BUREAU OF MATERIALS
MATERIALS PROCEDURES

MP NUMBER: 17-25

EFFECTIVE DATE: 03/03/2025

APPROVAL: *Edward Inman*

CALIBRATION OF CONTINUOUS MIXING-TYPE MOBILES

PURPOSE:

The purpose of this procedure is to establish a standard for the inspection and calibration of concrete mobiles.

SUPERSEDES:

Materials Procedure Number 21 – Dated 07/01/2008

REFERENCES:

NJDOT Test Method C-1
NJDOT Standard Specifications for Road and Bridge Construction, Addenda and Attachments
AASHTO T-121 Density, Yield and Air Content of Concrete
AASHTO T-22 Compressive Strength of Cylindrical Concrete Specimens
AASHTO R-100 Making and Curing Concrete Test Specimens in the Field
AASHTO T-119 Slump of Hydraulic Cement Concrete
ASTM C-172 Sampling Freshly Mixed Concrete
AASHTO T-152 Air Content of Freshly Mixed Concrete by the Pressure Method
ASTM C-685 Concrete made by Volumetric Batching and Continuous Mixing
ACI 304.6R Guide for Use of Volumetric-Measuring and Continuous-Mixing Concrete Equipment
AASHTO T-277 Electrical Indication of Concrete's Ability to resist Chloride Ion Penetration

FORMS:

TLB-100	Concrete Mobile Inspection Form
TLB-101	Concrete Mobile Calibration Worksheet
LB-314	Portland Cement Concrete Mix Designs
LB-201	PCC Inspection/Testing

INSTRUCTIONS:

I. Equipment Required for Calibration and Supplied by Contractor:

A. Sufficient container(s) of at least 2 cubic foot capacity with which to receive aggregate and cement.
B. One graduated 5 gallon (minimum) capacity container to receive water and liquid admixtures. Graduations shall be in ounces.
C. A scale with a 45 pound capacity. Scale accuracy will be 0.3% of capacity, or ± 1% of the material being weighed, or whichever is less. Scales shall be sealed by a State or Municipal Agency or a licensed scale company.

D. A .25 cubic yard watertight container sufficiently rigid to retain its form when filled with concrete.
E. A stopwatch.
F. Equipment for temperature, slump test, air test, and cylinder molds.

II. Contractor's Responsibility:

A. The contractor shall submit a Materials Questionnaire indicating the mobile unit(s) and source of materials for cement, sand, stone and certifications for any admixtures.
B. At least 45 days prior to the start of mobile use the contractor shall submit, to the appropriate ME, the mix design for approval and verification. The design shall include all material weights required to produce one cubic yard of concrete. Other data to be submitted include the suppliers, specific gravities, percent absorption, percent voids and the percent solids.
C. The contractor must provide a trained and qualified person to conduct the mobile calibration and to perform the required verification tests. Required qualifications shall include current certifications from the mobile manufacturer. If the calibration of the mobile is to be performed by a private testing agency, the agency representative must be Field Technician Grade I ACI certified, perform the procedures in accordance with Department practice, and document the results on Department forms.
D. Individual concrete mobiles will be approved for use for a maximum period of one year following the last inspection. Mechanical inspection of the mobile (TLB-100) and the mobile's calibration (TLB-101) must be performed at least 24 hours in advance of the mobile's use. This inspection is to be scheduled by the contractor with at least seven days' notice to the ME performing the inspection.

E. The capability to produce particular concrete mixes must be demonstrated on a truck and mix-specific basis. (If two trucks are to batch the same mix design, both trucks must be calibrated and approved.) The contractor must demonstrate that the mobile can accurately proportion the mix design according to NJDOT Specifications and ACI 304.6R each time the mobile is brought to a project. This requirement will be satisfied by successfully completing the procedure outlined on the TLB-101 Mobile Calibration Worksheet. If, in the opinion of the ME, the brief absence of the mobile from a project did not affect the current calibration settings, recalibration of the mobile may be waived provided the contractor can demonstrate that both the cement batch weight and the yield are within their respective tolerances.

F. Upon completion of the calibration, the following information is transcribed to the LB-314:

   a. Mobile identification number
   b. Gate setting for stone
   c. Gate setting for sand
   d. Cement meter count and time per bag cement
   e. Operating RPM of mobile
   f. Flow meter values for any admixtures

G. When the calibration is complete a yield test will be done and must be within ± 2%, as per test method NJDOT Test Method C-1.

