Transportation Research & Innovation Division

Post Winter Inspection #1
Matacryl Waterproof Membrane System
4/22/19
Introduction

In 2018, The Maine Department of Transportation in collaboration with Tremco, Inc. (formerly RPM Belgium Vandex Group) applied their Matacryl waterproof membrane (WPM) system to a bridge deck in Palermo, Maine. In the spring of 2019 the bridge was scheduled to be revisited to determine how it held up in through the harsh Maine winter. As part of MaineDOT’s qualification of WPMs for inclusion on the qualified products list, installation, post first winter and post second winter must be observed and inspection with written reports.

Project Location

The waterproofing membrane test deck is located in Palermo on Route 3, Bridge #2758. This bridge is also known as the Sheepscot Bridge and spans over a section of the Sheepscot River (shown below), the deck measures 46.7 ft. wide by 176 ft. long. The bridge was originally built in 1974 and reconstructed in 1995.
Inspection Scope

Maine Department of Transportation inspects waterproofing membranes for two years after installation before including them on any QPL. The goal of the inspection was to gather data and information to assist the Department in making an objective decision regarding the performance and viability of the Matacryl WPM system.

Inspection

On April 22, 2019, while installing the asphaltic plug joint on the east end of the bridge, MaineDOT discovered pieces of the membrane, applied fall 2018 during phase 3, were peeling off the bridge deck (photos 1 & 2).

Further investigation, done with the Engineer/Project Manager present and prior to the joint installation, showed that phases 1 and 2 did not peel as phase 3 had. The Tremco, Inc. representative was contacted and responded immediately. Pictures and a sample of the peeled WPM were sent to Tremco, Inc. to decide how to proceed given the issue.

It was quickly decided that some test patches would need to be exposed to run further pull-off tests on the membrane as well as taking sample for chloride content and measuring the moisture if the pull-off tests showed evidence of an adhesion issue. The next week the Tremco, Inc. Representative was in Maine to do the above listed tests and sampling with MaineDOT representatives on site during the testing process.

Testing

Three 10-inch by 10-inch sections within phase 3 of the Matacryl application were exposed for testing, two were 6 feet from the bridge approaches at each end and one in the middle (photo 3). The Manufacturer’s Representative then exposed the membrane by finely grinding away the last of the pavement to get down to the membrane and perform the pull-off tests (photos 4 & 5). The pull-off tests were then completed and documented (see table 1 and photos 6-8).

Sample holes were then drilled into the bridge deck and the material was collected for future chloride testing that will be performed by Tremco, Inc. Lastly, moisture meters were put into the holes and left for 24 hrs. to record the moisture level within the concrete at each of the three test areas (9 & 11).
Results

The results of the pull off tests conducted during the membrane application in 2018 ranged from 244 psi to 262 psi. The Engineer/Project Manager and the Tremco, Inc. representative agreed that the values of the pull-off tests were comparable to those initially taken at the time the membrane was installed.

The moisture readings all indicated that the moisture in the bridge deck was 100%. However, since the weather in the area had been rainy for most of the two weeks prior to the testing, it was concluded that this was not a result of the membrane failure but rather a result of the atmospheric conditions.

Table 1: Test Results

<table>
<thead>
<tr>
<th>Location</th>
<th>Test Site # 1 (East End)</th>
<th>Test Site # 2 (Middle)</th>
<th>Test Site # 3 (West End)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pull-off test (MPa)</td>
<td>1.56</td>
<td>1.36</td>
<td>1.62</td>
</tr>
<tr>
<td>Pull-off test (psi)</td>
<td>226.3</td>
<td>197.3</td>
<td>235.0</td>
</tr>
<tr>
<td>Pull-off test notes</td>
<td>Concrete removed with test.</td>
<td>Concrete removed with test.</td>
<td>Concrete removed with test.</td>
</tr>
<tr>
<td>Moisture Readings (%)</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
</tbody>
</table>

Figures

1. [Image 1]
2. [Image 2]
Conclusions

The waterproof membrane appeared to still be intact after its first winter season. The inspection was performed after a week of rain and, while difficult to see in the included photos, the underside of the bridge deck was dry. There were no signs of water leaking through even though the moisture reading were all at 100%. As the bridge is not new, the representative from Tremco, Inc. and the Engineer/Project Manager concluded that the moisture readings were due to the continuous moisture in the air over the prior weeks’ rainy conditions, based on the data available during the visual inspection and the tests conducted as described herein. Furthermore, it was concluded that the issues with bonding on the eastern end of Phases 2 and 3 were due to inadequate surface preparation prior to membrane application.

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