The second is to increase the luminance contrast of vehicles and obstacles inside the tunnel entrance. This can be done by the choice of materials used in the tunnel entrance.

The road surface inside the tunnel entrance should be of higher reflectance than that immediately outside and the walls of the tunnel up to a height of 2 m, against which vehicles in the tunnel are usually seen, should have a luminance within the range of 60 to 100 percent of the average road surface luminance, the actual minimum depending on the tunnel class.

The black-out effect occurs because although the approach to the tunnel starts the process of visual adaptation there is no guarantee that this process will be complete by the time the tunnel entrance is reached. The approach used to diminish the black-out effect is to gradually decrease the road surface luminance from a threshold zone, starting at the tunnel portal, through a transition zone, to the interior zone. The length of these zones is determined by the stopping distance (SD), this being the distance required to bring a vehicle travelling at the maximum allowed speed to a complete halt. The length of the threshold zone is one SD. The average road surface luminance of the threshold zone is determined by the access zone luminance. The access zone is the part of the road approaching the tunnel within one SD of the entrance portal. The access zone luminance is the average luminance of a conical field of view subtending 20 degrees at the eye of a driver located at the start of the access zone and looking at the entrance portal. The threshold luminance ranges from 3 to 10 percent of the access zone luminance depending on the tunnel class and the speed limit. The length of the transition zone is determined by the assumed vehicle speed, the distance being set so as to allow about 18 seconds for adaptation. The road surface luminance of the interior zone in daytime depends on the speed and density of traffic in the tunnel and covers a range of 0.5 to 10 cd/m^2, the higher the speed limit, the higher the traffic density and the more mixed the traffic, the higher the average road surface luminance recommended in the interior zone. The minimum overall uniformity ratio along each lane of the tunnel should be 0.4 and the minimum longitudinal uniformity ratio is in the range 0.6 to 0.7 depending on the tunnel class. Disability glare from lighting in the tunnel is controlled by limiting the threshold increment to less than 15 percent. At the end of the interior zone is an exit zone where drivers leave the tunnel. The length of the exit zone in metres is numerically equal to the speed limit in kilometres/hour. The road surface luminance of the exit zone should be five times the average road surface luminance of the interior zone. Detailed guidance on the lighting of tunnels can be obtained from BS 5489-2: 2003.

As for the type of lighting used to provide the luminances in the tunnel, the light source most commonly used is one of the discharge sources, because of their high luminous efficacy, long life and robustness. The luminaires used in tunnels have to be of rugged construction to deal with vibration, dirt, chemical corrosion and washing with pressure jets. Three types of light distribution are used, symmetrical, counter-beam and pro-beam lighting. Symmetrical light distributions produce uniform luminance lighting throughout the tunnel so vehicles of different reflectances will have either positive or negative luminance contrasts with the road. Counter-beam light distributions are those where the light is directed predominantly against the traffic flow. This gives a high pavement luminance so that vehicles tend to be seen in negative contrast, but there is some risk of the driver experiencing discomfort and disability glare. Pro-beam light distributions are those where the light is directed predominately in the direction of the traffic flow. This gives a low road surface luminance but high luminances for vehicles so the vehicles tend to be seen in positive contrast. Various claims have been made about the benefits of these different systems but no consensus about the best system has been reached.