In Place Recycling using Stabilized Full Depth Reclamation

Introduction

In late fall 2008 the Transportation Engineering and Road Research Alliance (TERRA) and SEM Materials Company formed a partnership to demonstrate and test the concept of stabilized full depth reclamation as pavement base material. Full Depth Reclamation (FDR) with asphalt emulsion reuses the existing asphalt mixture and blends a stabilizing additive to further increase material stiffness. This method was applied on three (3) cells located on the MnROAD mainline (Cells 2, 3 and 4).

Traditional FDR methods used on cell 2 consisted of grinding the existing HMA with the underlying granular base (50:50 blend) and injecting new asphalt emulsion (4.25%) into the top six (6) inches. On cell 3, the HMA was ground with two (2) inches of the underlying granular base (75:25 blend) and injected with new asphalt emulsion (3.5%) in the top six (6) inches. The full depth bituminous section in cell 4 was rehabilitated by removing and stockpiling eight (8) of the nine (9) inches of the in place HMA pavement. The remaining one (1) inch was ground with eight (8) inches of the clay subgrade. This mixture was then modified with fly ash to neutralize and stabilize the subgrade. The eight inches (8) of HMA was then returned (100%RAP) to be placed as a base layer and treated with asphalt emulsion (0.75%). Then a conventional paver was used to place 2” of level 4 SuperPave in cells 2 and 3, as well as the bottom lift (of 4” pavement thickness) in cell 4. An innovative spray paver was then used to place the ¾ inch ultra thin bonded wearing course (UTBWC) surface treatment in cells 2 and 3 as well as the top lift of HMA in cell 4. The spray paver uniformly applied a high quality tack coat immediately in front of the mix, which eliminates any traffic contaminating the tack material.

Performance

Pavement distress surveys and structure testing has been conducted seasonally since being opened to live interstate traffic (MnROAD I-94) in 2009. The test sections have received approximately 80% of their expected design capacity of 3.5 million ESALs. The sections have gone through three spring-thaw cycle and so far, the performance of all the cells is very encouraging with no cracking, minimal rutting and no other notable distresses.

For More Information:

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