

## **Reflective Cracking Construction Notes**

**Date:** December 18, 2014

**Project:** Reflective Cracking Indoor Phase IV

**Weather:**

	6:54 AM	3:54 PM
Temperature (°F):	33.1	39.0
Dew Point (°F):	18.0	24.1
Humidity (%):	54	55
Visibility (Miles):	10.0	10.0
Wind (MPH):	9.2 W	17.3 WNW
Conditions:	Clear	Clear

**Working Hours:** 7:00 AM – 4:30 PM

**Sub-Contractor(s):** ARA, SVT, Glasgow, Inc.

**Personnel:** (1) technician (ARA), (1) engineer (SVT), (5) equipment operators, (3) laborers, (2) supervisors, (1) mechanic (Glasgow)

**Equipment:** (1) IR Blaw-Knox PF-545 pathway paver, (1) John Deere 410G loader backhoe, (1) Hamm HD 12 vibratory tandem roller, (3) pickup trucks, (3) tandem dump trucks, (1) tack coat kettle, (1) plate tamper

**Reflective Cracking Construction:**

Glasgow paved Phase IV of the reflective cracking test area. The IR Blaw-Knox PF-545 pathway paver was used to place P-401 (PG 64-22) on the North and South test items with a total thicknesses of 5 inches and 7 inches, respectively.

SRA engineers were present at National Paving Co., Inc., in Berlin, NJ (P-401 supplier) to witness the sampling and testing of the plant batched P-401 material prior to shipment. The first truckload of material (Truck No. 2228 carrying 25.05 tons) arrived at the NAPTF at approximately 11:27 am. With the formwork for the first lift of paving in-place (3” in height), the test rig hydraulics were left on in preparation for the paving operation. Glasgow applied a tack coat by hand to the PCC surface of the North test item (including a thin application over the (4) EGs) as well as the entire surface of the new sampling slab ahead of the start of paving. A sheet of cardboard was placed over the (4) EGs previously installed atop the PCC surface on the north test item in an effort to protect the gauges during the paving operation by preventing direct contact between the paver tracks and the (2) outer gauges. After a portion of the P-401 from the first truckload was run through the IR Blaw Knox paver to warm up the machine, the paver entered the sampling slab area via rubber ramps and was loaded directly by the truck dumping into the hopper. The paver then travelled across the sampling slab and the north section of the test rig in order to begin paving at the East end of the test rig. During this initial paver movement, the (2) outer EGs on the PCC surface of the North test item were damaged by the paver tracks. Prior to the start of paving, SRA and ARA personnel removed the damaged EGs and replaced them with (2) new gauges which were relocated from the plan locations (approximately 11 inches from the forms) to the outermost positions in the test item (approximately 1.5 to 2 inches from the

forms) in order to minimize the likelihood of the paver tracks passing over these outer gauges. The replacement gauges and lead wires were secured to the PCC surface using binder and the lead wires were fed through a small gap in the forms (together with the lead wires from the other gauges). A thin layer of loose HMA mix from the paver hopper was also placed atop the gauges for protection. Paving of the first lift on the north test item then began at approximately 12:10 pm. The paver screed height was set using the forms and paving proceeded from East to West across the test rig. Additional HMA was supplied to the paver hopper during the paving of this first lift via a backhoe which approached the paver from the West and dumped HMA into the paver hopper from its front bucket. The backhoe travelled with its left side wheels on the test rig surface and its right side wheels on the center gap forms. The paver and backhoe were positioned on the East and West sides of the EG locations, respectively, and the backhoe bucket was extended as needed to load the hopper such that the paver tracks and the front wheels of the backhoe stayed clear of the EGs during the material transfer process. The paving continued across the remainder of the test rig and the Northern portion of the sampling slab with the screed height held consistent with the first lift formwork height. The backhoe once again supplied HMA to the paver while both machines were on the sampling slab to enable the completion of the first lift through the sampling slab area. Upon completion of the paving of the first lift on the North test item, a Hamm HD 12 tandem smooth drum vibratory roller (approximately 4' drum width) was used to compact this lift. After making (2) initial static passes for each rolling lane (with each pass constituting a West to East or East to West movement of the roller and the 2 rolling lanes having an approximately 3' overlap), a combination of vibratory and static passes were then made across the test rig until the desired asphalt compaction was achieved. A technician from Martin A. Ackley Associates, Inc. (a subcontractor of Glasgow) was present to monitor the asphalt compaction using a Model C-200 Seaman Nuclear Density Moisture Meter. The rolling operation continued until the asphalt achieved at least 96% of the maximum density (Rice) value of 163.4 pounds per cubic foot. The asphalt compaction was checked at the East and West ends of the North test item and on either side of the joint and verified to satisfy the compaction criteria. The P-401 placed on the sampling slab was compacted in a similar manner and the asphalt compaction was tested at (2) locations in the sampling area to verify the compaction criteria had been achieved.

