

DESIGN METHOD FOR THE LIGHTING OF TUNNELS BASED ON THE ASSESSMENT  
OF THE VEILING LUMINANCE

Contribution to V LUX Europa 1985, 9-11 September 1985, Lausanne,  
Switzerland.

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Leidschendam, 1985  
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Tunnels for road traffic have been built for a long time. In the beginning Dr. D.A. Schreuder, Institute for Road Safety Research SWOV and H.J.C. Oud, Locks and Weirs Division, Rijkswaterstaat, Ministry of Transport, The Netherlands was placed on the lighting of the tunnel entrance. In eight years these two steps the first and the second generation of traffic tunnel lighting respectively. The considerations of the second generation stood as a cornerstone for the recommendations for

In usual low-land situations, the adaptation of the visual system of drivers/observers follows without an appreciable adaptation lag the changes in the luminance of the immediate surround. This luminance may be assessed by adding the intrinsic luminance of the actual objects which are observed and the veiling luminance caused by scatter of light in the media in between. This system is applied in several new and renovated tunnels in the Netherlands. The high values of the luminance in the threshold zone are arrived at by applying louvres that are not sun-tight, and by artificial light. New design principles of the louvres are introduced. It seems that in the past an undue emphasis was placed on avoiding obstacles so at the moment the theoretical fundament for the third generation lighting is beginning to take shape, a fourth generation lighting is beginning to evolve!

### 2. THE BASIC FORMULA

The major visibility problem in tunnels is the daytime entrance. The approaching driver requires, however, to see into the tunnel even before he has reached the portal. A certain level of lighting is required in the tunnel entrance. This is conveniently indicated with  $L_2$ . According to the traditional viewpoints the requirements will be expressed in the visibility of specific objects.

The contrast of the specific object is expressed as

$$C = \frac{L_2 - L_3}{L_2}$$