



ENHANCED IN-PLACE DENSITY: WHY IS IT SO IMPORTANT?

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Although several factors can influence the performance of an asphalt pavement, one of the most important is in-place density. A small increase in density can potentially lead to a significant increase in service life of asphalt.

Recognizing the importance of in-place density in building cost-effective asphalt pavements, FHWA initiated a three-phase demonstration project from 2015 to 2018: "Enhanced Durability of Asphalt Pavements Through Increased In-place Pavement Density." The objective of this demonstration project was to support agencies in their evaluation of current density requirements for acceptance.

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WHAT IS DENSITY?

The density of a material is simply the weight of the material that occupies a unit volume of space. Increased density is achieved through the compaction process in asphalt pavements. The in-place density is an indication of the degree of compaction of the mixture by comparing it to the maximum density of the material.

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WHY IS DENSITY IMPORTANT?

The in-place density of asphalt pavements is considered to be the most important predictor of pavement performance. A lack of acceptable in-place density in the asphalt pavement can result in reduced service life through one of the following mechanisms:

- Rutting caused by consolidation of voids under traffic
- Cracking caused by high permeability and aging leading to fatigue
- Moisture damage caused by the intrusion of water due to high permeability

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HOW DOES THIS IMPACT ME?

Relatively small in-place density improvements can result in large benefits for agencies. Using the conservative 10 percent increase in service life, a life cycle cost analysis found that agencies would see a net present value cost savings of 8.8 percent by increasing the minimum required density by 1 percent. This also includes cost savings in operation, maintenance, and road user costs.

CHECK OUT MORE IN THE SERIES!

The Asphalt Pavement Density Series briefs present major findings and best practices that resulted from FHWA demonstration projects.

For more information or technical assistance on improved density, please contact: Derek Nener-Plante, FHWA Resource Center, derek.nenerplante@dot.gov

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