



NDOR SiteManager Materials Management

Standard Operating Procedures

Maturity Method Field Monitoring

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1. Introduction and Purpose:

This document is intended to be used in conjunction with the existing training materials provided by the Nebraska Department of Roads (NDOR), Materials & Research (M&R) Division.

1.1 Purpose:

The purpose of this document is to define the responsibilities of M&R personnel and construction field inspectors during:

- Pre-placement
- Placement
- Post Placement

1.2 Roles and Responsibilities:

As of the publication date of this document, roles and responsibilities are defined as follows:

SiteManager Staff: 402.479.4760, DOR.SiteManagerMaterials@nebraska.gov

Portland Cement Concrete Engineer: Wally Heyen, 402.479.4677, Wally.Heyen@nebraska.gov

NDOR Portland Cement Concrete Material & Tests Manager: Tim Krason, 402.479.4709, Tim.Krason@nebraska.gov

District 1, Quality Assurance Manager: Ron Vajgrt, 402.479.4543, Ron.Vajgrt@nebraska.gov

District 2, Quality Assurance Manager: Gary Manger, 402.595.2534, ext 286, Gary.Manger@nebraska.gov

District 3/8, Quality Assurance Manager: Mike Reynolds, 402.370.3476, ext 219, Mike.Reynolds@nebraska.gov

District 4/7, Quality Assurance Manager: Cal Splattstoesser, 308.385.6271, ext 218, Cal.Splattstoesser@nebraska.gov

District 5/6/7/8, Quality Assurance Manager: Rodney McNeel, 308.535.8111, ext 226, Rodney.Mcneel@nebraska.gov

1.3 Authentication:

Creating and Authorizing a SiteManager Sample Record: <http://www.dor.state.ne.us/mat-n-tests/MMG/CreatingSMGRSampleRecord.pdf>

M&R Final Review Manual: <S:\NDOR M&R Final Review Manual>.

Materials & Research Division Maturity Curve Monitoring: <http://www.transportation.nebraska.gov/mat-n-tests/pdfs-docs/NDORMaturityMethodFieldMonitoring.pdf>

M&R Maturity Curve Method of Development-Certification: [http://www.transportation.nebraska.gov/mat-n-tests/pdfs-docs/MethodofDevelopmentoftheMaturityCurve\(Rev1-13\).pdf](http://www.transportation.nebraska.gov/mat-n-tests/pdfs-docs/MethodofDevelopmentoftheMaturityCurve(Rev1-13).pdf)

NDR C 1074, Estimating Concrete Strength by Maturity Method: <http://www.transportation.nebraska.gov/mat-n-tests/NDR%20Standard%20Test%20Methods/ndr1074.pdf>

NDOR Materials Sampling Guide: <http://www.transportation.nebraska.gov/mat-n-tests/sampguide.htm>

1.4 Abbreviations:

M&R: NDOR Materials & Research
MSG: Materials Sampling Guide
NDOR: Nebraska Department of Roads
PR: Pavement Repair
SMGR: SiteManager
TTF: Time/Temperature/Factor

2. Pre-Placement:

2.1 Certification:

A sampler or tester shall be certified in accordance with the tester qualifications cited in the Materials Sampling Guide (MSG).

- NDOR Maturity Method Field Monitoring

For more information, refer to Quality Assurance Program for Construction. Section 28, Appendix A, [NDOR Materials Sampling Guide](#).

3. Placement:

3.1 Maturity Curve Development and Monitoring Guidelines:

For more information, refer to [Materials & Research Division Maturity Curve Method of Development – Certification](#) and [NDOR Maturity Curve Monitoring](#).

3.1.1 Maturity Curve Target Opening:

A certified consultant or NDOR will develop the maturity curve. It will provide the target required minimum TTF value that correlates with the required opening strength.

See Section 5, Appendix, Figure 8 for an illustrative example of Maturity Curve Target Opening.

3.1.2 Maturity Curve Target Acceptance:

A certified consultant or NDOR will develop the maturity curve. It will provide the target required minimum TTF value that correlates with the required acceptance.

See Section 5, Appendix, Figure 9 for an illustrative example of Maturity Curve Target Opening.

3.2 Documentation:

Sampling information will be stored in SMGR consistent with accepted SMGR practices.

The process to submit a sample is detailed further in previously published training materials. For more information, refer to [Creating and Authorizing SiteManager Samples](#).

Consideration should be given to these data elements when documenting concrete pavement repair.

3.2.1 Contract Tab:

Enter those contract line items that pertain to this sample record on the Contract tab.

