in society, science and technology often depends on a paradigm shift ... think Germaine Greer, Albert Einstein and Tim Berners-Lee. We believe interior lighting, as generally practiced, is ripe for a paradigm shift.

We believe the paradigm shift required is to stop designing lighting to deliver a specified uniform illuminance on a horizontal working plane, and to start giving priority to lighting the space rather than just focusing on the visual tasks.

There are four reasons for this belief. They are:

1. The way information is delivered has changed. Today, a lot of the information necessary for task performance is delivered through self-luminous screens. Unlike paper-based tasks, information on screen does not require task illumination for it to be visible. This means much lighting is being designed to fulfill needs that no longer exist;
2. The number of tasks that require visibility of fine detail is much reduced. This has occurred partly through the wider availability of good-quality photocopying and printing, and partly through the growth in machine vision, computer power and robotics. Again, this means much lighting is designed to fulfill needs that no longer exist;
3. Light is now recognised as generating both visual and non-visual responses, both of which are important for human health and wellbeing. This

recognition is directing attention away from lighting the task to the light received at the eye. This means lighting designed to deliver a set illuminance on a hypothetical horizontal working plane is largely irrelevant to what should be the main functions of lighting, making the whole space visible and supporting human health;

4. Continuing to define good lighting by nominal task illuminance delivered to a horizontal working plane means we will miss an opportunity to ensure lighting will make a real contribution to enhancing human health and happiness. It may also lead to a waste of energy and financial resources, and cause damage to the environment.

### Current practice

Lighting as currently practiced is an activity undertaken by a number of different groups, ranging from professional lighting designers through to lighting equipment manufacturers, architects, building services engineers and electrical contractors. These groups have different levels of expertise and different income streams, meaning the amount of time they can spend on a lighting design varies. However, they do have two things in common. First, they all use software to develop their designs, some more sophisticated than others. Second, they – and even professional lighting designers – mostly follow the illuminance standards produced by authoritative bodies, both national and international, as to do otherwise poses

a risk of litigation should the client be dissatisfied.

The consequences of current practice are many and varied. By designing lighting for a nominal task illuminance on a horizontal working plane, one consequence is that light is being delivered where it is not needed at a level that is not necessary. In other words, energy is being wasted. Excessive energy consumption has implications for climate change. Further, unless lighting practice frees itself from the chains of illuminance on a horizontal working plane, there is a risk that lighting will be seen as a simple commodity where innovation and creativity are limited and price is everything. The implications for the lighting industry are not attractive.

### The objective

To achieve the desired paradigm shift, what is required is to change the lighting standards produced by authoritative bodies such as ISO, CEN, CIE and SLL from illuminances and illuminance uniformity on a horizontal plane to minimum ambient illuminances. Ambient illuminance is defined as the average flux density of the indirect flux field within the volume of a space. As such, it involves consideration of the distribution of light throughout the space and can be expected to relate to peoples' perceptions of the space. It would also be a better approach to quantifying the non-visual impact of lighting as it provides an estimate of the amount of light that will be received by the eyes. Ambient lighting is real human-centric lighting.

A design method suitable for this paradigm shift, the Lighting Design Objectives (LiDOs) procedure, already exists (*Light Lines*, July/August, 2020). The LiDOs procedure first requires the practitioner to specify the objectives of the lighting installation. Once this is done, the ambient illuminance can be determined and target surfaces to receive direct flux selected, enabling objectives to be met by adjusting the target/ambient illuminance ratio values.

This can cover situations ranging from where visually-difficult tasks occur and the ambient illuminance is insufficient to creating distributions of emphasis to achieve envisaged visual effects. It is worth noting that the LiDOs procedure is very flexible and does not limit the possible outcomes. It even allows a uniform illuminance across a horizontal working plane to be produced if that is the objective.

### How to get there

To achieve such a paradigm shift we need to gain the support of a number of different groups such as lighting designers, lighting manufacturers, lighting regulators, professional lighting societies and architects. Among the questions that will have to be addressed are:

- How will lighting practice be changed?
- Will the change increase energy consumption?
- What are the costs of ambient lighting compared with the current practice?
- What are the opportunities for the lighting industry?
- Will it lead to architects and lighting designers working more closely together?
- Can design software be rewritten to support the LiDOs procedure?
- What form should lighting standards take?
- How can daylighting be incorporated into the LiDOs procedure?

There are a number of activities needed before the desired paradigm shift can occur. They are:

- (1) Research aimed at identifying suitable metrics for quantifying ambient lighting and appropriate levels of these metrics for inclusion in standards is essential;
- (2) Research is needed to establish that giving priority to ambient lighting results in a better human response to an interior than current practice, both on first sight and after prolonged exposure;
- (3) Development of a reliable and robust ambient illuminance meter;
- (4) Research is required to estimate the financial and energy costs of implementing an ambient lighting approach relative to current



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- practice, including any attempts to influence human health with light;
- (5) The present understanding of lighting efficiency may be literally turned upside down – and needs further investigation;
  - (6) Given the conservative nature of the authorities who prepare lighting recommendations, it is likely that a transitional phase will be required if the movement from standards based on task illuminance on a horizontal working plane to standards based on ambient illuminance is to succeed. A transitional lighting standard would be one in which application tables are given in terms based on current practice (illuminance and uniformity) and in terms suitable for ambient lighting (MRSE, MICI, TAIR

etc). This would allow lighting practitioners to use whichever approach they thought was best suited for a given project. Lighting regulators, such as those revising EN 1246-1, should prepare for this transition by providing information on the ambient lighting approach as soon as possible.

### Coda

There is a long way to go before a shift from working plane lighting to ambient lighting can be justified and made to occur. However, it will never happen unless all those involved lift up their eyes from the horizontal working plane and see the opportunities for better lighting practice presented by ambient lighting. ■

- The Ambient Lighting Manifesto was first published in *SLL Light Lines*, Vol 13, Issue 5, Sept/Oct 2020