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RESEARCH UPDATE

Number U93-6

ROYSTON 10AN BRIDGE MEMBRANE

PURPOSE:

This update documents the application of a new bridge membrane product developed to replace Royston's widely used 10A membrane.

HISTORY:

Royston's initial No. 10 membrane and the second generation 10A product were produced with a 1/4 mil mylar surface topping. The high melt plastic surface layer was designed to facilitate the movement of the paving equipment over the membrane and to limit the penetration of the mix into the membrane while providing sufficient pavement to membrane bond to prevent premature failure of the bituminous overlay. With only a few exceptions, the Vermont Royston membrane/overlay applications have remained stable under traffic. However, in 1992, applications completed in Maine revealed insufficient bond between the Royston 10A membrane and the Maine Type D mix (Maine Type D is comparable with Vermont Type IV). As a result of those field problems Royston developed the 10AN Easy Pave ER membrane in late 1992 and solicited its application in states where the 10A membrane was approved for use.

PRODUCT DESCRIPTION:

The Royston No. 10AN Easy Pave ER membrane is a prefabricated reinforced laminate consisting of an impregnated fiberglass, non-woven inner mat sandwiched between layers of a polymer modified bitumen. The surface consists of an "open" spun-bonded polyester mat. The major difference between the 10A and 10AN Easy Pave ER products is the surface material. Two minor changes include the woven versus non-woven inner reinforcement and the use of an embossed release paper on the bottom of the new product.

TRIAL LOCATION:

The experimental membrane system was applied on I91 Bridge 63 North over Muddy Brook on the Richmond-Williston IM DECK (29) project. The 60 foot long by 38 foot wide 279 sy deck constructed in 1963 had required Class II removal of concrete (3/4" below the top mat of reinforcing steel) at 5 locations totaling 8 sy plus repair along both curb lines prior to the membrane application.

APPLICATION:

The Royston 10AN Easy Pave ER membrane was placed on August 31, 1993. A Royston representative was present. There were no problems noted during the application. The first 1 1/4" course of 285 deg. F to 300 deg. F Type IV mix was placed over the membrane on September 1, 1993. The 1 1/4" surface course was completed on September 2, 1993.

COST:

The Royston 10AN Easy Pave ER membrane was substituted for one of the standard membranes at no change in the \$4.85 per sy bid price of the item.

DISCUSSION:

Items of interest noted during the membrane application and bituminous overlay plus comments by the workmen include the following:

- a. The 10AN Easy Pave ER membrane handled easier and adhered to the concrete surface better than the 10A membrane.
- b. The new embossed release paper (only 50% is in contact with the membrane) was easier to remove and tore less frequently than the standard release paper.
- c. The product laid out flatter without trapping air and developed no wrinkles.
- d. Every roll of membrane had a 4" to 5" wide streak where a roller in the production line caused the bitumen to bleed up through the polyester scrim surface. If that area remained tacky, there would be some risk that the paving equipment or haul trucks could lift or pull the membrane from the deck.
- e. The product remained wrinkle and blister free the day after placement even though exposed to 100% sunshine with the surface temperature reaching 125 deg. F.±.
- f. Air blisters which commonly occur in the first course of pavement and often require puncturing were not observed on this application.
- g. There was some partial aggregate puncture of the membrane beneath the paver's tracks and haul truck tires when they backed across the deck to place the second pass. The particles of mix had been spilled by workmen carrying material from behind the paver screed to fill low areas along the curb line.
- h. Removal of the compacted pavement from a small area revealed good bond of mix to membrane without any evidence of significant puncture.

CONCLUSION AND RECOMMENDATION:

The properties, materials, and initial performance of the Royston 10AN Easy Pave ER membrane appear superior to the standard Royston No. 10A membrane.

The new product should be considered for approval and use.

FOLLOW UP:

Sampling for chloride contamination should be undertaken after two winters of deicing applications. The samples should be taken from the new concrete in the Class II patches.

DISTRIBUTION

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