The screenshot shows the 'Maintain Sample Information' window in AASHTO SiteManager. The 'Contract' tab is active, displaying a table of contract line items. The sample ID is 043701670018. The table has the following columns: Contract ID, Project, Line Item, Item Code, Fed State Prj Nbr, Cont Est Matrl Qty, Represented Qty, Material Unit, Reported Matrl Qty, Satisfy Rep Matrl Qty, and Line I.

| Contract ID | Project | Line Item | Item Code | Fed State Prj Nbr | Cont Est Matrl Qty | Represented Qty | Material Unit | Reported Matrl Qty | Satisfy Rep Matrl Qty | Line I |
|-------------|-----------|-----------|-----------|-------------------|--------------------|-----------------|---------------|--------------------|-----------------------|--------|
| 7882 | 70882 000 | 0042 | 3040.11 | NH-6-4(120) | 26.400 | .000 | CU YD | 41.790 | 0.000 | CONC |
| 7882 | 70882 000 | 0043 | 3040.12 | NH-6-4(120) | 1,053.200 | .000 | CU YD | 1,077.006 | 0.000 | CONC |
| 7882 | 70882 000 | 0044 | 3040.13 | NH-6-4(120) | 322.600 | .000 | CU YD | 535.755 | 0.000 | CONC |
| 7882 | 70882 000 | 0046 | 3221.15 | NH-6-4(120) | 312.200 | .000 | CU YD | 347.807 | 0.000 | CONC |

Figure 1, Sample Record, Contracts Tab

3.2.2 Tests Tab:

The available test methods for concrete pavement repair, mainline pavement, and structures will be detailed on the Tests tab. They include PCF002001, Mainline Pavement – Structure Maturity Report, PCF003001, Pavement Repair (Maturity Tests) – Field; and PCX002001, Proportioning Report.

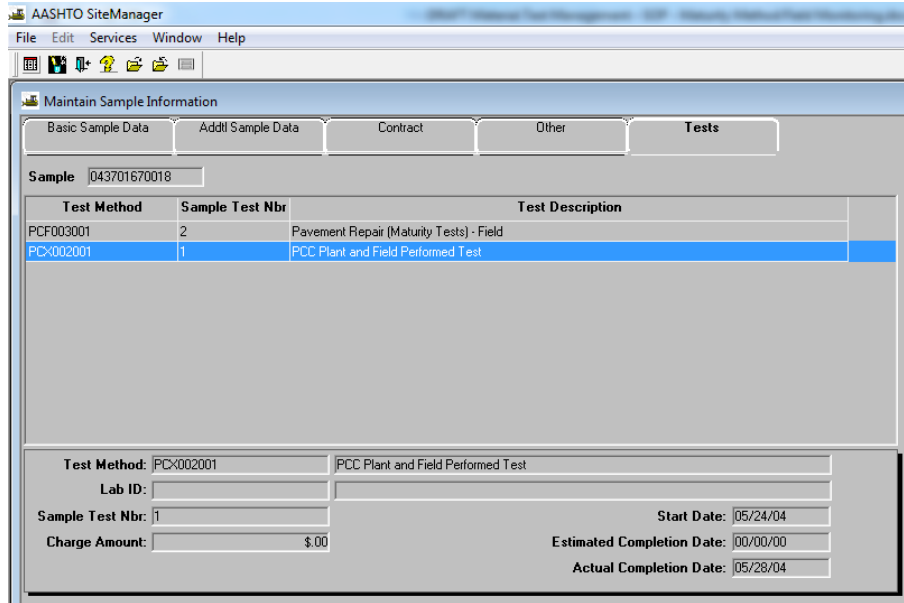


Figure 2, Sample Record, Tests Tab

These test methods are detailed in the following sections.

3.2.2.1 Pavement Repair – Maturity Summary Report:

The maturity summary report captures time and temperature information. Use this test method for pavement repair concrete acceptance.

| Pavement Repair - Maturity Summary Report | |
|--|---|
| NDOR M&R Wallace Heyen, Portland Cement Concrete Engineer | Template ID: PCF003001 Version: 20090508 |
| Date Placed | <input type="text"/> |
| Sta. to Sta. or Location | <input type="text"/> |
| Time Placed | <input type="text" value="00:00"/> |
| Initial Temp | <input type="text"/> |
| Date of Opening | <input type="text"/> |
| Time of Opening | <input type="text" value="00:00"/> |
| Opening Temp | <input type="text"/> |
| TTF @ Opening* | <input type="text"/> |
| Date of Acceptance | <input type="text"/> |
| Time of Acceptance | <input type="text" value="00:00"/> |
| Acceptance Temp | <input type="text"/> |
| TTF @ Acceptance* | <input type="text"/> |
| TTF Target (Opening) | <input type="text"/> |
| TTF Target (Accept) | <input type="text"/> |
| * TTF = ((Average Temp) + 10) x Elapsed Time | |
| Comments: | <input type="text"/> |
| | <input type="text"/> |
| | <input type="text"/> |

