

Development of an active headlamp system for glare-free illumination of the traffic space

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Humans pick up approx. 90 per cent of information by means of visual perception. Good visibility is important when driving a motor vehicle. In particular at night and in twilight conditions, poor visibility conditions are the cause of heavy traffic accidents.

The question about optimal illumination of the traffic space occupies the automotive lighting engineering for many years. On the one hand, the road and its surroundings are to be illuminated as bright as possible, so that the driver can surely recognise the objects in the traffic space. On the other hand, other road users and the driver himself may not be dazzled.

For safety, when driving at night, the today's high and low beam do not represent the optimal possible solution of this conflict of aims in most road situations. This dissertation focuses exactly on this conflict. The basic idea of the headlamp systems under consideration here is based on the requirement that the radiated light is reduced accordingly only within the area of the beam pattern zone which would otherwise dazzle oncoming traffic.

Active illumination optimises the use of the vehicle headlamp, in order to supply the maximum permissible quantity of "glare-free" light for each traffic scenario. This innovative lighting function can present therefore a breakthrough for traffic safety at night.

Within the scope of this research work the presented idea evolved into roadworthy, efficient prototypes. In test runs it was proven that the so achieved active illumination of the traffic space actually resolves the conflict between high illuminance and low degree of glare.