

EFFECT OF POLYMER TYPE ON IMPROVING RHEOLOGICAL PARAMETERS RELATED TO RUTTING RESISTANCE OF ASPHALT BINDERS

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ABSTRACT

Polymer additive should be sufficiently compatible with the asphalt and properly selected to improve rutting resistance of asphalt mix in a cost effective manner. At a given polymer content, the modified binders containing elastomers and plastomers differ widely in their rheological properties. The differences are more pronounced at higher temperatures up to 82°C. The main objective of this paper is to highlight the importance of selecting proper polymer type that would improve rutting resistance of modified asphalts by addressing the elastic and creep recovery. Each polymer has special characteristics which are used in asphalt modification. Four Arabian asphalts were modified with three types of plastomers and one type of elastomer with different concentrations (2-6%) from different sources. It was found that elastomers can increase the PG upper temperature by around 3°C more than Plastomers for the same amount of polymer and have higher tendency to increase the elastic recovery characteristics of asphalt binder by about 10% more than other types of polymers after Elastic Recovery (ER) and Multiple Stress Creep Recovery (MSCR) tests for PG 70, PG 76 and PG 82 binders. The relationship between ER and MSCR results indicated that elastomer modified asphalt binder with 30% MSCR recovery equal to 60% ER recovery while plastomer modified asphalts need to have at least 50% recovery.