MTO’s New Centre for Excellence in Transportation Infrastructure

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Our Mandate

MTO responsible for

- 40,000 kilometres of highways
- 2,800 bridges

MERO’s role

- ensure that quality materials and products are used
- facilitate use of innovative materials and processes
- material standards, policies and guidelines
- specialized laboratory testing and technical expertise
MERO External Liaison

ONTARIO MINISTRY OF TRANSPORTATION
HIGHWAY INFRASTRUCTURE INNOVATION FUNDING PROGRAM
for Ontario Universities and Colleges

U.S. Department of Transportation
Federal Highway Administration

Interact with universities

Liaise with industry stakeholder groups

Liaise with technical societies

External activities allow us to bring back information and innovation that can benefit MTO infrastructure

National and international standard setting committees

Interact with individual suppliers and stakeholders

Materials Engineering and Research Office
Centre for Excellence in Transportation Infrastructure (CETI)

New facility containing state-of-the-art laboratories

MERO’s office and laboratories

New 78,250 square feet facility

Budgeted at over $50 million

Construction starts at end of 2017, expected end 2019
CETI Site Plan

- CETI Building (1 storey)
- CETI Building (1 storey, high roof)
- CETI Tower (3 storey)
- Existing Aggregate Building
- New Garage
- Existing Traffic Operations Centre

Arrow Road
Highway 400
Building Wing A
Building Wing B

WING A

WING B

WING C
CETI Design
We have been working with Infrastructure Ontario and their architectural firm (Kasian) on the lab design.

Smaller, more efficient lab space.

Focus on equipment needs – for layout, power, dust & fume collection, IT.
Current Specialty Asphalt Testing

Asphalt Mixture Performance Tester (AMPT)
- Dynamic Modulus and Flow
- Cyclic Fatigue

Hamburg Wheel Tracker (HWT)
- Rutting Susceptibility
- Stripping Potential

Moisture Sensitivity
- Static Immersion
- MIST Swelling Parameter

Joint studies through HIIFP
- Pavement Permeability
- High Modulus Asphalt Mix Design
Current Acceptance Parameters

- Asphalt Mix Properties
- In Situ Compaction
- Performance Graded Plus Asphalt Cement
- Smoothness and Localized Roughness
HMA Acceptance Based on Performance Tests

- PG Plus tests (DENT and ExBBR)
- Chose HWT to address rutting
- Monitor emerging mix tests
- ETG participation
- FHWA BMD Task Group
- Most Promising Mix Performance Tests Identified
Mix Performance Test Evaluation

Evaluating asphalt mix performance tests

Test methods being evaluated with regards to low temperature and fatigue cracking

- Disk-Shaped Compact Tension (DCT) test
- Semi Circular Bend (SCB) test
- Cyclic Fatigue test

As the research progresses, pavement trials are planned in order to start a staged-implementation process
Dynamic Testing System (DTS)
Dynamic Testing System (DTS)

- Disk-Shaped Compact Tension
- Semicircular Bend
- Cyclic Fatigue
- Dynamic Modulus
- Flow Number
- Texas Overlay
- Indirect Tensile Creep Compliance
- Resilient Modulus
- Four Point Bending
- TSRST (Thermal Stress Restrained Specimen Test)
Disk-Shaped Compact Tension
Semicircular Bend and Cyclic Fatigue

Semicircular Bend

Cyclic Fatigue
Dynamic Modulus
Asphalt Cement Testing

- Routinely test asphalt cements from Designated Sources of Materials (DSM)
- Limited full PG plus testing of asphalt cement recovered from production mix
- Various AC initiatives or pavements investigations with our regional quality assurance and geotechnical sections
- Investigating correlation between low temperature grade properties and the Fraass breaking point.
FRAASS Breaking Point Tester
Efficiency Improvements

All operations under review

- Quicker
- More effective characterization
- Safety upgrades
- Reduced testing variability
Particle Size Analyzer (PSA)
Thermogravimetry Analysis (TGA)
Differential Scanning Calorimetry (DSC)
Automatic Asphalt Extraction
Asphalt Mixing Kettle
Conclusions

Our new CETI building will...

- Support the development of testing standards for new materials and products, enabling innovation;
- Help verify that quality materials and products are used, protecting infrastructure investments;
- Conduct specialized field and laboratory investigations to evaluate construction practices and material performance on our roads & bridges;
- Provide opportunities for cooperative research efforts between the ministry, other road authorities, academics.
Questions??

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