

LABORATORY TESTING – GENERAL

General Description

Lab testing consists of inspection, sampling, and testing of various materials used in pavement construction at MnROAD. The tests are performed on soils, aggregates, asphalt mixtures, asphalt binders, concrete mixtures, and other materials. Testing is performed both as part of regular construction quality assurance and more detailed research testing. The Maplewood Lab performs a number of tests in our own labs:

- Soils & Cement
- Aggregate
- Chemical
- Concrete & Metals
- Bituminous Trial Mix
- Metro Bituminous Inspection

In addition, materials are sent out to laboratories all around the country (i.e., universities, FHWA, consultants, state DOTs) to be characterized through a variety of different test methods.

COLLECTION FREQUENCY

A comprehensive set of lab testing is usually performed during construction of each test cell. Other tests are performed as needed or requested.

Procedure

Mn/DOT LAB MANUAL

See <http://www.dot.state.mn.us/materials/labmanual.html>.

This manual contains laboratory testing methods for the following materials:

- Standard Practices
- Aggregate and Sand
- Soil
- Cement, Concrete Products and Curing Materials
- Metallic Materials
- Joint Materials and Bearing Pads
- Miscellaneous Materials
- Bituminous Mix Design
- Calibration of Field Testing Equipment



Specifications

All Mn/DOT labs are certified by [AMRL](#). Most of the tests follow AASHTO or ASTM standards, with occasional minor modifications by Mn/DOT. Other specialized performance may still be under development, so standard test methods are not established at the time of testing.

Database Tables

Laboratory data is stored in several tables in the MnROAD database. See the table below for a brief description of the database tables.

DATABASE TABLES – CONTAINING CONCRETE & UNBOUND MATERIAL LAB TEST DATA

Database Table	Description
MAT_SAMPLES	Inventory of samples and storage locations
MAT_CONC_AIR_VOID_RESULTS	Concrete air void test results
MAT_CONC_FIELD_RESULTS	Concrete slump, air, & unit weight results from field
MAT_CONC_FREEZE_THAW_RESULTS	Concrete freeze thaw test results
MAT_CONC_MOD_POISSON_RESULTS	Concrete static modulus & Poisson ratio results
MAT_CONC_STRENGTH_RESULTS	Concrete compressive strength results
MAT_CONCRETE_MIX_DESIGNS	Components of concrete mixtures
MAT_CONCRETE_MIX_GRAD_RESULTS	Concrete mixture gradations
MAT_CORE_LENGTHS	Concrete field core lengths
MAT_PCC_COEF_THERM_EXP	Concrete coefficient of thermal expansion
MAT_PROCTOR_CURVES	Soil and aggregate procter curve test results
MAT_SOIL_GRAD_RESULTS	Soil and aggregate gradation test results
MAT_SOIL_TESTS	Characterization test results for soil & aggregate materials
MAT_TEST_TYPES	Description of test procedures for unbound materials
MAT_UNBOUND_GRADATIONS	Soil and aggregate gradation test results
RESILIENT MODULUS TEST*	* Data from the Mr and shear tests are stored in several tables. See a separate MnROAD document about these tests.



DATABASE TABLES – CONTAINING ASPHALT BINDER & MIXTURE MATERIAL LAB TEST DATA

Database Table	Description
MAT_BINDER_BBR_TEST	Low temp binder data from bending beam rheometer
MAT_BINDER_CRITICAL_CRACK_TEMP	Low critical crack temp from several test methods
MAT_BINDER_DENT_FRACTURE	Low temp binder data from double edge notched tension
MAT_BINDER_DILATOMETR_TST	Binder coefficient of thermal expansion & contraction
MAT_BINDER_DSR_TESTS	Binder test data from dynamic shear rheometer
MAT_BINDER_DT_TEST	Low temp binder data from direct tension
MAT_BINDER_FATIGUE	Binder fatigue test data from dynamic shear rheometer
MAT_BINDER_REPEATED_CREEP	Binder repeated creep data from dynamic shear rheometer
MAT_BINDER_STRAIN_SWEEPS	Binder strain sweep data from dynamic shear rheometer
MAT_BINDER_TRAD_TESTS	Binder penetration, viscosity, and other traditional data
MAT_BINDER_ZERO_SHEAR_VIS	Binder zero shear viscosity data from several test methods
MAT_HMA_AGING	Binder test data from thin slices of HMA cores
MAT_HMA_APA	Mixture rutting test data from asphalt pavement analyzer
MAT_HMA_COMPLEX_SHEAR_MODU	Mixture complex shear modulus test data
MAT_HMA_CORE_TESTS	Mixture air voids from field cores
MAT_HMA_DCT_TEST	Low temp mix data from disk shaped compact tension test
MAT_HMA_DILATOMETRIC_TEST	Mixture coefficient of thermal contraction & expansion
MAT_HMA_DYNAMIC_MODULUS	Mixture dynamic modulus test data
MAT_HMA_IDT_TEST	Mixture low temp indirect tension test data
MAT_HMA_INDIRECT_TENS_FATI	Mixture intermediate temp indirect tensile fatigue test data
MAT_HMA_MIX_TESTS	Mixture volumetric & QA test data
MAT_HMA_REPEAT_PERM_DEFORM	Mixture repeated permanent deformation test results
MAT_HMA_REPEAT_SHEAR	Mixture repeated shear test results
MAT_HMA_SCB_TEST	Mixture low temp semi circular bend test data
MAT_HMA_SENB_TEST	Mixture low temp single edge notched beam test data
MAT_HMA_SHEAR_STRENGTH_PAR	Mixture shear strength & cohesion test data
MAT_HMA_SIEVE_DATA	Mixture gradations
MAT_HMA_TRIAXIAL_STATIC_CR	Mixture high temp triaxial static creep test data
MAT_HMA_TRIAXIAL_STRENGTH	Mixture high temp triaxial strength test data
MAT_HMA_TSRST_TEST	Mixture low temp thermal stress restrained specimen test data
MAT_HMA_ULTRASONIC_MODULUS	Mixture ultrasonic (elastic) modulus test data



