

## JUST THE FACTS

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## Development of a Design Methodology for Asphalt Treated Base Mixtures

### PROBLEM

Asphalt treated base (ATB) is a dense-graded asphalt mixture with a wide gradation band and lower asphalt content intended for use as a base course layer. ATB costs less than typical asphalt base course mixtures because it can be produced with less expensive aggregates and lower percentages of asphalt cement binder. The use of ATB can provide a waterproof layer to prevent fines infiltration into the subgrade and other pavement structures. The use of ATB mixtures can be advantageous in limiting problems associated with untreated granular base materials, such as segregation, and improve the roadway smoothness and the speed of construction.

Currently, the Louisiana Department of Transportation and Development (LADOTD) considers the ATB mixture as one alternative of five types of class I and II base course layers. However, the specifications for ATB mixtures are similar to those required for binder and wearing asphalt mixtures. It is noted that there is no well-defined procedure available for the design of low cost ATB mixtures, other than those based on recipe type approaches. Thus, the use of ATB mixtures as base course layers is limited at the present time. This project will evaluate the mechanical and physical properties of ATB mixtures using fundamental engineering tests.

### OBJECTIVES

The primary objective of this research is to develop a simplified design methodology for ATB mixtures that are durable, stable, and cost effective through the examination of the performance of mixtures that have a different aggregate gradation from typically available sources.

A secondary objective of this research is to compare the performance of ATB mixtures to untreated granular base materials currently used in the construction of base layers in Louisiana, and evaluate the cost effectiveness of using ATB as an alternative to those materials.

### SPECIAL POINTS OF INTEREST:

- Problem Addressed
- Objectives of Research
- Methodology Used
- Implementation Potential

**METHODOLOGY**

The research objectives will be accomplished in two parallel phases. Phase I will develop a simplified design methodology for ATB mixtures through a comprehensive laboratory program. The fundamental tests that are used to evaluate the performance of ATB mixtures include: load wheel tracking, semi-circular bend, indirect tensile strength, dissipated creep strain energy, dynamic modulus, flow number, and flow time tests. In addition, the mechanistic tests selected to evaluate the performance of untreated granular base materials are: resilient modulus test and single stage repeated load triaxial (SSRLT) test. It is worth mentioning that the SSRLT test is similar to the flow number test that will be conducted on ATB mixtures.

Phase II of the project will demonstrate the production and constructability of the proposed ATB mixtures from ongoing field projects as compared to conventional base course materials. In addition, the performance of field projects containing ATB mixtures will be examined through in-situ as well as laboratory mechanistic tests from field cores and plant mixed laboratory compacted samples.

**IMPLEMENTATION**

A simplified design methodology will be recommended for obtaining a low-cost, structurally stable, and durable ATB mixture, potentially leading to improved pavement performance and cost savings. This study provides a unique opportunity to examine the laboratory limits of durability in hot mix asphalt (HMA) materials in addition to potential cost savings.



**Figure 1**  
Semi circular bend test setup



**Figure 2**  
Dynamic modulus test set up