

Effects of Super pave Specifies Aggregate Gradation on Marshall Mix Parameters

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Standard specification for roads and bridges (SSCM) includes gradation master band in which upper and lower percent passing has been specified for most sieve sizes. These limits tend to make finer gradation in the asphalt concrete than Superpave specifies aggregate gradation. The objective of this research is to evaluate the effect of Superpave aggregate gradations on Marshall Mix parameters (heavy traffic condition) while types of asphalt binder and type of aggregate remain unchanged

The method was very similar as Marshall Mix design procedure that SSCM are described for Sri Lankan conditions, except Superpave guides was used to develop the design-blended aggregate envelopes. Locally available crushed granite and 60-70 penetration grade bitumen were identified and collected to prepare different test samples. Individual properties of asphalt binder and aggregate were tested to determine that they are met relevant specifications as mentioned in SSCM.

The different hot bin aggregate samples were combined to make aggregate mixtures that comply with the Superpave conditions. The coarse side (plus 4.75 mm) of the grading curve remained almost unchanged, while the fine side (minus 4.75 mm) was varied in order to pass through, above, and below the restricted zone specified in superpave aggregate gradation. The blended aggregate envelopes were categorized as follows:

- Over Restricted Zone (ORZ) with comply to control points.
- Through Restricted Zone (TRZ) with comply to control points.
- Below Restricted Zone (BRZ) with comply to control points.

It was observed from the research that all Superpave specifies aggregates blends were satisfied the SSCM specified Marshall Criteria. Superpave restricted zone was not affected on Marshall criteria under local conditions and specifications. Optimum binder content (OBC) and Binder Tolerance (BT) were reduced when aggregate blend becomes coarser. Average Film Thickness (AFT) was increased when aggregate blend become coarser.

Further, Marshall Stability and Void in Mineral Aggregate (VMA) are not any significance differences when compare three gradation envelopes (ORZ, TRZ & BRZ). There was no significance different of Marshall Flow of ORZ & TRZ, while BRZ showed some lesser value than ORZ & TRZ. Air Voids (Va) value was increased when the aggregate blends become coarse.