



Cracking resistance of recycled asphalt mixtures in relation to blending of RAP and virgin binder

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ABSTRACT: The degree of blending between the reclaimed asphalt (RA) binder and the virgin bitumen during asphalt recycling mixing process is presumed to greatly influence the performance properties of recycled asphalt mixtures. Studies on the effect of different mixing methods using different quantities of RAP in the laboratory, showed that both rheological properties of RA mixtures and their fatigue are affected by preheating conditions and moisture content of the RAP. The effects however are not very significant. These somewhat unexpected results are believed to be due to the low void content of the mixtures tested but they also might be influenced by the amount of blending that has taken place between the RAP binder and the virgin binder. The results of these experiments will be reported in the paper.

Next to that studies will be reported on how well the virgin binder blends with the old binder which is part of the RAP. It is believed that by knowing precisely the degree of blending of RA binders, one can develop much more realistic mix designs and modify or select better mixing processes and will end up to more durable pavements.

In this study Nano-indentation is employed to measure the mechanical properties of the binder layer and to determine the degree of blending between the hard RAP binder and the soft virgin binder. Also the characteristics of the interface zone between binder and aggregate are measured in this way. For this purpose mono sized aggregate from round shape sea sand particles and glass beads up to 4mm are mixed with a virgin soft and hard bitumens separately to produce different mixtures in order to simulate different levels of blending and interface properties. RA is simulated by mixing aggregate with hard bitumen. Nano-indentation is employed to determine the resilient modulus and hardness at each location and these results are used to determine the degree of blending.

Initial results show promising results that allow the degree of diffusion and blending between two bitumens to be determined.

KEYWORDS: *reclaimed asphalt, blending, recycling, Nano-indentation, diffusion*