

**DETERMINATION OF NOTABLE TOLERANCE
LIMITS FOR BITUMEN AND AGGREGATE FOR
ASPHALT CONCRETE MIXTURES IN SRI LANKA**

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Degree of Master of Engineering

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DECLARATION OF THE CANDIDATE AND SUPERVISOR

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ABSTRACT

Determination of notable tolerance limits for bitumen and aggregate for asphalt concrete mixtures in Sri Lanka

The development of corrugation along longitudinal profile is one of the most common failures in asphalt pavement. The corrugation distresses are usually more severe in road sections with high longitudinal slope than sections with mild slope. This is because the slope decreases average speed of vehicles running upward and leads to increase in the total loading time drastically. On the other hand, vehicles tend to apply brakes when running downward.

The research aims at finding out how asphalt material (Bitumen & aggregates) properties have an impact on corrugation distress in sloped pavements. For this purpose a recently constructed and heavily trafficked road (Ambepussa Kurunegala Dambula A006) is considered.

The standard specification for construction and maintenance of roads and bridges (ICTAD) has specified requirement for bitumen content and combined aggregate grading for mix design of asphalt with tolerances. The gradation pattern of the aggregates can have an impact on permanent distress in asphalt concrete pavements. The gradients of roads are usually not considered when selecting the combined grading type for mix design of asphalt.

The specification may be adapted to suit different conditions considering various criteria. For above road project combined grading Type 1 and the bitumen content tolerance percentage by weight of total mixture was adapted as +0.3 % where standard specification states ± 0.3 %. This leads the asphalt plant production crew to maintain bitumen content at higher than the design (maintain at 4.9 % in the plant though design bitumen content is 4.8 %).

More than 2000 samples (each 1500 kg batch) of different Asphalt plant bitumen batching details were analyzed to conclude the predefined tolerance limits of bitumen content and combined gradation of aggregates.

It has been concluded that standard values provided in ICTAD specification for bitumen content tolerance can be modified as ± 0.2 % and bitumen content tolerance limit should also extend over \pm values. Further the combined gradation tolerance of aggregates need no modification based on the sample analyzed in this study.

Key Words: Bitumen content, Combined aggregate gradation, tolerances

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LIST OF ABBREVIATIONS

Abbreviation	Description
AASHTO	American Association of State Highway and Transportation Officials
BS	British Standards
FI	Flakiness Index
AIV	Aggregate Impact Value
MDD	Maximum Dry Density
LAAB	Los Angeles Abrasion Value
SSCM	Standard Specifications for Construction and Maintenance of Roads and Bridges
UK	United Kingdom
USA	United States of America