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Technical Data

Effect of MR on Marshall Properties

Importance to Roads

The Marshall properties, namely Stability and Flow, are inherent elements of the Marshall asphalt mix design method developed in 1939. Many countries still use the Marshall method for asphalt mix design and specification, meaning that Stability and Flow are broadly understood.

Although Marshall properties are not directly related to asphalt performance, they do provide a relative measure of the stiffness (Stability) and ductility (Flow) of an asphalt mix. When the same aggregate sources and volumetric composition is used, the Marshall properties become useful indicators of the contribution of different bituminous binders to asphalt performance.

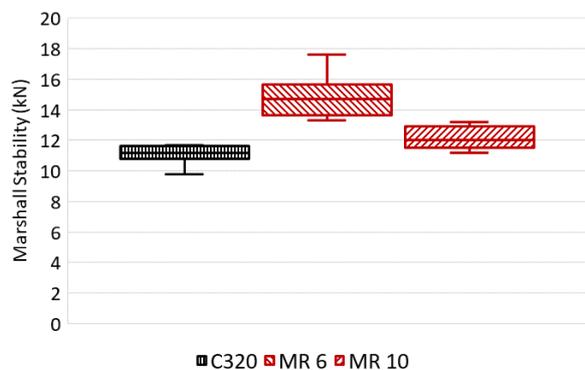
Methods of Evaluation

The same aggregate sources and mix designs were used to produce samples of nominally identical asphalt, except for the inclusion of conventional (unmodified) or MacRebur modified binder. Multiple sub-samples were tested for Marshall Stability and Marshall Flow and the replicate results were compared using simple statistical methods.

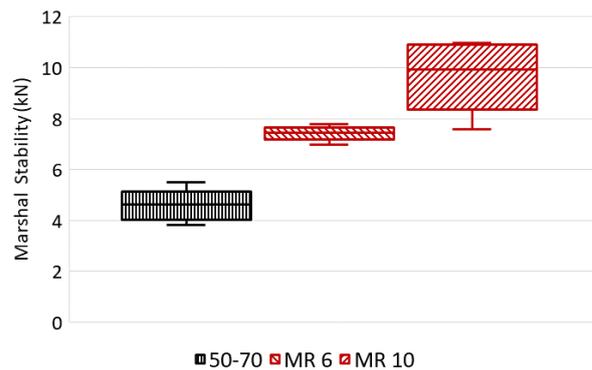
Effect of MacRebur on Stability

MacRebur MR 6 and MR 10 significantly increased the Marshall Stability of asphalt mixes, compared to otherwise nominally identical unmodified (penetration or viscosity grade) bitumens.

In Australia 6% of MR 6 and 6% of MR 10 increased the Stability from approximately 11 kN to 15 kN and 12 kN, respectively, compared to C320 (similar to 50-70 penetration grade). The asphalt was a typical 14 mm dense graded mix for road surfacing and six replicates were tested



Similarly, in the UK, six replicates of a 10 mm sized dense graded mix for road surfacing was evaluated. The Stability increased from approximately 5 kN to around 7 kN and 10 kN, for the MR 6 and MR 10 modified mixes.



Effect of MacRebur on Flow

The same studies also compared the Marshall Flow values. For both the Australian 14 mm dense graded mix and the British 10 mm dense graded mix, the Flow values were not significantly different for either of the MacRebur modified products, all with averages around 3 mm to 4 mm, which are typical values for common dense graded road asphalt mixes.

