

METHOD OF SAMPLING AND TESTING
MT 326-04
METHOD OF SAMPLING AND TESTING TO DETERMINE THE PLANE
OF FAILURE IN RUTTED ASPHALT PAVEMENTS
(Montana Method)

1 Scope:

1.1 This method covers the procedure for obtaining and testing asphalt pavement cores in order to determine the Plane of Failure. The Plane of Failure is defined as the depth at which the voids in the wheel path and/or between the wheelpaths are comparable to the voids in the passing lane.

2 Referenced Documents:

2.1 *MT Materials Manual*
 MT-314 – Method of Test for Bulk Specific Gravity of Compacted Bituminous Mixtures.
 MT-321 – Procedure for Determining Maximum Specific Gravity of Bituminous Paving Mixtures – “Rice Method”.

3 Apparatus:

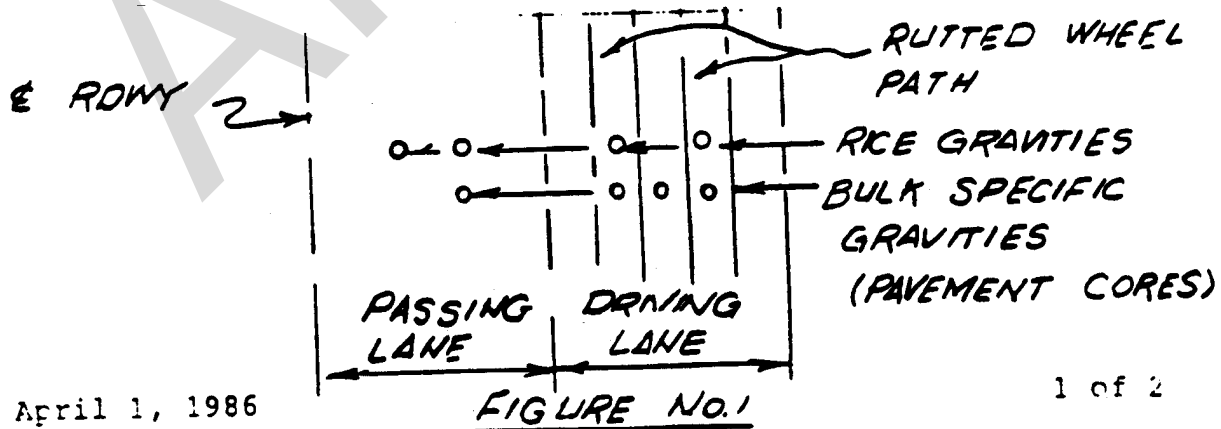
- 3.1 *Diamond saw*
- 3.2 *Coring machine*

4 Sampling:

4.1 One set of eight cores shall be taken, as shown in Fig. 1, from each area to be evaluated. Four cores consisting of one core from each wheel path, one from between the wheel paths and one from the passing lane shall be used to determine the bulk specific gravity. The other four shall be taken as close as possible to the first four and will be used to determine the voids by Rice Gravity.

4.2 In determining the Plane of Failure in rutted asphalt pavements, it is necessary that rut measurements be taken. Measurement shall be adjacent the cores taken as described in paragraph 5.1 and 5.2. See Note 1.

Note 1 - Whenever the void analysis does not provide sufficient information on which to base a recommendation, rut measurements serve as an aid in making recommendations for the depth of milling in rutted pavements.



5 Sampling Frequency:

- 5.1 The following is only a guideline for field personnel to follow and it may be necessary to increase or decrease sampling frequencies depending on the conditions of the pavements to be studied.
- 5.1.1 Uniformly rutted pavements shall have three randomly selected areas evaluated by taking one set of cores as in paragraph 4.
- 5.1.2 Non-uniformly rutted pavements shall have three sets of cores sampled so that the appropriate cores within a group are taken from rutting with approximately the same depth.

6 Procedure:

- 6.1 The lifts in each core are separated, if necessary, by cutting with a diamond saw. (Note 2)

Note 2 – It may be necessary to cut the lifts in half to determine the depth of failure within a lift.

- 6.2 The bulk specific gravity is determined according to MT-314 for the lifts of four of the cores. (Fig. 1)
- 6.3 All corresponding lifts are combined for each lane and the Rice Gravity is determined according to MT-321 for each lift and in each lane.

7 Calculations:

- 7.1 The Rice Gravity value for each lift in each lane is used with the Bulk Specific Gravity for the corresponding lift and lane to determine the voids in that lift for a particular core. The formula is shown below.

$$\frac{A - B}{A} \times 100$$

where:

A – Rice Gravity

B – Bulk Specific Gravity

- 7.2 The voids in the wheel paths, between the wheel paths and in the passing lane, are comparable when the variation is less than 0.4%. This value is based on a limited set of data and is subject to change. It is expected that variations may not fall within the area of 0.4% and in these instances evaluations must be based on consistent results and sound judgment.