

## ABSTRACT

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Title: Implementing the Superpave 5 Asphalt Mixture Design Method.

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Recent research developments have shown that the asphalt mixture durability and estimated pavement life can be increased by modifying Superpave asphalt mixture design to achieve an in-place density of 95%, 2% higher than the conventional Superpave density requirements of approximately 93% (7% air void content,  $V_a$ ). This requires increasing the design air void content ( $V_a$ ) to 5% from the conventional requirement of 4%. After success of this modified mixture design, known as Superpave 5, in laboratory tests, two controlled field trials and one full scale demonstration project, INDOT had bid 11 trial projects across 6 INDOT districts based on Superpave 5 mixture design method. The current research was tasked with observing the implementation of Superpave 5 mixture design, documenting the construction and in-depth analysis of the quality control and quality assurance (QC/QA) data obtained from 9 out of 11 construction sites where the projects had been completed to date. QC/QA data for each site was examined individually using various statistical metrics to measure their construction performance with respect to Superpave 5 guidelines. Data analysis stated a 4.99% average air void achieved in the field for all the trial projects combined which coincides with the Superpave 5 recommendation of the same. It also reported the in-place field density of 93.82% for all the trial projects combined, which is roughly 1% less its Superpave 5 recommendation. Additionally, mitigation measures to alleviate under-compaction in the field were discussed. The results of this field study validate the possible benefits of using Superpave 5 mixture design with higher air voids and increased densities. The findings of this study hope to benefit the future implementation of this modified mixture design.