METHOD OF DETERMINING LIFT THICKNESS USING CONCRETE COVER METER

1. SCOPE

1.1 This method covers the determination of lift thickness of a hot mix course using an electromagnetic concrete cover meter.

2. RELEVANT DOCUMENTS

2.1 Covermeter User's Guide for Concrete Cover Survey, Engineering Materials Office, Concrete Section, Ministry of Transportation, Ontario, March 1998.

3. DEFINITIONS

Concrete Cover Meter: means a measuring meter that utilizes Pulse Induction Eddy Current technology to determine the thickness of the lift thickness above a metal delineator.

Design Lift Thickness, T_D: means the thickness in millimetres of the hot mix course specified in the Contract Documents.

Lift Thickness, T: means the thickness in millimetres of the placed and compacted hot mix course as determined through the measurement method specified.

Metal Delineator: means a reflector that can be secured to the top of the underlying course in order to obtain a cover meter reading from which the lift thickness of the overlying course can be determined.

4. APPARATUS

4.1 Protovale CM9 Microprocessor CoverMaster®: An electromagnetic concrete cover meter that uses Pulse-Induction Eddy Current technology to determine distance from the meter head through a non-reflective material to a reflector. The meter is equipped with a 24 character LCD screen, audio and visual signal to indicate a reading has been taken. Equipment is battery operated, equipped with the large Head 210 mm X 100 mm face, 52,710 g with a sensing area of 160 mm X 80 mm and a cover range of 20 mm to 180 mm.

5. CALIBRATION OF EQUIPMENT

5.1 Prior to taking any measurement the equipment shall be calibrated using a combination of non-conductive calibration blocks (i.e. wood or plastic) T_D, T_D –5 mm, and T_D – 10 mm thick. Calibration measurements at a minimum shall be taken for these three thicknesses over a sample of the metal delineator, at bar diameter size settings 5, 5+, and 6 for a minimum of nine readings. Calibration at a minimum shall be carried out at the start of each day, after each battery charge or change (See Reference 2.1).

6. OPERATIONAL CONSTRAINTS

6.1 The unit shall only be used when it is fully charged.

6.2 Testing shall only occur when the pavement and air temperature range from 0ºC to 45ºC.

6.3 The cover meter head and pavement being tested shall be clean and dry.

6.4 Prior to any readings being taken, the equipment shall be set up and zeroed according to the equipment manual.

7. TEST PROCEDURE

7.1 All Cover Meter Readings shall be taken with the bar diameter size set at 5.

7.2 Place the cover meter over the hot mix course in the location of the metal delineator and locate it using the sensor.

7.3 Once the metal delineator is located, the operator shall take successive readings over the test location.

7.4 Readings shall be taken by moving the cover meter using a constant arm motion back and forth over the location in one direction and then at 90 degrees to the original direction until an intersection point is determined.

7.5 Readings shall be taken until two consecutive readings are the same, and they are not larger than any previous reading taken.

7.6 This reading is X, the cover meter reading.

8. CALCULATIONS

8.1 Calculate the lift thickness for the sublot, T

Where:

X = cover meter reading in millimetres

w = thickness of metal delineator (washer) measured in millimetres

$T = X + w$

9. REPORTING

9.1 Report all the calibration cover meter readings, X in millimetres and the thickness of the calibration block used in calibrating the equipment on a sheet such as Form A: Concrete Cover Meter Calibration Report shown in Figure 1.

9.2 Report the cover meter reading X, washer thickness, w and the calculated lift thickness, T in millimetres on a sheet such as Form B: Report on Lift Thickness as Determined from Concrete Cover Meter Readings shown in Figure 2.

Figure 1: Form A for Reporting Calibration of Concrete Cover Meter

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Form A : Concrete Cover Meter Calibration Report

Contract No.: Description of Cover Meter:

Highway: Design Lift Thickness, T_D (mm):

Date (dd/mm/yy)	Time	Thickness of Calibration Block (mm)	Cover Meter Reading, X (mm) at Bar Diameter Size #			Operator and Comments
			5	5+	6	

Figure 2: Form B for Reporting Lift Thickness

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Form B: Report on Lift Thickness as Determined from Concrete Cover Meter Readings

Contract No.: _____ Design Lift Thickness, T_D (mm) _____

Highway _____ Metal Delineator Thickness, w (mm) _____

Station	Offset from *	Date Tested (dd/mm/yy)	Time Tested	Cover Meter Reading, X (mm)	Lift Thickness T = X + w (mm)	Operator and Comments

* Note: Fill in where offset is taken from, ie. Centreline, right or left pavement edge.