Traffic Safety and Energy Efficiency of Future Street Lighting

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The importance of road lighting both from safety and energy saving perspectives is obvious. Over the last decades due to the increasing interest in the energy-reducing lighting systems on road networks, new generations of street lighting systems have been developed such as Light Emission Diodes (LED) and dynamic dimming lighting systems. These new technologies offers a wide range of unique potential benefits (i.e. durability, lower operating costs, energy efficiency etc.) compared to conventional systems and hence, the application of this technology is bound to increase. Nevertheless, the impact of the new road lighting technologies on road safety is not well understood. This study aims to first introduce the new street lighting technologies and compare them with conventional ones and second propose some practical approaches for evaluating the safety impact of them on road users. It is important to examine whether replacing the new road lighting technologies with conventional one affect the level of travel risk concerning road users including drivers and vulnerable road users. Crash frequency and severity are direct measures of road safety. Due to the fact that new lighting technologies have recently been applied and accordingly the number of accidents is too small for a before-and-after study, the safety impact of them on road users could not be evaluated through direct measures of traffic safety. In order to assess the safety impact of these light systems, this study aims to create a framework by introducing some indirect safety measures (e.g. speeding profile, behavior adaptation in terms of visibility, jerky driving etc.) and presenting relevant indicators and experiment design.

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