While this understanding is useful, it is not enough to make quantitative predictions of the effect of lighting conditions on visual performance for all tasks although it is possible for some. Specifically, the relative visual performance (RVP) model of visual performance (Rea and Ouellette, 1991) has been shown to make accurate predictions for tasks that are dominated by the visual component, that do not require the use of peripheral vision to any extent, that present stimuli to the visual system that can be completely characterised by their visual size, luminance contrast and background luminance only, and that are seen in photopic conditions e.g. reading and doing data-entry work. Figure 2.15 shows the form of relative visual performance produced by this model for a fixed size but variable luminance contrast target and a range of background luminances. This form has been described as the plateau and escarpment of visual performance, the point being that over a wide range of luminance contrasts and background luminances the change in relative visual performance is slight but at some point either contrast or luminance will be so low that performance will start to deteriorate rapidly. The objective of functional lighting is to keep performance on the plateau and well away from the escarpement.

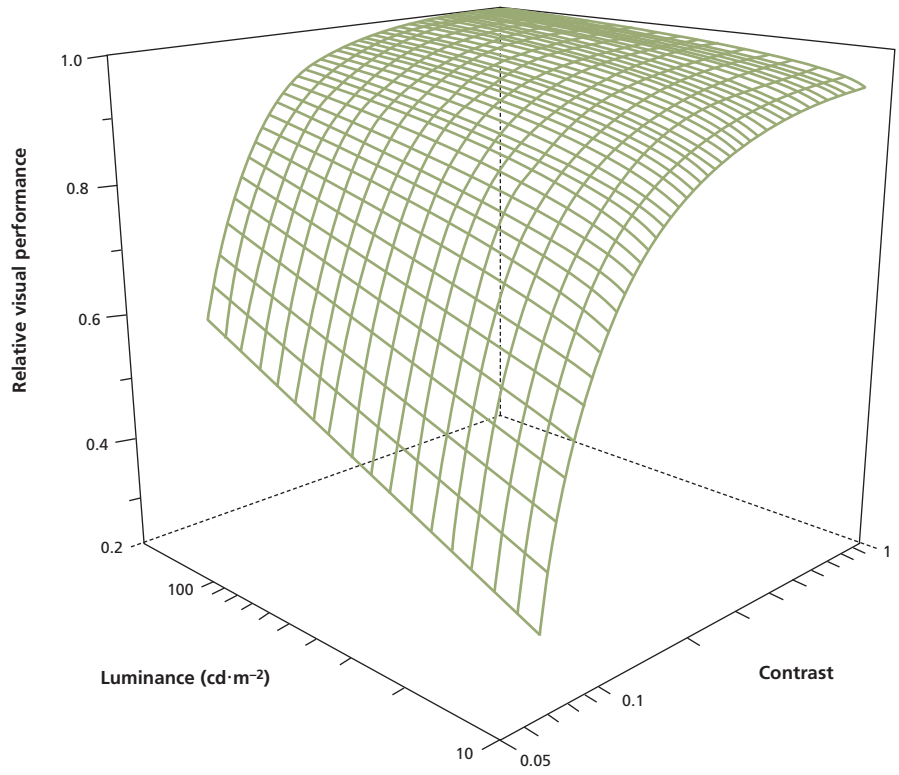

Figure 2.15 The form of relative visual performance plotted against target luminance contrast and background luminance for a fixed target size (after Rea, 1986)

2.5 Visual search

One type of work that is outside the RVP model is visual search. Visual search proceeds via a series of fixations joined together by saccades (Figure 2.2). This implies that the target is most likely to be seen first, away from the fovea. For a uniform field, where any departure from uniformity is a target, the probability of off-axis detection can be related to the visibility of the defect. The concept used to model the effect of lighting conditions on search time is the visual detection lobe, i.e. a surface centred on the fovea that defines the probability of detecting the target at different deviations from the fovea within a single fixation pause (Figure 2.16).