During compaction of the first lift on the North side, the South side was prepared for paving of the first lift. SRA and ARA personnel relocated the (2) outer EGs installed on the PCC surface of the South test item to the edges of the forms in order to replicate the as-installed locations of the EGs embedded within the first lift of the North test item. SRA personnel also cut and removed the kicker boards spanning between the center gap forms and the south side forms in order to allow paver access to the South test item. Glasgow then applied a tack coat to the PCC surface of the South test item, including a thin application over the (4) EGs. In preparation for placing the first lift on the south side, the paver was loaded to the East of the test rig and approached the South test item via the East lead-in area, thereby avoiding unnecessary travel of the paver over the EGs. Paving of the first lift of the South test item then began at approximately 12:50 pm and proceeded from East to West. Glasgow placed a thin layer of loose HMA mix from the paver hopper over the (4) EGs as the paver approached the gauges. The paving operation continued across the rig and through the sampling slab area to complete the placement of the first lift. The 3-inch loose lift was compacted with a Hamm roller and checked for compaction in a manner consistent with the procedure used for the first lift on the North test item. The compaction criteria were satisfied and the resulting compacted lift thickness measured approximately 2.5 inches. Figure 1 shows the Phase IV paving operation.

As compaction of the first lift on the South side proceeded, SRA and ARA personnel installed the (4) EGs and (1) experimental strain gauge on the surface of the first lift of P-401 on the North test item in preparation for paving of the second lift. The gauges and lead wires were secured to the asphalt surface using binder. SRA personnel installed the pre-fabricated forms to accommodate the second lift of paving (2.5 inches in height) on the North edge and center gap by securing these elements to the first lift formwork with wood screws. A small notch was cut into the North forms to accommodate the gauge lead wires. Prior to commencement of the second lift of paving, Glasgow applied a tack coat to the asphalt surface of the first lift of the North test item including a thin application over the gauges. The second truckload of material (Truck No. 11Z carrying 25.05 tons) arrived at the NAPTF at approximately 1:35 pm. The paver was again loaded to the East of the test rig and then began paving of the second lift on the North test item starting from the East lead-in area at approximately 1:58 pm. Glasgow placed a thin layer of loose HMA mix from the paver hopper over the gauges as the paver approached them. The paving operation continued across the rig and through the sampling slab area to complete the placement of the second lift on the North test item. The overall 3-inch loose lift was compacted with a Hamm roller and checked for compaction in a manner consistent with the procedure used for the previous lifts. The compaction criteria were satisfied and the resulting compacted thickness of the second lift on the North side measured approximately 2.5 inches.

The (4) EGs and (1) experimental strain gauge and the formwork associated with the second lift on the South test item (South edge forms only) were installed in a similar manner during the paving and compaction of the second lift on the North test item. The third truckload of material (Truck No. 11B carrying 14.52 tons) arrived at the NAPTF at approximately 2:27 pm. After applying tack coat to the asphalt surface of the first lift of the south test item, Glasgow began paving of the second lift on the South test item at approximately 2:31 pm; using the same procedures for placement and compaction as the second lift on the North test item.

