METHOD OF DETERMINING THE THICKNESS OF COMPLETED
COURSES OF BASE, SUB-BASE AND HOT MIX ASPHALT
General Re-Write

SCOPE

This method covers the sampling and measurement procedures for determining the thickness of completed courses of pavement.

REFERENCED DOCUMENTS:

IM 320 Method of Sampling Compacted Asphalt Mixtures

APPARATUS

1. Complete core drilling apparatus as required in IM 320 or as furnished by the contractor.

2. Straightedge at least 18 in. (500 mm) long

3. Ruler with graduations of 1/16 in. (1 mm)

4. Tape measure

PROCEDURES

Specifications and instructions require that the thickness of the completed pavement courses be measured to the nearest 1/8 in. (3 mm) by means of cores, measurement of hole depth or measurement of the side of the trench, as directed by the engineer. Sample sites shall be randomly located.

A – THICKNESS DETERMINATION BY CORE MEASUREMENT

A-1 If the compacted material has sufficient cohesion and strength to permit the drilling and handling required to obtain an undisturbed core, this method should be used.

A-2 Drill through the course and remove the core. Refer to IM 320 for drilling and removal procedures.

A-3 Measure with a ruler, to the nearest 1/8 in. (3 mm), the thickness of the pavement course. Make four measurements, along the edge of the core at 90° intervals.

A-4 Assign a number to the core and record the core number, date drilled, station, transverse position (distance from centerline) and core measurements.

A-5 Retain all samples obtained from lots of construction that are determined to be deficient until final disposition of the lot is made as provided for by the specifications.

B – THICKNESS MEASUREMENTS BY HOLE MEASUREMENT

B-1 If the core breaks, while drilling or handling, or if it crumbles or disintegrates in the hole while drilling, the hole may be measured.

B-2 Place a straightedge at least 18 in. (500 mm) long, flat on the surface so as to establish the plane of the surface surrounding the hole.

B-3 Measure with a ruler, to the nearest 1/8 in. (3 mm), the distance perpendicular from the straightedge, laid across the center of the hole, to the bottom of the hole.

B-4 Take two measurements along the edges on opposite sides of the hole with the straightedge parallel to the centerline of the road, and two with it perpendicular to the centerline.

B-5 If the core breaks, but the portion in contact with the subgrade remains intact, remove it and measure to the nearest 1/8 in. (3 mm) the amount of the subgrade material adhering to it at four points on the edge of the core at 90° intervals. Subtract the average depth of subgrade material for the average depth measurement of the entire depth of the hole as made in B-1 to arrive at the average thickness.

B-6 Record the station, lateral position, date measured, and the depth of hole measurements.

C – THICKNESS DETERMINATION BY SIDE OF TRENCH MEASUREMENT

C-1 If accurate measurements cannot be obtained as outlined in Section A or B, the engineer, at his/her discretion may require the course to be dug open with any hand or mechanical means which will produce an opening large enough, and of sufficient depth, to permit viewing of the pavement course profile and the subgrade immediately under it. Obtain at least four measurements from the surface to the bottom of the course as viewed in the trench as described in Section B.

CALCULATIONS

Average the individual measurements for each core or hole to the nearest 1/8 in. (3 mm), and record in the appropriate field book and report form.

EXAMPLE DETERMINATION OF QUALITY INDEX (QI)

Design thickness 4 in. (101.6 mm)

Individual core averages as determined and recorded per this IM.

> 4.50 in. (114 mm)
> 3.75 in. (95 mm)
> 4.00 in. (102 mm)
> 4.12 in. (105 mm)
> 3.50 in. (89 mm)
> 3.88 in. (99 mm)
> 4.12 in. (105 mm)

Average = 3.982 in. (101.3 mm)

Range = (high value - low value) = 1 in. (25.4 mm)

$$QI = \frac{Average - (Design - 0.5^*)}{Range}$$

*0.5 is used with English units, 12.7 is used with S.I. units.

$$QI = \frac{3.982 - (4.00 - 0.5)}{1.00}$$

$$QI = 0.48$$

Report QI upon completion of each lot. Refer to applicable specifications for specific details and disposition for each type of construction.