



**Figure 16.1** Angles upon which the luminance coefficient is dependent

In principle, the relevant angles for characterising the reflection properties of the road surface are:  $\alpha$  = angle of observation from the horizontal,  $\beta$  = angle between the vertical planes of incidence and observation,  $\gamma$  = angle of incidence from the upward vertical, and  $\delta$  = angle between the vertical plane of observation and the road axis. In practice, for lighting of traffic routes, it is assumed that  $\alpha$  has a fixed value of 1 degree corresponding to a viewing distance of about 60 m and  $\delta$  is irrelevant because the reflection properties of road surfaces are isotropic.

Although different road materials have different reflection properties, and those properties change over time and with wear, there are only two  $r$ -tables commonly used in the UK, one for asphalt-based roads and one for concrete roads. The  $r$ -table for the asphalt-based roads is called the representative British road surface.  $r$ -tables are characterised by two parameters, one concerned with lightness and one concerned with specularity. The parameter for lightness is the average luminance coefficient,  $Q_0$ ; this is highly correlated to the average luminance produced on the road surface. The parameter for specularity is

$$S1 = r(0, 2) / r(0, 0)$$

where:  $r(0, 2)$  is the reduced luminance coefficient for  $\beta = 0$  degrees and  $\tan \gamma = 2$   
 $r(0, 0)$  is the reduced luminance coefficient for  $\beta = 0$  degrees and  $\tan \gamma = 0$