

Analysis of Suitability of Dry-Back Process in Sri Lankan Road Pavement Construction

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Abstract

Moisture content is an important component in the Compaction of pavement layers in road construction. Moisture content in pavement layers is varied by precipitation and environmental factors in the construction and operational stages. If the measured moisture content of the pavement layers exceeds the optimum moisture content, it causes premature pavement failures, such as traffic compaction in the wheel path. Also, this excess moisture content leads to the formation of undulation in the pavement. Therefore, the Dry-back process is widely used in Australia and New Zealand to prevent such pavement failures. The dry-back process is required to prevent the pavement from moisture-related failures. Water is added to the pavement material to achieve a specified density in the construction stage. If the moisture content of the pavement layer exceeds the optimum moisture content, pavement material must be allowed to dry to a certain level below the optimum moisture content. It is known as the dry-back process. Before laying one pavement layer over the other, the water content of the laid pavement must be checked. This is the quality measurement activity for the dry-back process. This research mainly focuses on the dry-back Requirement in Sri Lankan Road pavement construction. The research was carried out using four methods such as survey, material comparison, case study, and practical analysis. First, based on carried out industrial surveys, it was found that the dry-back method is followed in Sri Lankan pavement construction practices without understanding the exact process of it. Second material comparison, In Australia, higher quality materials are allowed for pavement construction when compared with the Sri Lankan Standards. In Australia, field compaction is maintained at a higher value, whereas California Bearing Ratio (CBR) is kept lower than the Sri Lankan materials specification. Various testing methods are practised in Australian Construction processes to ensure the quality of materials compared to Sri Lanka. The third Case study, weather reports, and testing summaries were interpreted to identify the pavement layers with high moisture content, specifically during the rainy season. On the other hand, failures on the pavement surface were identified. Professionals were interviewed regarding these pavement failures, while weather reports and material testing-related data were analyzed. Both approaches clearly illustrate that high moisture content might increase the possibilities of reconstruction of layers, obstruction in the pavement compaction, and pavement failures. Further, this finally practical analysis was carried out in the road sections where cracks are formed on pavements due to moisture content above the optimum moisture content. The moisture content of the pavement layer should be below 60% degree of saturation is preferable for the Sri Lankan pavement condition. This condition is derived from the literature survey and practical analysis of this research. Hence it can be concluded that the dry-back process is a primary requirement in Sri Lankan Road pavement construction.

Keywords: *Dry-back, Optimum Moisture Content, traffic Compaction, Degree of Saturation*

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