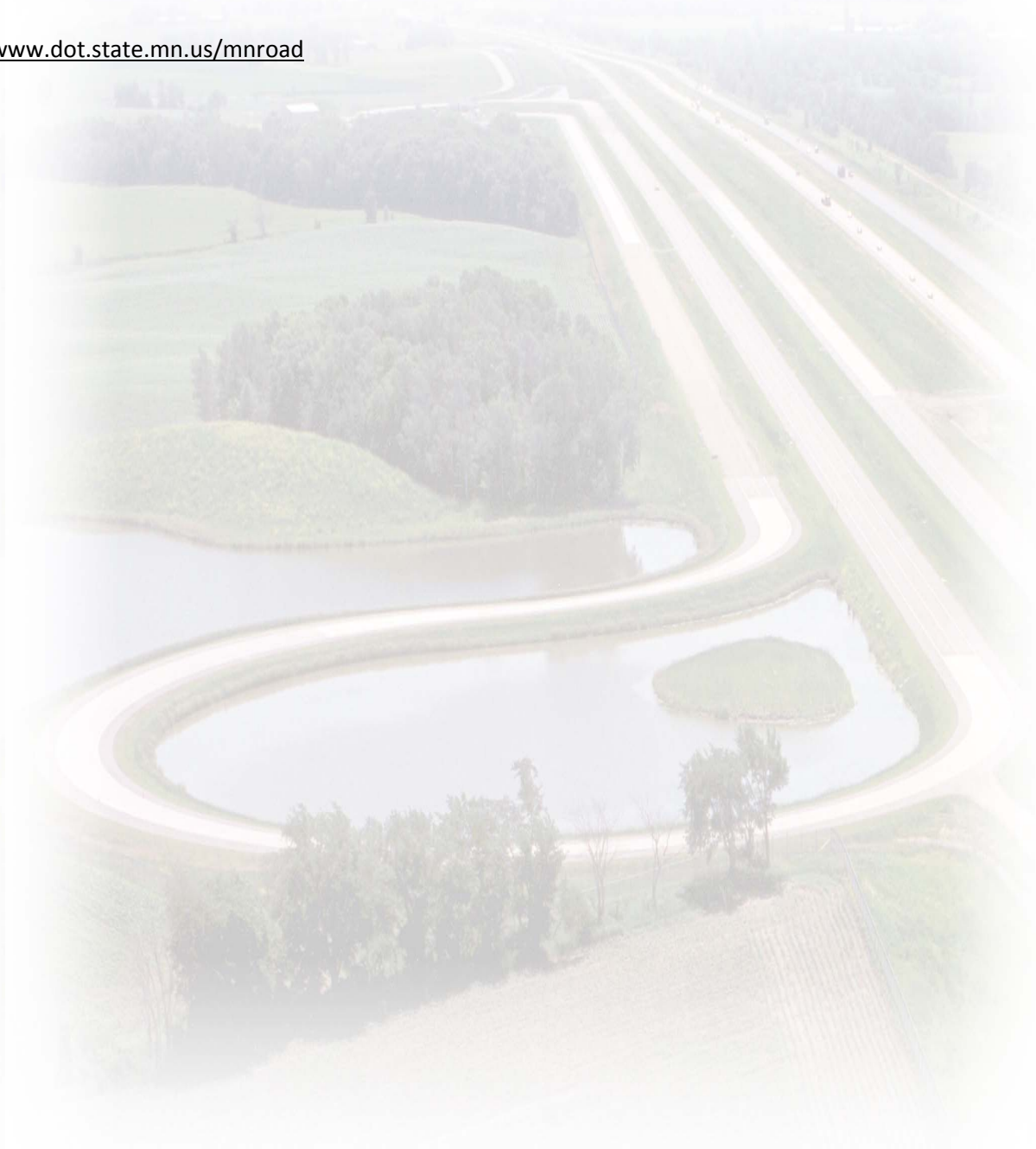
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MnROAD is a state of the art cold weather pavement and transportation testing facility located in Minnesota