

Mechanistic and Cost-Effectiveness Analysis of Cement Treated Bases in Flexible Pavement

Mena I. Souliman¹, Nitish R. Bastola¹, Waleed A. Zeiada²

¹The University of Texas at Tyler
3900 University Boulevard, Tyler, TX 75701 RBS 1008, USA
msouliman@uttyler.edu; nbastola@patriots.uttyler.edu

²University of Sharjah
Sharjah, P.O. Box: 27272, UAE
wzeiada@sharjah.ac.ae

Abstract - Pavement performance is a key parameter that governs the serviceability of road networks. This performance is heavily influenced by the pavement construction materials such as asphalt binder and aggregates. The use of proper aggregates results in enhanced structural stability and greater long-term performance of pavements. However, due to the rapid construction of roads around the world, aggregates used in the base layer are often treated with various stabilizing agents such as cement. In this study, various observations are made based on the use of cement as stabilizing agent and traffic speeds over the pavement. Various mechanistic analyses are performed using the 3-D Move Analysis software and the comparative studies are presented in between the treated and untreated bases and their effect on fatigue performance. The analysis showed that the use of cement as a stabilizing agent increased the pavement performance up to 96% for fatigue cracking compared to untreated base layers. The cost-effectiveness analysis also showed that the use of stabilizing agent would reduce the long-term cost of pavement as compared to untreated bases.

Keywords: Pavements, Base Layer, Aggregates, Stabilizing Agents, Cement, Fatigue Cracking, Mechanistic Analysis, Cost-effectiveness.