

# Experiences with LED-based visual guidance systems in tunnels

Karl Eigentler

*Swareflex Division, D. Swarovski & Co, Austria*

LED-based visual guidance systems for tunnels have been examined in scientific studies regarding their contribution to road safety. It was stated that lighting equipment consisting of roof lights and LED-lane indication systems were considered to be significantly more convenient. The edge marking by LED is a contribution to an improved quality of traffic flow and avoids stress situations for the drivers. The studies were done in Austria, Germany, Norway and Switzerland. LED-based visual guidance systems are already used in many European tunnels. Due to the positive results such systems have already been included in national regulations. The LED modules are installed on the kerbstone or on the wall of the tunnel and controlled by a control unit. Advantages of the new technology are the extremely low energy consumption and the high durability combined with low maintenance requirement. Experience gained from arson attempts has shown that LED modules can be used also as escape route marking. In tunnel escape route identification the top priority is to create conditions for escape. The time available for escape must be used as effective as possible. LED products offer new technical possibilities. Dynamic escape route identification systems with green LED arrows are activated in an emergency case and show the best emergency exit. Especially in two-way traffic tunnels marking of the centre line is very important. For this purpose, special flush-mounted LED modules have been developed. These products withstand being driven over repeatedly and cannot be damaged even by snowploughs.

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