

Developing Criteria for Periodic Road Marking Maintenance in Sri Lanka

Achala Perera, H.R. Pasindu

Abstract

Road markings are important for traffic safety and guidance. In Sri Lanka, markings are mostly maintained in a reactive way, i.e. repainting is based on complaints or accident data and not on a regular, planned maintenance. Since there are no criteria based on quantitative criteria, resources are misallocated and more lives are lost due to delayed maintenance, i.e. the markings are less visible for the drivers since the lane demarcations are blurred. The goal of the present study is to derive scientifically based threshold values and approaches that can be used for the routine maintenance planning and the repainting intervals for road markings in Sri Lanka. The research starts with a review of the current situation, and it can be concluded that there are no standardised thresholds for repainting. Practitioners usually act on visual observations that occur irregularly and without proper quantitative support. This leads to premature or late painting, which has an impact on road safety and maintenance costs. Given this situation, our study aims to replace the current reactive approach with a proactive approach that will systematically assess the condition of markings using conventional and new techniques. The study will use a two-pronged condition assessment approach. The first component is a conventional visual condition process. This will be supplemented with automated evaluation tools. High-resolution imaging techniques combined with classical image processing algorithms will be used to quantify the condition of lane marking in terms of retroreflection and wearing pattern. The resulting technical metrics will be used to develop a measurable quality parameter for road markings. In parallel, data on environmental and operational parameters, i.e. traffic and weather data, will be collected from meteorological stations, a traffic management agency and road material suppliers. The main part of the methodology is the development of statistical models that relate the condition of the marking to influencing factors. Regression techniques and multivariate modelling techniques will be used to determine the rate of deterioration over time. The analysis will consider the influence of the history of exposure to weather conditions and heavy traffic loads. Where possible, the use of sensor data will be considered. It is expected that the statistical models will yield clear deterioration profiles, and these will be used to develop repainting thresholds. In addition, the study will use a multi-criteria decision analysis (MCDA) approach to consider multiple criteria, i.e., visibility, durability and cost effectiveness. This will not only identify optimal intervals for painting but also ensure that the proposed maintenance guidelines are practicable for the different types of roads in Sri Lanka. Engagement with Stakeholders is an important aspect of the study. Structured interviews with experts such as officials from the Road Development Authority, experienced contractors and transportation planners will be carried out to validate the technical findings and to ensure that the maintenance framework is practicable as well as recognisable within the local context. Their findings will refine the quality parameters and also provide further context to the statistical findings in the operation of roads in Sri Lanka. Expected outcomes from this research are identified repainting thresholds, in terms of a summary quality index, an improved maintenance cycle, and a practice-based road marking maintenance guide.

The local maintenance practices in Sri Lanka will be aligned with the best practices followed internationally, thereby minimizing unnecessary repainting, reducing maintenance costs, and improving road safety by enhancing marker visibility. Eventually, the framework developed in this study will assist in data-informed decision-making and policy development for sustainable maintenance of road assets in Sri Lanka.

Keywords: *road markings, quality metrics, automated assessment, traffic safety*

Author details;

1. Project Engineer, Road Development Authority.
achalaperera6@gmail.com
2. Professor, Department of Civil Engineering, University of Moratuwa.
pasindu@uom.lk