

Pavement Quality Evaluation Using Intelligent Compaction Technology: Overview of Some Case Studies in Oklahoma

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Abstract : Achieving desired density during construction is an important indicator of pavement quality. Insufficient compaction often compromises pavement performance and service life. Intelligent compaction (IC) is an emerging technology for monitoring compaction quality during the construction of asphalt pavements. This paper aims to provide an overview of findings from four case studies in Oklahoma involving the compaction quality of asphalt pavements, namely SE 44th St project (Project 1) and EOC Turnpike project (Project 2), Highway 92 project (Project 3), and 108th Avenue project (Project 4). For this purpose, an IC technology, the intelligent compaction analyzer (ICA), developed at the University of Oklahoma, was used to evaluate compaction quality. Collected data include GPS locations, roller vibrations, roller speed, the direction of movement, and temperature of the asphalt mat. The collected data were analyzed using a widely used software, VETA. The average densities for Projects 1, 2, 3 and 4, were found as 89.8%, 91.50%, 90.7% and 87.5%, respectively. The maximum densities were found as 94.6%, 95.8%, 95.9%, and 89.7% for Projects 1, 2, 3, and 4, respectively. It was observed that the ICA estimated densities correlated well with the field core densities. The ICA results indicated that at least 90% of the asphalt mats were subjected to at least two roller passes. However, the number of passes required to achieve the desired density (94% to 97%) differed from project to project depending on the underlying layer. The results of these case studies show both opportunities and challenges in using IC for monitoring compaction quality during construction in real-time.

Keywords : asphalt pavement construction, density, intelligent compaction, intelligent compaction analyzer, intelligent compaction measure value

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