Chicago Testing Laboratory, Inc.

Hamburg Wheel Track Study

Hot In Place Recycled Cores
Rockdale County, Georgia

Chicago Testing Laboratory, Inc.

10/20/2013

Hot In Place Recycling

Resistance to Permanent Deformation in existing pavement cores through the use of the Hamburg Wheel Tracking device

Overview:

There has been a recent move by state DOTs to adopt the Hamburg Wheel Tracking device as a part of State acceptance criteria for Hot Mix Asphalt (HMA) mixtures. Examples of this are seen in Illinois and Texas, the leaders in Hamburg specifying, where the DOTs specify both a passing Hamburg Wheel test as part of all HMA mix acceptance criteria. Specifications typically establish a maximum rut depth (0.5 in or 12.5mm is standard) at a specific number of wheel passes based on the high temperature PG grade of the binder in the HMA pavement. Below is an example of typical specification limits.

PG Grade	**Number of Passes (before 12.5 mm)**
PG 58-xx (or lower)	5,000
PG 64-xx	7,500
PG 70-xx	15,000
PG 76-xx (or higher)	20,000

Project Summary:

Cores were received from the following project site(s) located in Rockdale County:

- (control section) 2012 mill and inlay at bridge approach on either side Irwin Bridge Road
- Irwin Bridge road overlay on HIR
- Old Covington overlay on HIR

Cores were prepared and subjected to Hamburg wheel tracking device analysis to determine the potential for permanent deformation (rutting). Each sample was subjected to 20,000 passes (typically the maximum for conventional specifications) in the Hamburg wheel device, and results were recorded.

Procedure:

Per AASHTO T324, The Hamburg Wheel-Track Test is a process that tests submerged, compacted HMA in a reciprocating rolling wheel device. The test is used to determine the premature failure susceptibility of HMA due to weakness in the aggregate structure, inadequate binder stiffness or moisture damage.

Laboratory or field compacted HMA samples are mounted in a mold and placed in the machine. The mold is covered with 122F water and allowed to cure at this temperature for thirty minutes. A 158 lb steel wheel is placed on top of the specimen. The wheel reciprocates over the sample and makes 52 passes per minute across the specimen. The passes are counted and an LVDT device measures the depth of the impression of the wheel within 0.15mm. The test continues until the set number of passes is reached (20,000 maximum) or if the maximum rut is obtained (typically 12.5mm). Reporting includes rut depth vs. number of passes and a stripping inflection point.

Results:

Three sets of core samples were tested per AASHTO T324. Sample A is identified as "IRWIN BR CONTROL", sample B is "IRWIN BR HIR" and sample C is "OLD COVINGTON HIR." Each set tested to the 20,000 pass duration. The maximum rut measured during the test was measured and is summarized in table 1 below:

Table 1

Sample Number	Maximum Impression	Number of Passes
Irwin Control	-4.73 mm	20,000
Irwin Bridge Overlay	-12.26 mm	20,000
Old Covington	-6.44 mm	20,000