H. Slump and air tests will be performed by the contractor's representative and at least six verification cylinders will be made for each acceptable mix. The ME will test three cylinders at 7-days and three cylinders at 28-days to determine the compressive strengths.

   NOTE: If Surface resistivity testing is required, then cast an additional four 4"x8" cylinders to be tested according to AASHTO T 358.

I. A copy of the completed TLB-101 Mobile Calibration Worksheet will be sent to the appropriate Regional Materials Office and to the Bureau of Materials Office.

III. Department Responsibility:

A. Aggregates will be tested and approved by the ME prior to calibration. At the time of calibration, a moisture test will be done on the coarse and fine aggregate and a sample of cement will be submitted for testing.

B. The ME will observe and record the calibration of the mobile. The ME will also perform the calculations necessary to determine whether the mobile performs satisfactorily.

C. Final acceptance of the mobile will be given by the ME.

D. The ME will maintain the LB-314 Mix Design, TLB-100 Concrete Mobile Inspection, and the TLB-101 Mobile Calibration Worksheet. The ME will maintain a current list of approved concrete mobiles.

DISTRIBUTION OF FORMS:

Bureau of Materials
Regional Laboratory
Project File

TLB-100

CONCRETE MOBILE INSPECTION FORM

Date of Inspection ___/___/_____
Rejected

Company Name _____Truck No. _____
Address_____
_____
_____

Phone No._____
Operator Name_____
Operator Certification _____

Inspected by_____Region _____
Title _____Phone No. _____

1) Truck Type (manufacturer): _____

2) Calibration Plate Data:
Serial No. _____
Date _____
Operating Speed (rpm)
Cement Constant (ct)
Time (sec) _____

3) Truck gross capacity (cy) _____

4) Cement bin capacity (lbs) _____

5) Water tank capacity (gal) _____

6) Cement bin capacity adequate for class of concrete and truck capacity?
(6110 pounds or 65 bags, minimum) Yes No

7) Specified water measuring device

operational and accurate? Yes No

8) Water tank capacity adequate for class of concrete and truck capacity? Yes No

9) Specified admixture measuring device operational and accurate? Yes No

10) Admixture tank capacity (gal)

11) Cement bin sealed to preclude moisture and contamination? Yes No

12) Admixture tank present and in satisfactory condition and of adequate capacity? Yes No

13) Tarp or plastic to cover aggregate bins during rain? Yes No

14) Aggregate bins appropriately labeled to avoid contaminated loading? Yes No

15) Extended partition between bins to prevent contamination during loading? Yes No

16) Operator advised that filling bins to maximum capacity not permissible without extended partition? Yes No

17) Divider apron at bottom of feed bin (and just above feed belt) present and in operational condition? Yes No

18) Feed belt (conveyor) operational and in satisfactory condition? Yes No

19) Mixing unit (auger blades) operational and in satisfactory condition? Yes No

20) Bin vibrators operational? Yes No

21) Truck mixer capable of maintaining manufacturer's recommended operating speed (rpm's) while truck is moving? Yes No

22) If applicable, gate setting dials lockable?

Stone	Yes	No
Sand	Yes	No
Cement	Yes	No
Water	Yes	No

23) All fluid level indicators present and in satisfactory condition? Yes No

24) All indicators, dials, meters, tachometers and controls in full view and near enough to be read and adjusted by operator while mixing concrete? Yes No

25) Mobile manufacturers operating manual available? Yes No

26) Remarks:_____
_____
_____
_____
_____
_____

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TLB-101

CONCRETE MOBILE CALIBRATION WORKSHEET

Producer _____ Date ____/____/_____

Concrete Mobile Serial No. _____ Truck No. _____

Determination of Cement Meter Count and Time to Discharge One Bag of Cement

Cement Brand _____ Cement Type _____

Tolerance = 0 to +4% = 94 lbs to 97.76 lbs Material + Container Limits = _____to_____

	Trial #1	**Trial #2**	**Trial #3**	**Trial #4**	**Trial #5**	**Totals**	
Wt (Cement + Container)							
- Tare Weight							
= Wt of Cement							Lbs
Count							Units
Time							Seconds
R P M s							
Conveyor Belt Speed							

