TEST METHOD FOR COHESION OF COLD BITUMINOUS PATCHING MATERIAL BY ROLLING SIEVE METHOD

1. SCOPE

1.1 This test method covers the determination of the cohesive property of cold patching material (CPM) in cold temperatures (e.g. at -10°C). This property of CPM is evaluated in this method by rolling a compacted briquette in a sieve simulating the wearing of traffic on a mix patch.

2. REFERENCED DOCUMENTS

2.1 MTO Method LS-261 Preparation of Marshall Specimens

2.2 MTO Engineering Materials Office Report EM-85 - New Method for Testing Workability and Cohesion of Cold Patching Material ISBN 0-7729-3825-3, 1987.

3. SUMMARY OF METHOD

3.1 The bonding or cohesive property of a CPM is evaluated by subjecting a compacted mix to the disturbance and attrition action of a rolling sieve back and forth twenty times on a standardized tray. The abrasion between the surfaces of the sieve and the briquette simulates the wearing action of traffic. The percentage of material retained on the sieve to the total mass of the briquette is a measure of the cohesion and is called the cohesion index (C.I.); the higher the C.I., the better is the cohesion.

3.2 The compaction of CPM sample is carried out at -10°C using a 100 mm (4 in) diameter Marshall mold and handheld hammer.

4. SIGNIFICANCE AND USE

4.1 Since field performance of all asphalt mixes relates to a great extent on the material's cohesive characteristic, it is therefore important that the cohesion property be determined in the laboratory prior to application of the materials in the field. This method quantifies the cold patching material cohesiveness and its potential to resist ravelling due to traffic wear.

5. APPARATUS

5.1 MARSHALL COMPACTION APPARATUS:

5.1.1 Marshall mold assembly

5.1.2 Compaction hammer, hand type

5.1.3 Pedestal, for handheld compaction

5.1.4 Flat bottomed metal scoop

5.2 FREEZER/COLD ROOM: Capable of maintaining temperature at -10 ±2°C

5.3 BALANCE : 200 g capacity, with sensitivity of ±1 g

5.4 THERMOMETER: Suitable for measuring mix temperature in the range of -25 to +25°C, with sensitivity of ±2°C

5.5 METAL PANS OR BOWLS

5.5.1 One pan, 400 mm square x 100 mm deep

5.5.2 Four pans or bowls with 1000 g holding capacity

5.6 METAL TRAY: With an inside dimension of 550 mm length, 445 mm width and 105 mm height.

5.7 SPECIMEN EXTRUDER: Hand type, suitable for extruding a compacted specimen from the mold with the use of a mold collar

5.8 STANDARD SIEVE: 19 mm square openings, 305 mm diameter and 82.6 mm height, with a sieve cover sufficiently tight fit to keep the specimen inside during the test.

5.9 RUBBER GLOVES

5.10 STOP WATCH OR TIMER

6. PREPARATION OF TEST SPECIMENS

6.1 Prepare three specimens using the material to be tested.

6.2 Weigh into the separate pans the amount of cold patching mixture (about 1100 g) that will result in a compacted specimen height of 63 ±2 mm.

6.3 Place the pans and mix in a freezer and store for at least 12 hours at -10°C.

6.4 Place the specimen mold assembly and hammer head in the freezer for at least 2 hours.

6.5 Remove the mixture and compaction devices from the freezer and immediately place a piece of filter paper at the bottom of the mold before the mixture is introduced. Level the surface before placing another piece of filter paper on top.

6.6 Place the mold assembly on the compaction pedestal in the mold holder and apply five (5) blows with the compaction hammer with a free fall of 457 mm (18”). Reverse the mold and mix assembly and apply another five (5) blows of compaction to the specimen.

7. PROCEDURE

7.1 After compaction, carefully extrude the specimen into an extension collar and transfer the specimen to a diametrically positioned test sieve in a metal tray on a level surface (Figure 1).

7.2 Place the compacted briquette diametrically on the lowest point of the sieve with the flat face facing the wire mesh.

7.3 Immediately place the sieve cover tightly on the sieve and bring the sieve to one side of the metal tray. Roll the compacted briquette in the sieve back and forth twenty (20) times. The rolling should last about 20 seconds.

7.4 Lift the sieve from the pan and hold it in a horizontal position. Strike the side of the sieve slightly with a hand to allow all particles separated from the specimen to pass through the sieve openings.

7.5 Place the retained and passed portions of material in separate containers and determine the mass of both portions by weighing on a balance to the nearest gram.

8. CALCULATION

8.1 Calculate the cohesion index (C.I.) in percent as follows:

$$\text{C.I. (\%)} = \frac{r}{r + p} \times 100$$

where:- C.I. = percent of cold patching mix retained on the 19 mm sieve

r = mass of mix retained on the 19 mm sieve

p = mass of mix passing the 19 mm sieve

9. REPORT

The report shall include the following information:

9.1 Identification and description of the sample

9.2 The C.I. calculated from averaging the triplicate test results for each of the samples.

Figure 1

A 305 mm Diameter 19 mm Opening Sieve and Cover,
Metal Tray, Compaction Hammer and Mold, and Pans