

## 1.3 Lighting levels

The human eye can only perceive surfaces, objects and people through light that is emitted from them. Surface characteristics, reflection factors, and the quantity and quality of light determine the appearance of the environment.

These variables create unlimited permutations between the physical elements and the light that strikes them. Nevertheless, when dealing with an interior it is useful to quantify the luminous flux received per unit of area – i.e. the illuminance measured in lumens per square metre, or lux. The illuminance can be specified and measured as planar, scalar, cylindrical and vector illuminance. These are explained elsewhere in this *Code* (Alternative calculations of illuminance, and Verification of lighting installation performance – see CD). The commonly used planar illuminance relates to tasks that lie in a horizontal, inclined or vertical plane. The plane within which the task is seen is called the reference plane. It is assumed that many critical tasks take place on the flat surface of a desk or bench, and this establishes a horizontal reference plane at the height of the desk or bench tops. This is referred to as the working plane.

This *Code* deals principally with recommendations relating to the task(s), and requires that each task is correctly illuminated and that extreme variation is avoided both across the task and within the space. The illuminance of the immediate surrounding areas should be related to the illuminance of the task area, and should provide a well-balanced luminance distribution in the field of view. For the sake of convenience the recommendations are often applied to the entire working plane, but the designer should be aware of the many tasks that do not lie on the horizontal plane and therefore require separate consideration (see section 1.3.2, Satisfaction).

Measures of illuminance are important because they influence three key aspects of the visual environment: task performance, satisfaction and appearance.

### 1.3.1 Task performance

The ability to see degrees of detail is substantially determined by size, contrast and the viewer's vision. Improvement to lighting quantity and quality makes an important contribution to improved visual performance. The effect of lighting on task performance is illustrated in Figures 1.5 and 1.6.

Three important points should be noted:

- increasing the illuminance on the task produces an increase in performance following a law of diminishing returns
- the illuminance at which performance levels off is dependent on the visual difficulty of the task – i.e. the smaller the size and the less the contrast of the task, the higher the illuminance at which performance saturates
- although increasing illuminance can increase task performance, it is not possible to bring a difficult visual task to the same level of performance as an easy visual task simply by increasing the illuminance.