

Application of a Lighting Design Method Using Mean Room Surface Exitance

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Abstract : The visual needs of people in modern work based buildings are changing. Self-illuminated screens of computers, televisions, tablets and smart phones have changed the relationship between people and the lit environment. In the past, lighting design practice was primarily based on providing uniform horizontal illuminance on the working plane, but this has failed to ensure good quality lit environments. Lighting standards of today continue to be set based upon a 100 year old approach that at its core, considers the task illuminance of the utmost importance, with this task typically being located on a horizontal plane. An alternative method focused on appearance has been proposed, as opposed to the traditional performance based approach. Mean Room Surface Exitance (MRSE) and Target-Ambient Illuminance Ratio (TAIR) are two new metrics proposed to assess illumination adequacy in interiors. The hypothesis is that these factors will be superior to the existing metrics used, which are horizontal illuminance led. For the six past years, research has examined this, within the Dublin Institute of Technology, with a view to determining the suitability of this approach for application to general lighting practice. Since the start of this research, a number of key findings have been produced that centered on how occupants will react to various levels of MRSE. This paper provides a broad update on how this research has progressed. More specifically, this paper will: i) Demonstrate how MRSE can be measured using HDR images technology, ii) Illustrate how MRSE can be calculated using scripting and an open source lighting computation engine, iii) Describe experimental results that demonstrate how occupants have reacted to various levels of MRSE within experimental office environments.

Keywords : illumination hierarchy (IH), mean room surface exitance (MRSE), perceived adequacy of illumination (PAI), target-ambient illumination ratio (TAIR)

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