2016 MnROAD/NCAT Cracking Group Construction
Weekly Construction Update
For the week of July 18, 2016

In 2014, a partnership between the National Center for Asphalt Technology (NCAT) and the MnROAD test track facility was formed. This partnership seeks to study both cracking performance tests and pavement preservation techniques in two unique climates (extremely hot and extremely cold). A total of five states are participating in the Cracking Group study which include Wisconsin, Michigan, Illinois, New York, and Minnesota. For the cracking group, several tests developed to predict cracking will be run on plant mixed production material. The Disk Shaped Compact Tension (DCT) test will also be run on mix design specimens. Eight cells will be constructed at MnROAD with varying levels of thermal cracking potential based on design and selection of materials. Over the three year test cycle, data from the cells will be collected to monitor pavement performance, such as rutting, pavement roughness, transverse cracking, and longitudinal cracking. The end goal is to determine which cracking tests best predict future pavement performance in the field.

The contract for this project was awarded to Hardrives Inc., with WSB & Associates in charge of contract administration and inspection of the project. Mike Rief and Kory Eichhorst of WSB & Associates, Inc., are the Contract Administrator and Chief Inspector, respectively. Various surveying duties will be handled by Aaron Duncan and his MnDOT survey crew out of District 3. Total cost of the project is estimated at $1.3 million.

A pre-construction meeting was held June 28, 2016 to introduce everyone involved with the project, discuss the contract, and set up weekly construction update meetings. Personnel from Hardrives, Inc., MnDOT, and WSB & Associates, Inc. were in attendance. Meetings will be held each Thursday at 9am throughout the project.

The first weekly construction meeting as well as a pre-activity meeting were held on Thursday, July 14. Several topics were discussed such as traffic control, access points for haul trucks and machinery to the enter the construction site and stockpile area, relative density requirements, submittal of mixture production and paving plan, bituminous aggregate submittal, acceptance sampling and testing of binder during construction, bituminous mix design status, and sampling that must be completed after milling and before excavation begins. The start date of the project was moved from July 18 to July 19.

Work began July 19 with milling Cells 16-19. Shoulder material was milled to a depth of 3 in., followed by a 5 in. milling of mainline passing and driving lanes. All RAP milled from the cells was hauled to the stockpile area at MnROAD and sent though a stacker to ensure a well-placed pile. RAP material form Cells 16-23 will not be used on this project. Machinery on site included a milling machine and haul trucks transferring material to the stockpile area.

Milling of Passing Lane Shoulder

Milling of Mainline

RAP Material from Haul Truck Transferred into Stacker

Excavation of base material began July 20 on Cells 16-19. Base material for these cells consisted of Cell 16 with 100% recycled Portland cement concrete (PCC), Cell 17 with 50% Recycled PCC and 50% Class 5, Cell 18 with 100% RAP, and Cell 19 with Class 5 aggregate. Excavated base material was hauled and placed in the stockpile area. Due to the presence of PCC in Cells 16 and 17 base, excavated material from these cells were separated from Cells 18 and 19. Equipment on site included an excavator and haul trucks.

Formation of Excavated Base Material in Stockpile Area

Sampling of aggregate base/subbase near lysimeters from Cells 16-19 was done for researchers at the University of Wisconsin-Madison on August 19. Samples were taken at 3 locations per cell at 3 depths, for a total of 36 samples taken. Removal of lysimeters took place on July 20.

Removal of Lysimeters

The weekly construction meeting was held on Thursday, July 21. Items discussed included location of trial mixture paving, test rolling, update on status of trial mixes from NCAT, and volume available of Class 6 aggregate base. Volumetric mix designs for Cells 18 and 21 are finished. The final JMF for Cell 18 should be ready and sent out to Cracking Group members soon. Location of trial mix paving has yet to be decided on site at MnROAD. Suggestions were made by MnROAD staff of locations at the north loop on the low volume road or at Gate 2, which is being used as a haul road to the stockpile area. The group

discussed acceptance methods for aggregate base. The current material stockpile will be sufficient for Cells 16-19. A second stockpile of base aggregate is currently being produced for construction of Cells 20-23.

