


Prepared by:

  
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Attendees:

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**October 20, 2017**

**FINAL FIELD REPORT**

**U2017 - 04**

**Poly-Carb Mark-163 Flexogrid Site Visit  
Bridge 8 on Concord Ave. (TH 4), Waterford VT**

**EA:** Experimental Features – SPR 352

**Work Plan:** WP 2012 R-2

**Date:** Wednesday, August 23<sup>rd</sup>, 2017

**Time:** 1:30 PM to 1:55 PM

**Weather:** 69°F, Partly Cloudy

A site visit to Bridge 8 in Waterford was conducted as part of an investigative check. Observations and photos on the performance and appearance of the Flexogrid System after installation were collected and can be seen in Figures 1 - 8. Figure 9 shows the location of bridge 8 on Google Maps.

*Introduction:*

The purpose of this study is to apply an experimental bridge overlay treatment manufactured by Poly-Carb known as Flexogrid, a high friction bridge deck overlay system. This system creates an anti-skid surface for use on high crash locations while also creating a barrier to water and chloride intrusion into the concrete deck.

Further information on the Poly-Carb Flexogrid System can be found by reviewing the Technical Data Sheet for Mark-163 on the manufacturers website.

*Background:*

An experimental feature was applied as part of IM MEMB(31) membrane replacement project on bridge 8 over I-93 in the town of Waterford on Town Highway 4, built in 1982. The estimated total deck area of the application was approximately 1000 square yards. The project description indicates that it involved removing and replacing the sheet membrane waterproofing and bituminous concrete pavement on the bridge and its approaches along with minor related work. There are seven bridges involved with the project, with only one - Bridge 8 receiving Flexogrid. Asphalt overlay was not placed over the overlay system.

*Flexogrid Membrane Site Visit Photos & Notes:*



**Figure 1: Overall View of Bridge 8 on Concord Ave. (TH 4), Waterford VT.  
Facing north over I-93.**



**Figure 2: Overall View of Bridge 8 on Concord Ave. (TH 4), Waterford VT.  
Facing south over I-93.**



**Figure 3: Close-up of bridge deck surface.**

Figures 1 & 2 show the overall view of Bridge 8 from both the north and south, while Figure 3 shows a close-up view of the overlay surface. The excellent condition of the bridge deck surface and evidence of no new surface deterioration, except for some minimal wear in the wheelpaths, can be seen in the above figures. The wheelpaths showed minimal signs of raveling and smoother, less textured aggregate. Small amounts of loose aggregate, from the Flexogrid System surface, was found around the wheelpaths and alongside the bridge curb. The slight wearing to the wheelpaths can be seen in Figures 1 & 2 and the loose aggregate can also be seen in Figure 6. The amount of wear to the wheelpaths should not be viewed as a major blemish to the performance of the Flexogrid System considering that the system was installed during the spring of 2013 and endured 5 winter seasons of plowing. The adhesive adhering the aggregate to the bridge deck has performed well given the small amount of loose aggregate found during the site visit.





**Figure 4: Bridge joints. Photo on left shows the bridge joint on the north end of the bridge, while the photo on the right shows the bridge joint on the south end of the bridge.**



**Figure 5: Pavement deterioration. Photo on left shows the pavement deterioration approaching the north end of the bridge, while the photo on the right shows the pavement deterioration approaching the south end of the bridge.**

Significant cracking was evident around the bridge joints, Figure 4 and the approaches to the bridge, Figure 5. The cracking around the bridge joints were also noticed during the prior year's inspection by the Research Section and by the Bridge Management and Inspection Unit. Observations from the field show that the approaches to the bridge, from the north and the south, are experiencing significant transverse and longitudinal cracking. In certain areas, which are evident in Figure 5, alligator cracking has begun occurring. The patching near the bridge joints that was noticed during last year's research inspection seems to be performing well, accomplishing the task of extending the life of the bridge joint. At this point it is unclear why this cracking is occurring, but it is most likely attributed to the deterioration of the concrete bridge joint underneath the Flexogrid Membrane. Further discussions with the Structures Unit and The Bridge Management and Inspection Unit would have to be had to accurately determine the cause of the deterioration around the bridge joints and the approaches.



**Figure 6: Deterioration of metal curb protector.**

Figure 6 shows the deterioration on the metal protection of the curb. Aggressive agents from run-off and winter maintenance has most likely attributed to the metal curb protector deterioration around the concrete curb. The extent of deterioration and corrosion seems minor and has been slow to progress. The rust and some of the holes were evident during the 2013 installation of the Flexogrid System. Photos from the installation of the overlay system can be found by reviewing the [Installation Report](#).



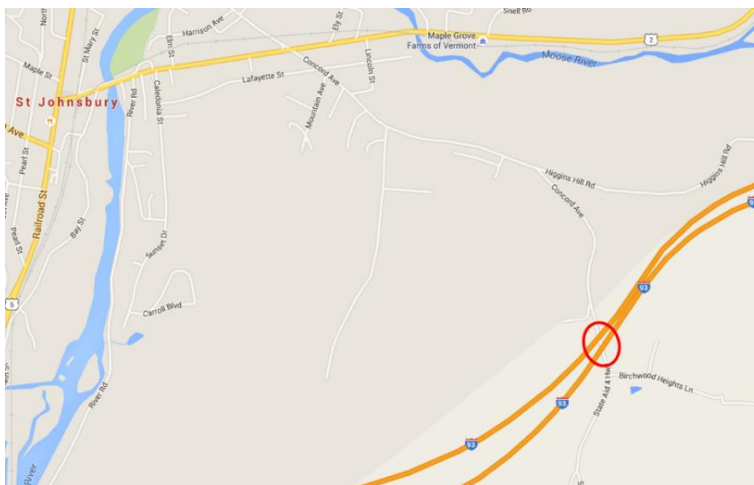
**Figure 7: Full view of the underneath of the bridge.**

No cracking, deterioration, or leaking was visible on the underside of the bridge, which can be seen in Figure 7.



**Figure 8: Bridge 8 abutment and extended gutter.**

No new cracking to the bridge abutments was found near the bridge joints. This is most likely attributed to the extended gutter, seen in Figure 8, which carries run-off from the bridge joints away from the abutments.



**Figure 9: The location of Bridge 8 on Google Maps is represented by the red circle.**

*Summary:*

The performance of the Poly-Carb Mark 163 Flexogrid Overlay System is supported by the visual inspection and photographic evidence gathered during the recent site visits. The Bridge Management and Inspection Unit conducted their last inspection on 6-3-2016 and noted that the bridge structure in good condition. The inspection personnel did notice the extent of the deterioration to the bridge joints and the surrounding concrete housing. They recommended that the joints either be repaired or eliminated. The structure inspection, inventory and appraisal sheet can be found ([here](#)) and the June 3<sup>rd</sup> 2016 photos can be found ([here](#)). This study has surpassed its initial (3 years) study duration and the observations from the field visits regarding to the performance of the Flexogrid System 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.