Figure 5, Proportioning Report

3.2.2.3 Mainline Pavement – Structure Maturity Report:

The maturity summary report captures time and temperature information. Use this test method to determine the opening strength requirement for paving concrete and structures. This test does not determine final acceptance.

Use of this test method is closely monitored by the NDOR Portland Cement Concrete Division. Please contact the NDOR Portland Cement Concrete Engineer, Portland Cement Concrete Material & Tests Manager, or the District Quality Assurance Manager prior to selecting this test method.

Mainline Pavement/Structure Maturity Report

Field Performed Tests

| | | |
|--|--|-------------------------------|
| NDOR M&R | | Template ID: PCF002001 |
| Wallace Heyen, Portland Cement Concrete Engineer | | Version: 20080228 |

Section of Pavement to Open or Structural Unit for Form Removal or Loading

| | | | | |
|--------------------------------|---|---|---|---|
| Sta. to Sta. or Structure: | <input style="width: 100%;" type="text"/> | | | |
| Probe #: | <input style="width: 25%;" type="text"/> | <input style="width: 25%;" type="text"/> | <input style="width: 25%;" type="text"/> | <input style="width: 25%;" type="text"/> |
| Date Placed: | <input style="width: 25%;" type="text" value="00/00/00"/> | <input style="width: 25%;" type="text" value="00/00/00"/> | <input style="width: 25%;" type="text" value="00/00/00"/> | <input style="width: 25%;" type="text" value="00/00/00"/> |
| Time Placed: | <input style="width: 25%;" type="text" value="00:00"/> | <input style="width: 25%;" type="text" value="00:00"/> | <input style="width: 25%;" type="text" value="00:00"/> | <input style="width: 25%;" type="text" value="00:00"/> |
| Time Target TTF Value Reached: | <input style="width: 25%;" type="text" value="00:00"/> | <input style="width: 25%;" type="text" value="00:00"/> | <input style="width: 25%;" type="text" value="00:00"/> | <input style="width: 25%;" type="text" value="00:00"/> |
| Date Target TTF Value Reached: | <input style="width: 25%;" type="text" value="00/00/00"/> | <input style="width: 25%;" type="text" value="00/00/00"/> | <input style="width: 25%;" type="text" value="00/00/00"/> | <input style="width: 25%;" type="text" value="00/00/00"/> |
| TTF Value Reached: | <input style="width: 25%;" type="text"/> | <input style="width: 25%;" type="text"/> | <input style="width: 25%;" type="text"/> | <input style="width: 25%;" type="text"/> |
| Target TTF Value: | | | | <input style="width: 25%;" type="text"/> |
| Maturity Curve Number: | | | | <input style="width: 25%;" type="text"/> |
| Comments: | <input style="width: 100%; height: 20px;" type="text"/> | | | |
| | <input style="width: 100%; height: 20px;" type="text"/> | | | |
| | <input style="width: 100%; height: 20px;" type="text"/> | | | |

Figure 6, Mainline Pavement – Structure Maturity Report

3.2.3 Basic Sample Date Tab:

When all of the sample information has been entered into the sample record, mark the sample record status as Complete.

Sample records created for the purpose of documenting pavement repair using the maturity method will be authorized by project personnel.

Sample records created for the purpose of documenting pavement repair using compressive strength testing will be authorized by laboratory personnel.

The screenshot displays the 'AASHTO SiteManager' application window. The main area is titled 'Maintain Sample Information' and features a tabbed interface with 'Basic Sample Data' selected. The form contains the following fields and values:

- Smpl ID:** 043701670018
- Status:** Complete
- Revised By:** (empty)
- Revising:** (empty)
- Sample Date:** 05/24/04
- Link To:** (empty)
- Link From:** (empty)
- Log Date:** 00/00/00
- Smpl Type:** Quality (dropdown menu)
- Acpt Meth:** Sample & Test (dropdown menu)
- Material:** 1002PCC (dropdown menu) / Portland Cement Concrete
- Sampler:** DOR37016 (dropdown menu)
- P/S:** Minden-Minden Lumber & Concrete Company / RM0070
- Type:** PC Concrete (dropdown menu)
- City:** No Address Found.
- Prod Nm:** PR1
- Mnfctr:** (empty)
- Town:** (empty)
- Geog Area:** District 7
- Intd Use:** Pavement Repair
- Repr Qty:** .000 (dropdown menu) / CU YD
- Lab Control Number:** (empty)
- Auth By:** DOR9055
- Auth Date:** 05/28/04
- Lab Reference Number:** (empty)

