GDT-115
METHOD OF TEST FOR DETERMINING
RUTTING SUSCEPTIBILITY
USING THE LOADED WHEEL TESTER

A. SCOPE:

The Loaded Wheel Tester will be used to test the rutting susceptibility of asphaltic concrete mixtures. This method describes the procedures needed to accomplish this task.

B. APPARATUS

1. 6000 gram scale, accurate to 0.1 gram.
2. Mixing utensils (bowls, spoon, spatula, bullet nose rod)
3. Hot plate
4. 3" x 3" x 15" mold
5. Curing Box, capable of maintaining a temperature of 105°F to ± 2°F
6. Compression machine capable of 60,000 lbs. of load.
7. Loaded Wheel Tester (Modified Benedict Slurry Seal Tester)
8. Ovens

C. PREPARATION OF SAMPLE:

Beams should be batched to meet actual laboratory density at optimum asphalt cement content. Heat aggregate, liquid asphalt, molds, and utensils to specified temperatures. Temperatures for heating and mixing should conform to the Asphaltic Concrete Mixture Control Temperature chart published quarterly by the Bituminous Control Unit. Dry mix aggregates and one percent lime first, then add optimum percentage of asphalt cement. Mixing temperature should conform to the Mixture Control Chart for the grade of asphalt being used. Place ENTIRE mixture in a one gallon can, close lid and place in an oven set on approximately 350°F. Heat until mixture meets compaction temperature as specif·ed on Mixture Control Chart for the grade of asphalt being used. Remove lid and place entire batch in mold and spade sample thoroughly with bullet nose rod 30 times. Place mold under loading head, put filter paper on top, add top plate and rapidly apply and release a load of 60,000 pounds using 4 repetitions. Next apply 60,000 pound load and allow load to remain on beam for six minutes. Remove load and top plate and allow beam to cool to room temperature. Once cooled, extrude beam from mold. The density of the beam should be measured using GDT-39 and compared to the design density. Densities within 97% of actual laboratory density will be considered acceptable. Once a beam has been stripped, place it on a flat steel plate to prevent beam deformation. Beams mus: cure at room temperature for a minimum of 7 days before testing. After 7 days at room temperature, beam must be cured for 24 hours at a temperature of 105°F before testing.

D.   PROCEDURE:

METHOD A

1.   Testing chamber temperature should be stabilized at 105°F.
2.   Load sample into testing frame of machine.
3.   Take an initial reading (at 3 locations: center, 2 inches left of center, and 2 inches right of center.
4.   Position rubber hose across sample and tighten nuts.
5.   Inflate hose to 100 PSI.
6.   Apply loading head and 100 lbs. of weight.
7.   Turn on and test for 8,000 cycles. A complete test will take approximately 4 hours.
8.   Take final reading (at 3 locations: center, 2 inches left of center, and 2 inches right of center).

METHOD B

12" Roadway Cores are used in this method for evaluation.

1.   Saw core to give sample specimen 3" X 3" X 11".
2.   Proceed with test as outlined in Method A above with the exception that spacers must be used to center specimens in loading frame.

E.   CALCULATIONS

1.   Beam Weight

   (a) $3" \times 3" \times 15" = 135$ in.^{3}

   (b) $\dfrac{135 \text{ in.}^3}{1728 \dfrac{in^3}{ft^3}} = 0.781$ Ft.^{3}

   (c)   (Density @ Opt.) $(0.0781$ ft.$^3) = $ Total weight of beam

2.   Conversion to Grams

   $\dfrac{(\text{Total Beam Weight})\ (453.6 \text{ Gms.})}{*N} = $ No. of Grams per Layer

   *N is the number of layers per beam. Beam may be batched in 1, 2 or 3 layers

3.   Individual weights for dry aggregate, lime and liquid A.C. per layer

   (a)   (No. of gms./layer) (% A.C. @ Opt.) = No. of Grams of A.C.

   (b)   (No. of gms./layer) (Grams of A.C.) = No. of Grams of
                                                aggregate + lime

(c) $\dfrac{\text{(Gms. of Agg. + Lime)}}{1.01}$ = No. of Grams of Dry Aggregate

(d) (Gms. of Agg. + Lime) - (Gms. of AGG.) = No. of Grams of Lime

F.   REPORT

Report rut depth to the nearest 0.01 inches. If the average rut depth for the three beams exceeds 0.30 inches, the asphaltic concrete mixture shall be reported as failing.