
Identifying Effective Brightness Limits for Headlights of Operating Vehicles in Sri Lanka

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Abstract

Driving an automobile is primarily a visual task, and vision contributes as much as 90% of the information required to drive (Alexander and Lunenfeld 1990). At night time, the required visibility level of roadway is created artificially by vehicle headlights or street lighting or both. Illuminating roadway using vehicle headlight is the most common method in night time driving, but too much light and improper lighting may result in glare which causes visual discomfort and a diminished ability to see the roadway. In another way, insufficient light causes problems to drivers to see the information needed or potential hazards in the roadway.

There are many different kinds of headlight systems in operating vehicles (imported from various manufacturers of various countries in various time periods) in Sri Lankan roads including the oldest systems and the most upgraded systems. Generally, a halogen headlamp system which is commonly found in Sri Lankan roads is expected to be performed well about 10 years in normal conditions. But the percentage of older vehicles more than 10 years is higher in Sri Lankan roads.

Different organizations all around the world have introduced regulations on vehicle headlights not only to the vehicle manufacturers but also to the drivers. Comparisons show that the current Sri Lankan regulations have not been updated to address the issues. Even though the road surfaces have been improved so that encouraging drivers to drive faster, other factors have not been considerably improved. Therefore, introducing the new regulatory system should be considered to control this vast variety and mitigate the risk and uncomfortable condition. The intention of this research is to identify brightness levels of operating vehicles in Sri Lankan roads based on Federal Motor Vehicle (USA) regulations which may be helpful to above.

The experimental brightness levels of headlights were measured by simulating the testing arrangement at a work station free for night time. The readings were taken in terms of “Lux” and maximum and minimum levels of brightness were identified.

The results of field tests revealed that the majority of operating vehicles have less brightness levels comparing with the minimum brightness level specified in the Federal Motor Vehicle regulation. Further, it was revealed that the most headlights of operating vehicles are miss-aimed and illuminate unnecessary regions which cause inconvenience to the drivers of oncoming vehicles.

Also, it was revealed that the driver's attention on headlight system of their own vehicle is very poor.

Finally, this research suggests introducing regulations to minimize or mitigate adverse effects of headlights by periodically evaluating headlight systems of operating vehicles based on a proper regulatory system in Sri Lanka.

Key words: Headlight, High beam, Low beam, Illumination

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