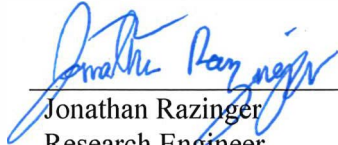


POLICY, PLANNING, & INTERMODAL DEVELOPMENT DIVISION

Research & Development Section

Prepared by:


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Attendees:

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August 21, 2017

FIELD REPORT

U2017 - 03

**Assessment of Bridge Deck Membrane (BDM) System
Bridge 165 VT 100, Warren VT**

EA: Experimental Features – SPR 352

Work Plan: WP 2012 R-1

Date: Tuesday, August 15th, 2017

Time: 1:30 PM to 2:00 PM

Weather: 78°F, Sunny

A site visit to bridge 165 in Warren was conducted as part of an investigative check under the 2012 R-1 Work Plan. Observations and photos on the performance and appearance of the Bridge Deck Membrane (BDM) after installation were collected and can be seen in Figures 1 - 8. Figures 1, 2 & 3 show the overall view of Bridge 165 from both sides. Figures 4 – 6 show the overall condition of the bridge deck overlay. Figure 7 shows evidence of the BDM on the side of the concrete curb above the asphalt overlay. Figure 8 shows a close-up view of the underside of the concrete bridge and the wood debris that has collected on the north end, which can also be seen in Figure 1.

Background on Site:

The BDM system produced by Bridge Preservation LLC was used on one bridge replacement project on VT 100 in the town of Warren, 50 feet north of the Warren and Granville town line. The bridge was produced under rapid construction techniques and the entire structure was replaced in 2012. The bridge is 21 feet long by 34 wide, with a reported average annual daily traffic (AADT) of 980. The bridge structure is a precast rigid frame and was precast by S.D Ireland in an outdoor containment structure. The complete BDM system consists of: the primer, used to penetrate and seal the substrate enhancing the system’s bond to the deck and the membrane, a polyurethane membrane that provides 100% effective waterproofing.

Notes:

Figures 4 - 6 show longitudinal cracking on the bridge overlay. From the visual inspection and photographic evidence, the BDM has been working properly. The only signs of deterioration are several longitudinal cracks on the pavement surface. As previously stated in the 2016 field report, I observed and monitored the longitudinal cracking occurring in the surrounding asphalt overlay, again emphasizing the fact that the cracking could be attributed to the material properties of the asphalt overlay and not the bridge deck membrane. This year’s site visit showed the single

longitudinal crack on the southbound lane and eight longitudinal cracks on the northbound lane. The crack on the southbound side was located on the south end of the bridge, in the center of the wheel path, and was approximately 12ft long. On the northbound lane there were; two cracks in the wheel path and one between the wheel path on the southern end of the bridge that were approximately 2 – 3ft long, three cracks near the mid-span of the bridge within the wheel path that were approximately 9, 12 and 15ft long and two cracks on the north end of the bridge in the center of the wheel path that were 6 and 12ft long. The centerline crack that runs the whole length of the bridge was again evident and can be seen in Figure 4. To be certain that the membrane was in good condition and is not contributing to the surface cracking, core samples through the surface overlay and into the concrete deck, full deck ground penetrating radar (GPR) scans or an overlay replacement would have to be conducted. The annual site visits have shown photographic evidence of the BDM (Figure 7) and the progression of the longitudinal cracks on the pavement surface (Figure 6).

After the initial inspection of the surface pavement on bridge 165, a subsequent inspection of the underside of bridge was done. There was no evidence of the white material seeping through the bridge deck joints and cracks that was observed and noted during the [2016 site visit](#). The current inspection revealed no new cracks or leaking of the underside of the concrete bridge. The inspection did yield evidence of wood debris on the north side of the bridge, which can be seen in Figures 1 & 8.

In general, the condition of the bridge deck is good and the BDM membrane study has surpassed its initial (more than 3 years) study duration. The Bridge Management and Inspection Unit conducted their last inspection on 8-5-2015 and noted that the concrete culvert was in good condition. The structure inspection, inventory and appraisal sheet can be found ([here](#)) and the photos can be found ([here](#)). The observations from the field visits regarding to the performance of the BDM is evidence that the product has performed as specified and that no further monitoring is needed. Results from this study will be given to the VTrans Structures Section for consideration on future bridge designs.

BDM Site Visit Photos



**Figure 1: Overall View of Bridge 165 on VT 100, Warren VT.
Right side of the bridge**



**Figure 2: Overall View of Bridge 165 on VT 100, Warren VT.
Right side of bridge facing south**



**Figure 3: Overall View of Bridge 165 on VT 100, Warren VT.
Left side of bridge facing north**

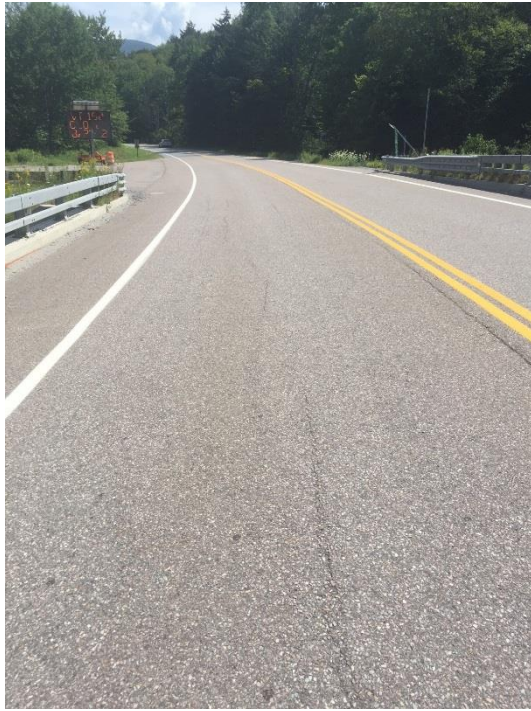


Figure 4: Overall view of bridge overlay. Side view looking south.



Figure 5: Bridge Overlay, looking north.



Figure 6: Longitudinal cracks on northbound lane



Figure 7: Bridge deck membrane



Figure 8: Bridge underside with debris