Upon excavation of Cells 16 and 17, soft spots were revealed in certain areas of the subgrade. These areas were found to correspond to locations outside the pavement shoulders near the PI. Problem areas were investigated first by excavating small holes; the upper 8 to 12 inches were found to be saturated. Areas of Cell 16 were then proof-rolled with a fully loaded tandem truck, which was carrying roughly 10 yd^3 of material, to visually investigate the deflection. Despite the saturation the areas of concern looked to be in satisfactory condition based upon the amount of observed deflection. Excavation continued on July 21 throughout Cell 19 with all material being hauled to the stockpile area.

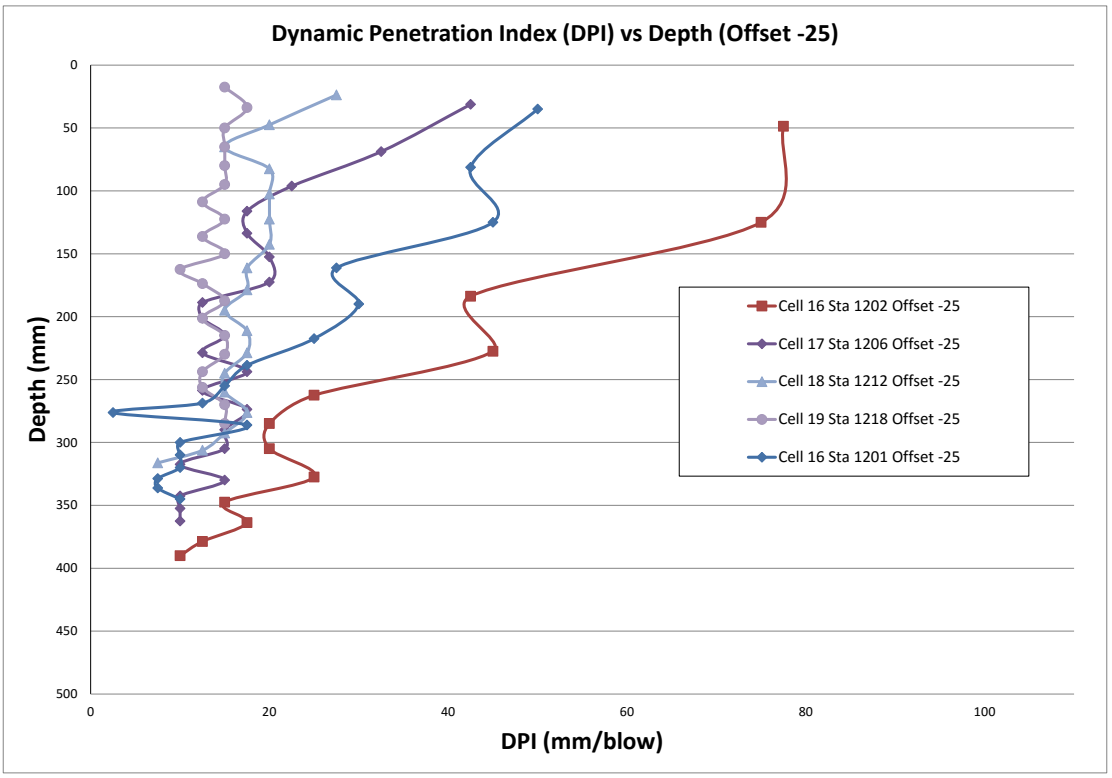
Proof Roll of Shoulder/PI Area on Cell 16

Proof Roll of Shoulder/PI Area on Cell 16

As a follow-up to the test excavations and proof-rolling, DCP testing was conducted by MnROAD staff at two locations in Cells 16 and 17 at both shoulders and centerline. One location was tested in Cell 18 at both shoulders and centerline and in Cell 19 only at both shoulders. This testing confirmed that areas in Cells 16 and 17 did include areas that were quite soft, in particular at the outer edges of the embankment (see Figure 1). For reference, note that MnDOT's maximum allowable penetration index for this material is approximately 20 mm/blow.

DCP Testing Cell 16 Passing Lane Shoulder

No construction work took place on Friday, July 22.



Cone Penetrometer Results for Outside Edge of Embankment