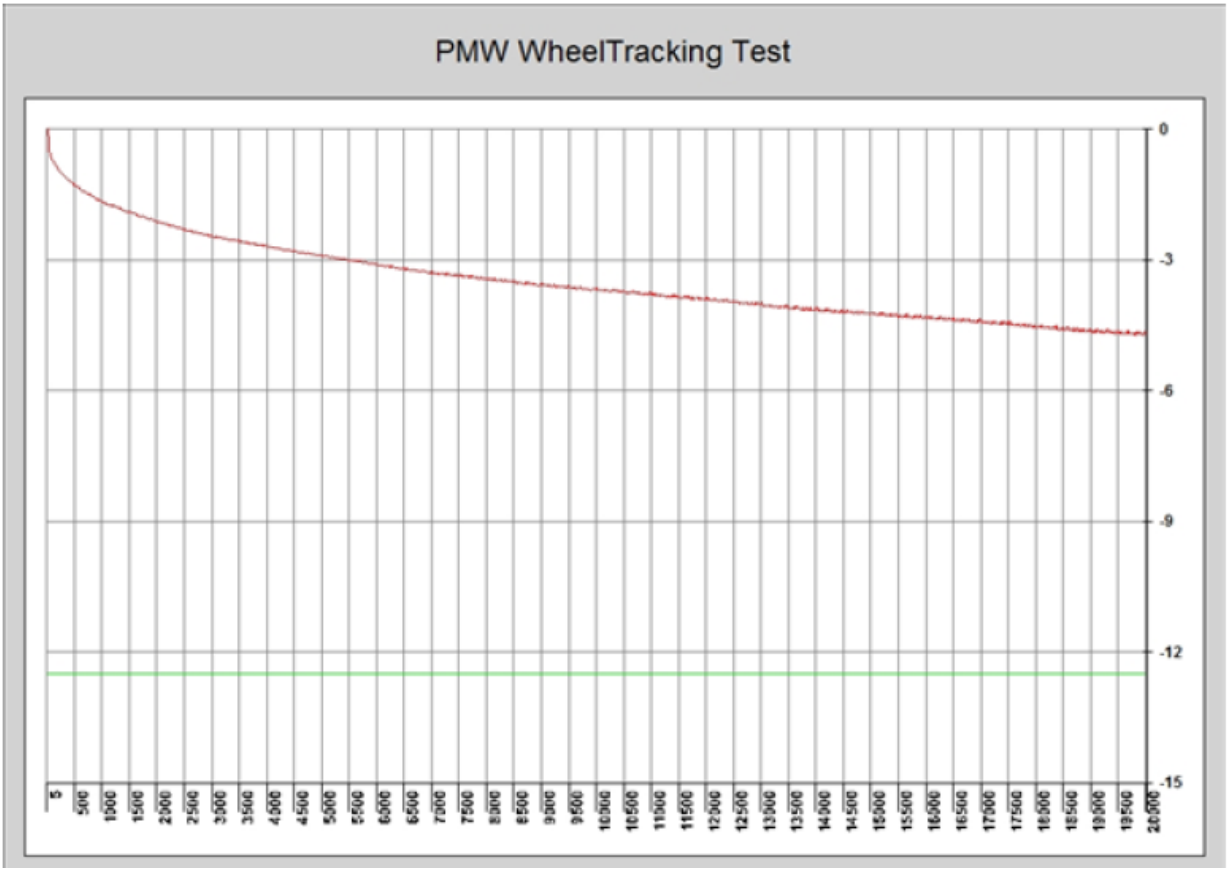


Figure 1: Irwin Control Rut Depth Chart per wheel pass

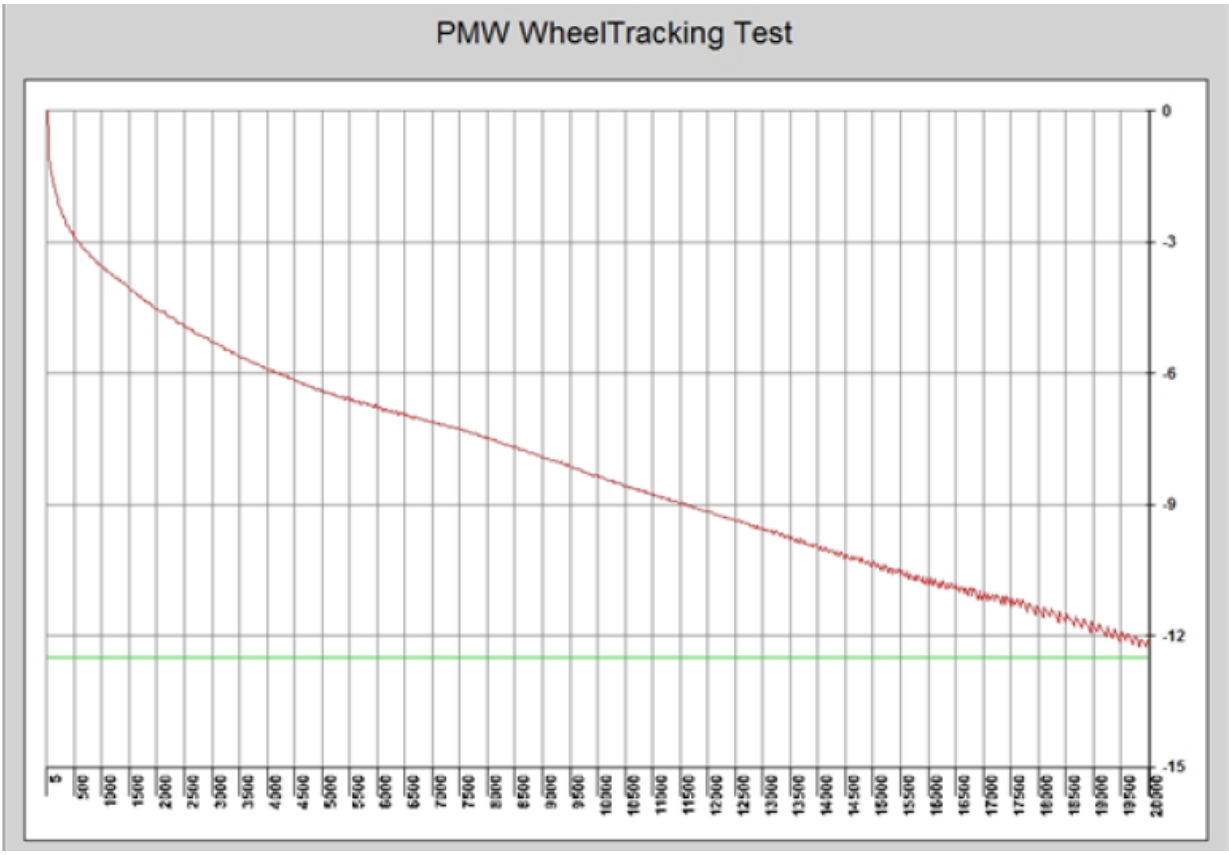


Figure 2: Irwin Bridge Overlay rut depth chart per wheel pass

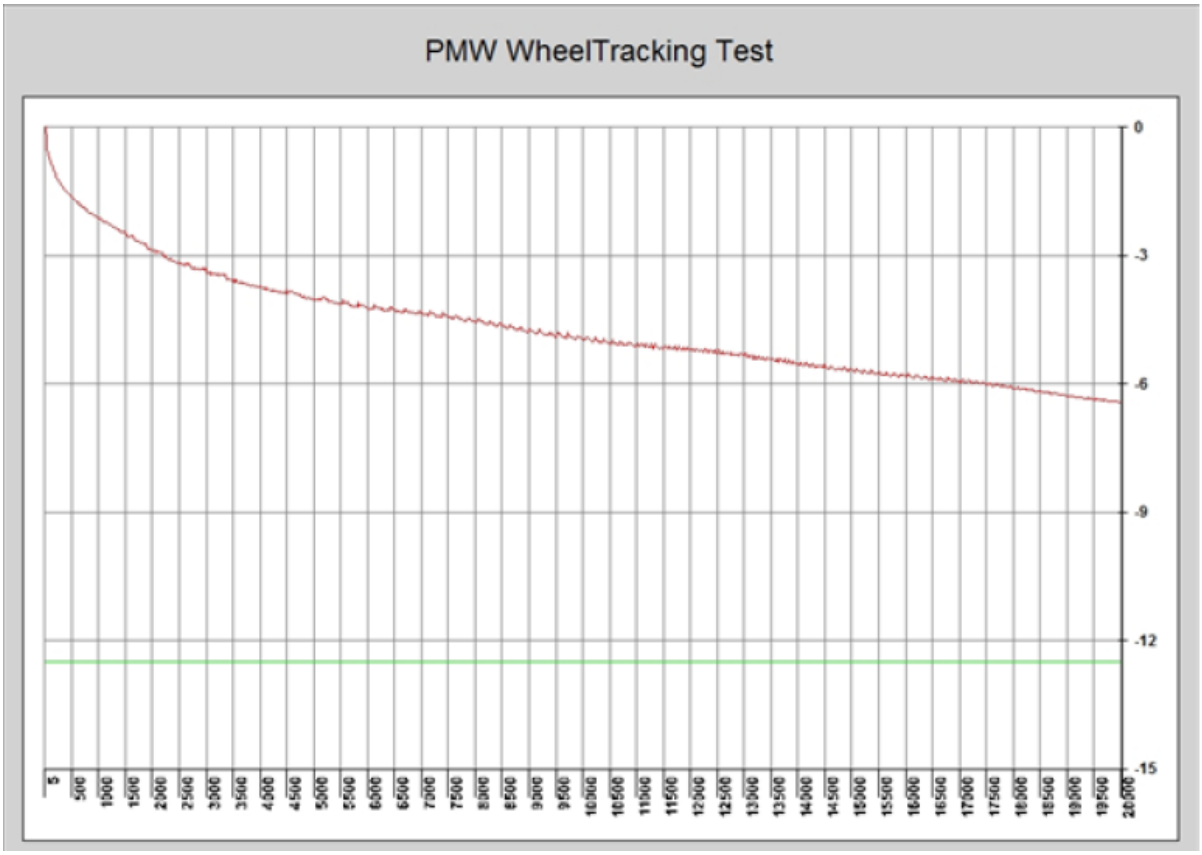
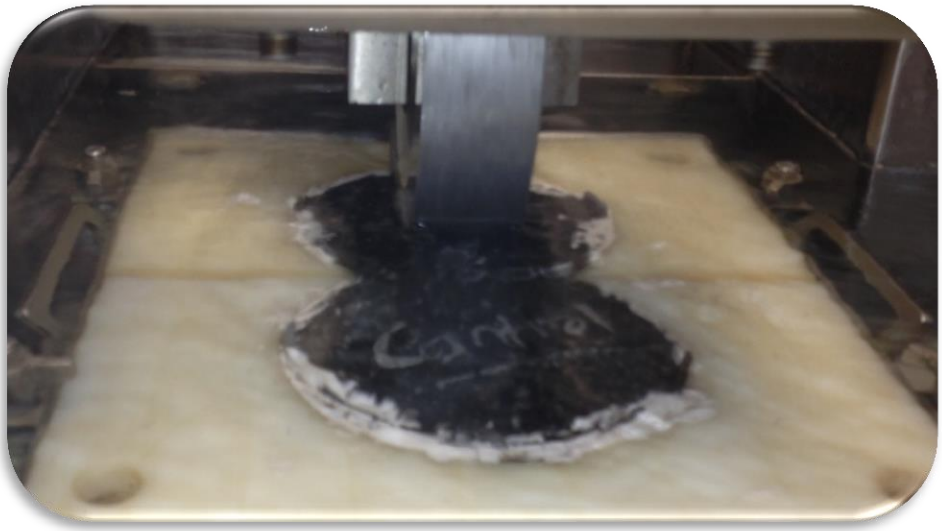


Figure 3: Old Covington rut depth chart per wheel pass



Picture 1: Control Cores in Hamburg Device

Conclusions:

Each sample tested exceeds prevailing DOT specifications for the Hamburg Wheel Test as shown in the tables and tables above. Further, based on the results completed in this study, and on the previously provided research information, there appears to be no risk of permanent deformation when using the Hot In Place process on this project and likely on most other projects. Additionally, the Hot In Place process appears to improve the overall resistance to permanent deformation of the existing pavement structure. As it relates to rut resistance, the Hot In Place process on this project passes conventional Hamburg specifications, and is beneficial in providing additional resistance to permanent deformation.

Respectfully Submitted
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