Upon completion of the second lift on the south test item, SRA and ARA personnel installed the (4) EGs and (1) experimental strain gauge on the surface of the second lift of P-401 on the South test item in preparation for paving of the third and final lift. The gauges and lead wires were secured to the asphalt surface using binder. SRA personnel installed the pre-fabricated forms to accommodate the third lift of paving (2 inches in height) on the South edge and center gap by securing these elements to the second lift formwork with wood screws. A small notch was cut into the south forms to accommodate the gauge lead wires. After applying tack coat to the asphalt surface of the second lift of the South test item, Glasgow began paving of the third lift on the South test item at approximately 3:30 pm. The placement and compaction procedures used on the previous lift were also applied to this third lift. The compaction criteria were satisfied and the resulting compacted thickness of the third lift on the South side measured approximately 2 inches.

SRA technicians obtained samples of the binder and P-401 delivered to the NAPTF during the Phase IV paving operation for testing at the NextGen Pavement Materials Laboratory. (2) bucket samples of asphalt binder were obtained from Glasgow. A total of (26) bucket samples of loose P-401 were also obtained, including (10) buckets from each of the first (2) truckloads and (6) buckets from the third truckload.



(a) Paving (1).



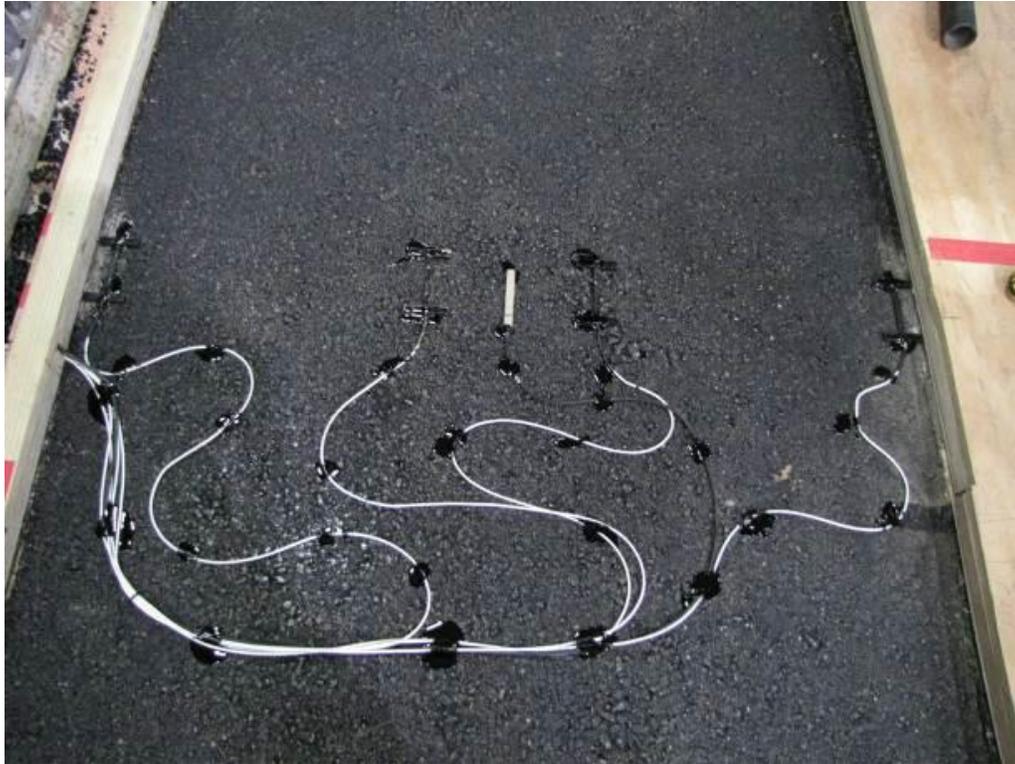
(b) Paving (2).



(c) Paving (3).



(d) Testing Compaction.



(e) Gauge Installation, and Wire Routing and Tacking.



(f) Compaction.

Figure 1. Paving of Phase IV Indoor.