FIELD REPORT

HOT MIXED ASPHALT, PRIME COAT

HMA OVER ENVIROPREM TRIAL ON RTE 8/RTE 107 CONNECTOR

On Wednesday Sept 25'13, eight days after the Enviroprem application on the Rte 8 / Rte 107 Connector, Springhill Conjunction finally paved over the first NBDTI emulsified prime job.

The following outlines the observations, comments, and recommendations:

General Observations:

- Arrived on site at 11:30am
- Left site at 2:00pm
- Weather: 14.6C and mostly cloudy
- Type of mix being placed: 1" Type HRB Superpave mix
- Laydown temperature of HMA behind the paver was approx. 151-157C

- Equipment on site:
  - Remix Tracked Paver
  - MTV with tracks
  - Double Drum Vibratory Roller (breakdown position)
  - Rubber Tire Roller (intermediate position)
  - Double Drum Steel/ Static Mode (finish position)

- Rollers were nice and tight to the paving train (see Pic.1) and were rolling at a good speed to ensure sufficient impacts per foot and that density was achieved.

Pic.1 Nice tight rolling train = good practice.

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- The primed surface held up very well, as shown in Pic. 2, even though the Enviroprem penetrated less than expected into the very dense well compacted granular surface.

Pic 2. Prime held up well; good looking surface

- The coarser / more opened areas that received prime were not picking up (see RHS of Pic. 3), while the finer/tighter granulars were more prone to tracking (see LHS of Pic. 3). Pic. 4 is a close up of a pooled Enviroprem area. Good thing we were not in the heat of the summer otherwise things could have gotten sticky and a lot worse. This shows the importance of loosening up the surface prior to the application of the Enviroprem.

Pic. 3: Variable texture = variable pick up

Pic. 4: Close up of pooled area prone to pick up

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- As noted previously the primed areas varied greatly. Some were fine/tight which led to pooling, some were coarse and more prone to premature raveling under traffic, while others were ideal and uniform. (see Pics 5, 6,and 7 respectively)

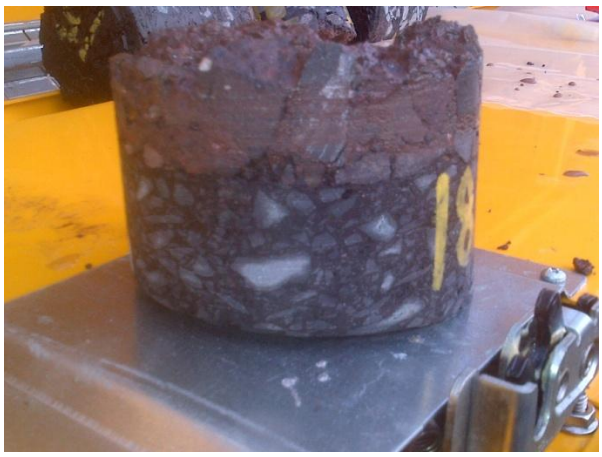
Pic 5: Fine and pooled

Pic 6: Coarse & raveling prone

Pic 7: Homogenous Gradation

- The prime seems to have performed as well as can be expected in the areas where the gradation and texture were more open and prone to the penetration of the 2L/m2 of Enviroprem. Pics 8 and 9 show cores taken the morning of Oct 1'13 in the primed sections. Notice how there is 31.5mm glued to the bottom of the cores.

Pic 8.: Two lifts cored with granulars on bottom



Pic 9: One lift cored with granulars on bottom

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- Areas with Enviroprem exhibited no lateral shoving of the HMA under the weight of the rollers, however, this was not the case when rolling the mix over normal unprimed granulars. Where prime was not used, the mat appered to shove laterally thus widening the pavement. This is not ideal for core and mat thicknesses. As a result of this lateral shoving, you can no longer see the paint line that was used as a guide for the spreader in the regular non-primed section (see Pic. 10), while in Pic. 11 the prime restrains the mix from moving and the paint line is still clearly visible. The primed areas also showed no signs of a longitudinal bow wave in front of the rollers because the Enviroprem restrained the mix from shoving and thus the HMA was getting tucked underneath the rollers very nicely. The hot mix in the unprimed section was, on the other hand, shoving longitudinally as it slid over the loose granulars.

Pic 10: Unprimed area shoving laterally;

Pic 11: Primed area not shoving laterally; Paint line guide is gone. Paint line guide line is still exposed

- The non-primed areas had lots of loose gravel as shown in Pic. 12.

Pic 12: Paving over a loose unprimed granular surface

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- The rubber tire roller operator was overhanging the unsupported edge too much as shown in Pic. 13. This is not good practice as it rounds the joint (see Pic. 14), making it difficult to match the adjacent mat and forcing the screed person to overhang the end gate too much (see Pic. 15).

Pic. 13: Too far over edge

Pic. 14: Edge rounded by roller

Pic. 15: Large end gate overlap

Comments from roller operators:

- Breakdown Roller: He said the HMA over the Enviroprem section rolled much better, shoved less (longitudinally and transversely) and he preferred it to rolling over a traditional granular fine grade due to the resistance created by the primed surface. Also, the mat felt smoother because when his roller came to a stop to back up, it left less of an indentation in the mat due to the reduced shoving, which translated into less roughness while rolling over these areas on his subsequent passes.

- Rubber Tire Roller: He also liked the prime very much and found that over the Enviroprem surface the Double Drum Vib was leaving him a much smoother mat to knead together.

- Finish Roller: He saw a huge difference between the Enviroprem "primed section" and the granular "unprimed section". Not only was he able to get on the HMA to begin his finish rolling much earlier, he also noticed that the mat in the primed areas was much smoother due to the decrease in bumps left by the other two rollers. The main selling feature for him however, was that he could get on the mat much more quickly to take out the roller marks and hopefully get a bit more density because the mat didn't shove, crack or check over the prime. He compared rolling over primed granulars to rolling over a lift of hot mix (i.e. just like if he was rolling the 2nd lift of base mix. Another thing that surprised him was that as soon as he got back on the unprimed granular section, he had to stop rolling operations until the mat cooled because he could feel it start to shove under the weight of his roller. The operator went as far as to say he wished all paving jobs over granulars or pulverized surfaces were primed. In short, he loved the stuff.

Recommendations and lessons learned:

- The surface should be scarified or graded following the initial shaping and compaction of the granular surface in order to provide a loose float of material into which the Enviroprem can penetrate properly. This would also allow for an increase in the application rate of the Enviroprem to more closely target the Product Data Sheet rate of 3L/m2. i.e. better performance for the contractor and **more liquid sales for McAsphalt**.
- Insist on have a uniform gradation full width after floating/scarifying.
- Roll surface after application to knead loose float soaked in Enviroprem
- Use a double drum steel roller because the prime will pick up on a grade roller's tires. Double drum rollers have the option of adding a light spray of H2O to minimize pick-up. Combi rollers would work as well.

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Conclusions:

- Even though the core data did not show any improvement in field densities or core/mat thicknesses (see attached file), the Enviroprem held the fine grading together, the roller operators really liked how it facilitated their operations, and the DOT was pleased. That's good news all round!
- Next year we will be doing more trials on both chipseal and HMA jobs, so now all we have to do is guide the NBDTI in the proper writing of the specifications for prime coats to ensure an even more successful outcome.
- If anyone has any feedback that could help us with this endeavor please feel free to share the wealth.