Figure 7, Sample Record, Basic Sample Data Tab

4. Post-Placement:

4.1 Final Review Process:

NDOR will follow operating procedures defined in the NDOR M&R Final Review Process Manual located at [S:\NDOR M&R Final Review Manual](#).

5. Appendices:

5.1 Maturity Curve for Pavement Repair Concrete – Target Opening:

Referenced in section 4.6.1., this is an example of Maturity Curve for Pavement Repair Concrete – Target Opening.

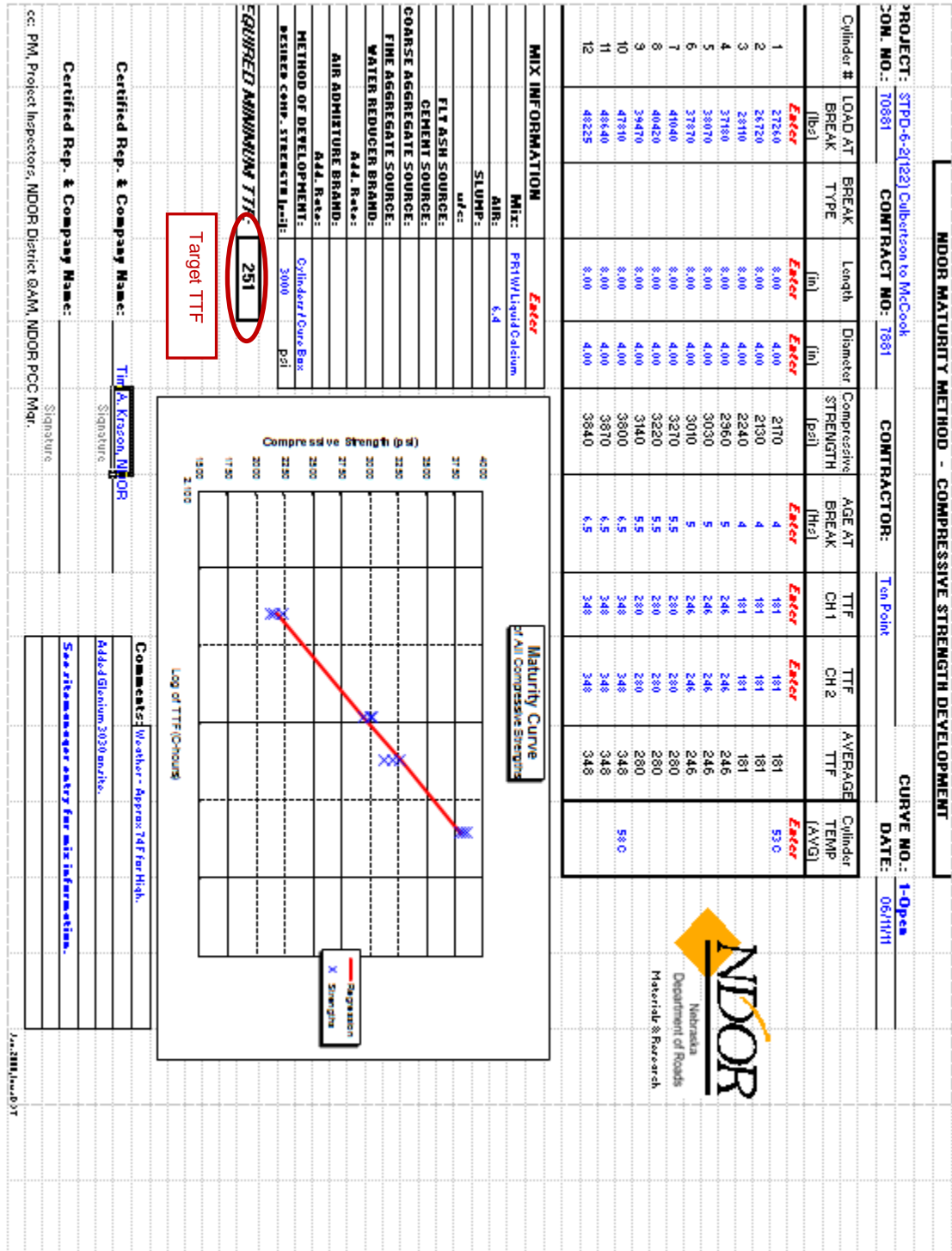


Figure 8, Maturity Curve for Pavement Repair Concrete – Target Opening – 3000 psi

5.2 Maturity Curve for Pavement Repair Concrete – Target Acceptance:

Referenced in section 4.6.2., this is an example of Maturity Curve for Pavement Repair Concrete – Target Acceptance.

