Polymer modification of Arab asphalt

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Abstract: Neat asphalt binders lack the proper viscoelastic balance that usually occurs when an effective elastic network is created by molecular association. It is hypothesized that proper viscoelastic balance can be formed by creating molecular entanglement in asphalt through the use of high molecular weight polymeric additives. In this research, a procedure for modifying asphalt binders was developed, together with criteria to evaluate the effectiveness of the polymer modification process. The procedure and criteria were used to modify Arab asphalt binders to satisfy the performance requirements of the Gulf countries, in terms of rutting, fatigue, and low-temperature cracking. The data collected clearly indicated that polymer modification is effective in improving the rheological properties of neat Arab asphalt binders to satisfy the performance requirements of the Gulf countries. Furthermore, life cycle cost analysis of various polymer modified mixtures indicated that polymer modification is feasible and economically justified.