
Time Available for Compaction of Asphalt Concrete (TAC) in Tropical Countries

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Abstract

Road sector development is increased rapidly in Sri Lanka after the civil war. Asphalt concrete is most widely used for the construction of roads due to fast construction, durability, and comfortability, construction easiness compared to other materials.

The aim of this research is to identify the time available for compaction of hot mixed asphalt concrete in the field, during both day time and night time. The temperature of the asphalt mixture directly affects for compaction process. In this study, measure the time available for cooling of laid asphalt up to 90⁰C for ABC base and existing asphalt roads. The parameters taken are asphalt layer thickness, base temperature, ambient temperature with different mixtures and different types of asphalt pavers.

The standard specification for construction and maintenance of roads and bridges (ICTAD) has specified that the breakdown and the intermediate rolling shall be carried out at a temperature not less than 135⁰C and 115⁰C respectively. The final rolling shall be completed before the temperature of the mix falls below 90⁰C.

In the field, thermocouples were installed in different layer thicknesses of asphalt to measure temperature changes and recorded at five-minute intervals of the same mixture throughout the day. Measurements were taken in different types of mixtures and observed the available time for compaction of HMA. It was found that the cooling rate of HMA is significantly affected the measured parameters and best results were found from 12.30 pm to 1.30pm and also found that lay down temperature below 135⁰C was not significantly affected to compaction of HMA and need to complete all the compaction process before 900C.

In this research found that cooling rate of HMA mixes are significantly affected environmental factors and layer thicknesses of the mixes and also found that first 10 -15 minutes cooling rate is greater. Also found that the binder course cooling rate is greater than wearing course.

Key words: Temperature of asphalt, HMA, Aggregate base course, TAC, Asphalt compaction

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