

土木工程

石灰岩与玄武岩集料SMA高温蠕变特性试验研究

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摘要:

为对比石灰岩与玄武岩两种岩性集料对SMA(stone mastic asphalt)混合料高温性能的影响,采用玄武岩、石灰岩两种岩性集料配制了3种组合SMA混合料:(1)玄武岩集料SMA,粗、细集料全部采用玄武岩;(2)石灰岩集料SMA,粗、细集料全部采用石灰岩;(3)玄武岩与石灰岩混合集料SMA,即粗集料为玄武岩,细集料为石灰岩。通过弯曲蠕变试验评价了3种SMA混合料的高温稳定性,建立了相应的Burgers模型,并分析了不同集料组合对其高温性能的影响。结果表明,玄武岩集料SMA的高温性能最优,其次为玄武岩与石灰岩混合集料SMA,最后为石灰岩集料SMA。以弯曲蠕变速率为指标进行的方差分析表明,玄武岩集料SMA与石灰岩集料SMA二者的高温性能有显著性差异,而玄武岩集料SMA与玄武岩石灰岩混合集料SMA的高温性能无显著性差异。

关键词: 玄武岩 石灰岩 SMA 弯曲蠕变 高温性能

Experimental research on high temperature creep property of stone matrix asphalt mixtures using basalt and limestone aggregates

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Abstract:

The impact on the high temperature property of stone matrix asphalt mixtures using basalt and limestone aggregates were comparatively studied. Three kinds of SMA mixtures were fabricated using basalt and limestone aggregates, basalt coarse and fine aggregates named B-SMA, else limestone coarse and fine aggregates, named L-SMA, basalt coarse aggregates and limestone fine aggregates, named BL-SMA. The high temperature property of the three kinds of SMA was evaluated and the corresponding Burgers model was established through the bending creep test. Also, the effects on the high temperature property of the different combinations of the two kinds of aggregates were analyzed. The results indicated that B-SMA showed the best high temperature property, followed by BL-SMA and L-SMA in sequence. The results of the variance analysis on bending creep rate showed that the high temperature property differences between B-SMA and BL-SMA were statistically significant. However, the differences between B-SMA and BL-SMA were insignificant.

Keywords: basalt aggregate limestone aggregate stone mastic asphalt (SMA) bending creep high temperature property

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