

## Lighting – One size fits all OR design for all?

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### 1. Introduction

Standards for interior lighting typically specify a maintenance illuminance level for various tasks, e.g. in Australia and New Zealand, the standards recommend at least 320lux for general office based tasks (Australian / New Zealand Standard AS/NZS 1680.2.2: 2008). Although this one-size-fits-all approach generally provides adequate illumination for people to perform their work, it may not be suitable or comfortable for all people working within the space.

#### 1.1 Practice innovation

This paper proposes a design-for-all approach for office lighting which combines reduced levels of ambient illumination with task illumination. Since this provides more flexibility for workers (i.e. they can vary the amount of light according to their personal visual needs) it has the potential to improve visual comfort and satisfaction. This is particularly important considering the varied visual needs of ageing workers.

### 2. Findings and discussion

Using task lamps to provide supplementary illumination at workstations is not a new concept. Neither is using a reduced level of ambient illumination in combination with task lighting. However, this latter concept is often pitched as an energy saving measure rather than one which enhances the visual comfort of workers, for example, Australian / New Zealand Standards AS/NZS1680.1: 2006.

A combination of reduced ambient illumination and localised task illumination has potential to avert workplace tensions where people working within the one space may have different preferences for lighting levels. These differences can be accentuated by age-related changes within worker's eyes e.g. there is evidence that some people with age-related macular degeneration prefer to read with illumination exceeding 2000lux (Bowers, Meek, & Stewart, 2001), while some people with cataracts experience discomfort glare symptoms with task illuminance of 320lux.

The disparity in lighting needs between individuals can be observed in workplaces where some overhead luminaires have been purposefully switched off, resulting in uneven illumination within the space. Further tensions may arise, particularly among managers, through a fear of non-compliance with the standards and hence a perceived breach of work health safety obligations e.g. if some work space areas have illuminance less than 320 lux. Uneven illumination can also contribute to a gloomy appearance, and this may have an effect on worker satisfaction with the work space.

There are standards which specify minimum illuminance levels for safe movement e.g. 20 lux (Australian / New Zealand Standard AS/NZS 1680.0:2009), but if this very low illuminance level is implemented throughout buildings and workplaces, it could make the space appear gloomy and luminaires may be perceived as glare sources.

Purposefully designing a work space with reduced general illumination and with shielded adjustable task lighting at workstations is a more aesthetically pleasing solution than the current ad-hoc approach to addressing different lighting preferences between individuals. Further research is required to determine appropriate illuminance levels which could be used in a design-for-all approach for lighting design.

### 3. Conclusion

Lighting preferences will vary between individuals because of differences in age, ocular health and physical health status. A design-for-all approach which uses reduced ambient illumination with localised task lighting promises more flexibility for individuals to select task illuminance levels as well as potential energy savings for businesses.

## **References**

- Australian / New Zealand Standard AS/NZS 1680.0:2009 Interior lighting Part 0: Safe Movement.
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- Bowers, A., Meek, C., & Stewart, N., 2001. "Illumination and reading performance in age-related macular degeneration." *Clinical and Experimental Optometry*, 84(3), 139-147.