

Challenges of Wearing Course Mix Design for Hambanthota International Airport

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Hambanthota international Airport (HIA) is a major ongoing development project in Sri Lanka. Since an Airport is a very important location for a country, durability and long term performance with least maintenance is fully ensured in the selection of material to the design and the construction methods in airport runways. In HIA, wearing course of runway has been decided to construct using Polymer Modified Bitumen (PMB) which is currently unfamiliar to Sri Lankan Highway industry. The modified binder to be used in the construction is PG 76-22 SBS modified binder. Further more the specified aggregate gradation for the design is coarser than the ones currently using in Sri Lankan highway industry. So it's a challenging task to prepare a mix design for the wearing course.

Polymer modified binder properties are different from conventional bitumen with high resistance to deformation at elevated temperatures and cracking at low temperatures. Some additional tests are included for the SBS modified binder to ensure its quality such as elastic recovery test and separation tendency test which are currently unfamiliar. Establishment of Viscosity ranges of the modified binder for compaction and mixing temperatures was a challenging task since the polymer modified binder behavior is non Newtonian..

In HIA the aggregate gradation selected for the mix design is coarse than the normally used aggregate gradation for asphalt wearing course. The maximum aggregate size is 31.5mm and the minimum size is 0.063mm. The aggregate was blended to avoid the maximum density line of Thompson and fuller curve and the Superpave restricted area to meet the design criteria.

The mix design for asphalt concrete was done using the marshal mix design. The asphalt mixing and compactions were conducted at different temperatures to obtain the optimum temperature for mixing and compactions. The gradation has considerable effect on satisfying the specification limits of air voids (VTM) and void in mineral aggregate (VMA). Effect of gradation, mixing and compaction temperatures were studied in the mix design using PMB binders.

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