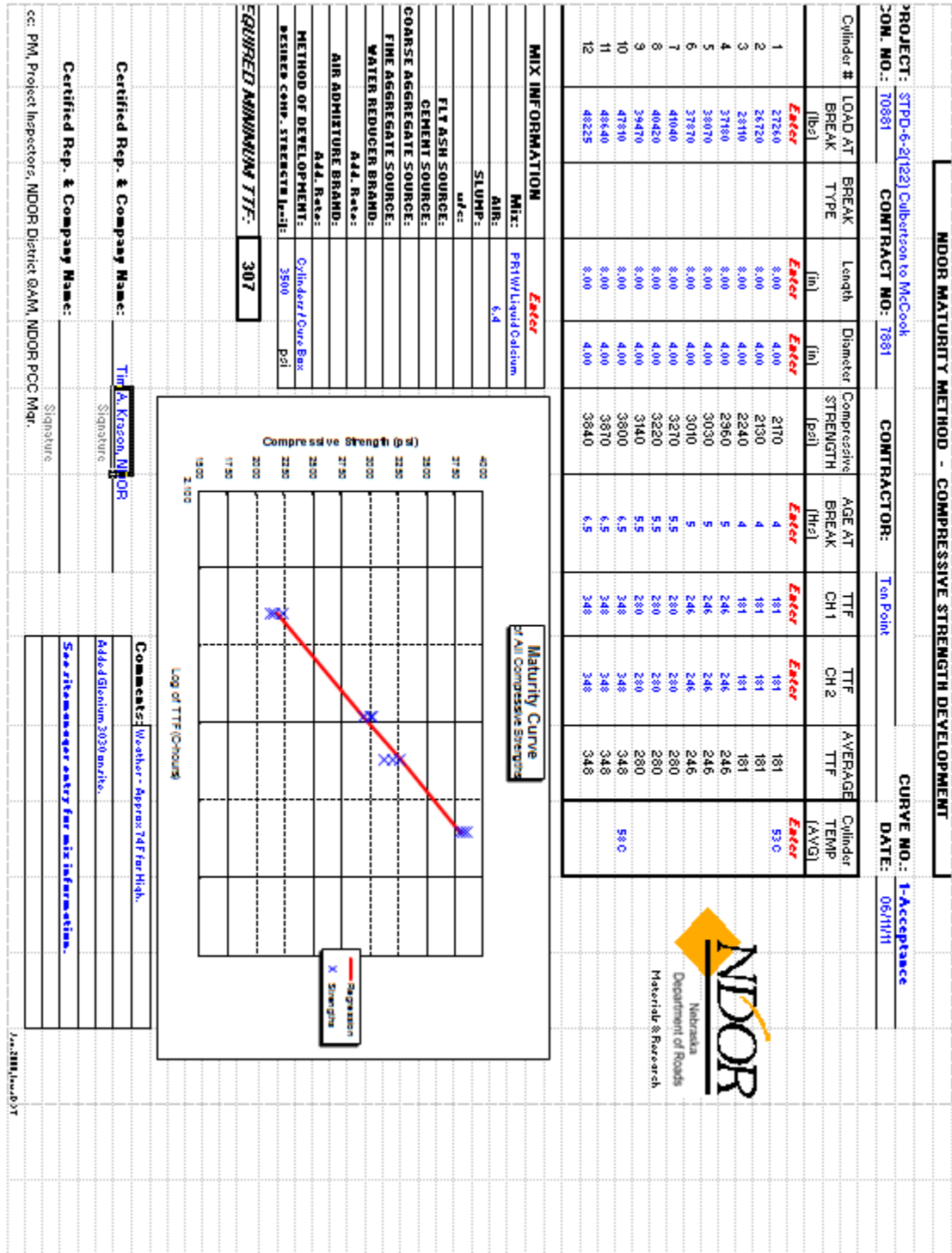


Figure 9, Maturity Curve for Pavement Repair Concrete – Target Acceptance – 3500 psi