

2.6 Visual discomfort

There are four situations in which lighting installations may cause visual discomfort. They are:

- visual task difficulty, in which the lighting makes the required information difficult to extract,
- under- or over-stimulation, in which the visual environment is such that it presents too little or too much information,
- distraction, in which the observer's attention is drawn to objects that do not contain the information being sought,
- perceptual confusion, in which the pattern of illuminance can be confused with the pattern of reflectance in the visual environment.

The occurrence of visual discomfort is made manifest by the occurrence of red, itchy eyes, headaches and aches and pains associated with poor posture. The most common aspects of lighting that cause visual discomfort are insufficient light, too much variation in illuminance between and across working surfaces, glare, veiling reflections, shadows and flicker.

2.6.1 Insufficient light

There is insufficient light when the worker approaches the escarpment of the relative visual performance surface for the task (see Figure 2.15). Behavioural signs that there is insufficient light are attempts to move the work to get more light or movements by the worker to get closer to the task. Discomfort caused by insufficient light can be avoided by following the recommendations in the *SLL Code for lighting* and the guidance given in the application chapters of this *Handbook*.

2.6.2 Illuminance uniformity

Lighting recommendations almost always include an illuminance uniformity criterion. These criteria can be direct or indirect. Direct criteria are ratios of illuminance, typically minimum/maximum or minimum/average measured on the relevant working plane. Indirect criteria are selected to produce a minimum illuminance uniformity ratio, e.g. spacing/mounting height ratio.

Such criteria can be considered on different scales. For a whole room where tasks can be anywhere in the room, the minimum/average illuminance ratio on the working plane should not be less than 0.7. This criterion probably only applies where the lighting installation is perceived by the occupants to be intended to produce a uniform distribution of illuminance. In rooms with large windows, the illuminance on a desk close to the window will be much greater than on a desk well back from the window so the illuminance uniformity ratio will be much less than 0.7, but few complaints are heard. Similarly, studies in offices where the luminaires can be individually switched or dimmed have shown that wide variations in the illuminance on desks can be tolerated, without complaint. This suggests that illuminance uniformity limitations are more a design requirement adopted to ensure that no one has insufficient illuminance for their work rather than an intrinsic requirement of the visual system.

On the scale of an individual work surface, there are two potential sources of discomfort. Distraction can occur where there are areas of high illuminance adjacent to the work area.