1. Record the cement weights, actual meter counts and times for 5 in-tolerance trials.
2. Determine 2% of total weight: Total lbs _____ X 0.02 = _____ lbs
3. From the total weight, subtract the 2% of the total weight to get the adjusted wt
   Adjusted Wt = _____ - _____ = _____lbs
   (total lbs) (2% total wt)
4. Divide the total units by the adjusted weight factor (use 4 decimal places):
   Factor for Units = _____ ÷ _____ = _____
   (total units) (adjusted wt)
5. Determine the new cement meter count by multiplying the Factor for Units by 94. **New Cement Meter Count** = _____ X 94 = _____ units 6. Divide the total seconds by the adjusted wt to determine the factor for time.
   Factor for Time = _____ ÷ _____ = _____

(total seconds) (adjusted wt)

7. Determine the new time by multiplying the factor for the time by 94

New Time = _____ X 94 = _____ seconds
(factor for time)

Calculated by: _____ Title _____
Checked by: _____ Title_____
***Latex _____Wt per Gallon _____ Pounds of Latex per Bag _____

Tolerance for Admixtures = ± 3% Material + Container Limits = _____ to _____

	Trial #1	Trial #2	Trial #3	Trial #4	Trial #5	
Wt (Latex+Container)						
- Tare Weight						
= Wt of Latex						
Seconds						
Flow Meter Setting						
R P M s						

Calculation for Entrained Water in Latex:

3.5 gals X (% liquid) X 7 bags = _____ gals / cy of water
1 bag of cement 1 cy

***Coarse Aggregate _____

Tolerance for coarse agg = ± 3% Material + Container Limits = _____ to _____

	Trial #1	Trial #2	Trial #3	Trial #4	Trial #5	
Wt (CoarseAgg+Container)						
- Tare Weight						
= Wt of CoarseAggregate						
Count						
Seconds						
Gate Setting						
R P M s						

*****Fine Aggregate** _____

Tolerance for fine agg = ± 2% Material + Container Limits = _____ to _____

	Trial #1	Trial #2	Trial #3	Trial #4	Trial #5	
Wt (FineAgg+Container)						
- Tare Weight						
= Wt of Fine Agg						
Count						
Seconds						
Gate Setting						
R P M s						

*****Water Temperature** _____ Unit Wt of Water at this temp _____

Tolerance for water = ± 1 % Material + Container Limits = _____ to _____

	Trial #1	**Trial #2**	**Trial #3**	**Trial #4**	**Trial #5**	
Wt (Water+Container)						
- Tare Weight						
= Wt of Water						
Seconds						
Flow Meter Setting						
R P M s						

*****Admixture #1** _____

Tolerance for admixture = ± 3 % Fluid in Cylinder = _____ ml

	Trial #1	**Trial #2**	**Trial #3**	**Trial #4**	**Trial #5**	
Wt (Admix+Container)						
- Tare Weight						
= Wt of Admixture						
Seconds						
Flow Meter Setting						
R P M s						

Parts of solution _____ to _____ total solution parts _____

$$\frac{(\quad \text{gals})}{1 \text{ hour}} \times \frac{1 \text{ hr}}{3600 \text{ sec}} \times \frac{128 \text{ oz}}{1 \text{ gal}} \times \frac{(\quad \text{seconds})}{1 \text{ bag cement}} \times \frac{(\quad \text{bags})}{1 \text{ cy}} = \_\_\_\_\_ \text{oz/cy}$$

*****Admixture #2** _____

Tolerance for admixture = ± 3 % Fluid in Cylinder = _____ ml

	Trial #1	**Trial #2**	**Trial #3**	**Trial #4**	**Trial #5**	
Wt (Admix+Container)						
- Tare Weight						
= Wt of Admixture						
Seconds						
Flow Meter Setting						
R P M s						

Parts of solution _____ to _____ total solution parts _____

$$\frac{(\quad \text{gals})}{1 \text{ hour}} \times \frac{1 \text{ hr}}{3600 \text{ sec}} \times \frac{128 \text{ oz}}{1 \text{ gal}} \times \frac{(\quad \text{seconds})}{1 \text{ bag cement}} \times \frac{(\quad \text{bags})}{1 \text{ cy}} = \_\_\_\_\_ \text{oz/cy}$$

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