



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

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.

1

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.

2

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

3

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.

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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:
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