

Matacryl TPO – Bridge Deck Thin Polymer Overlay on William Umstead Memorial Bridge, Manns Harbor NCDOT Division 1: Contract C204775

Project Details

System: Matacryl TPO Wear System

Installer: Titan Construction – Baltimore, MD

Owner: North Carolina Department of Transportation

Application

Opened in 1955, the William B. Umstead Memorial Bridge (Dare County Bridge 9) spans the Croatan Sound between Manns Harbor and Roanoke Island in Dare County, NC. It is a two lane bridge, with a total span of around 4.35 miles.



To preserve and protect the existing concrete deck, North Carolina Department of Transportation developed a special provision for an MMA (methyl-methacrylate) overlay and the Matacryl TPO system was approved. Further, the special provision called for bridge deck crack sealing prior to installation of the MMA overlay and Matacryl Sealer was approved.

In addition to deck restoration, the project included expansion joint repair and replacement, pier and pile restoration, and bridge approach repairs. The entire bridge was closed for the duration of the project; the Matacryl portion commencing in October 2024 and completing in March 2025.

Matacryl TPO

Several key characteristics of the Matacryl TPO MMA system are its tenacious bond (to substrates and itself) and the flexibility of the wear layer – greater than 170% elongation. In addition, it is a watertight system with high chemical resistance. It can also be installed at temperatures below 32 F. These characteristics were crucial in accommodating the conditions of the bridge deck including:

- Multiple types of substrate repair materials including exposed steel grate from the former lift gates on the bridge
- Expansion joints at every support pier
- Vibratory movement of the deck
- Bridge closure for renovation through the winter
- Span over salt water sound

Matacryl Sealer was applied to the prepared the deck, sealing the porous concrete and filling micro-cracks. Matacryl Primer CM was applied with a light sand coat on sealed concrete. Multiple adhesion tests were conducted, passing 250 psi to meet the required bond strength specification. The WLV+ layer was applied at an average 200 mil thickness, with the manual application preventing any material blow off into sensitive waters around the bridge. While wet, aggregate was broadcasted to form the traction wear layer of the TPO system. Finally a thin coat of WLV+ was applied to seal the system and prevent water and chemical intrusion.

Installation images page 2

System Build page 3

Matacyl TPO
Manns Harbor (North Carolina)



Prepared deck



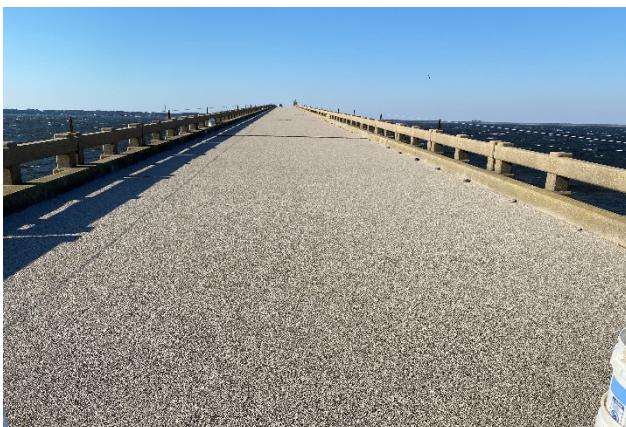
Matacyl Sealer application



Matacyl Primer CM application



Matacyl WLV+ slurry wear coat application



WLV+ Layer with aggregate



WLV+ seal coat layer

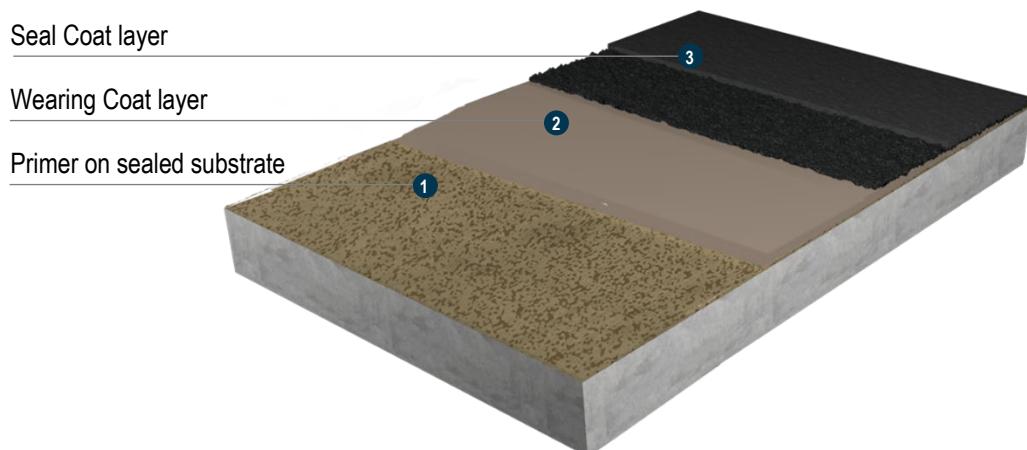
Matacryl TPO Wearing System – System Build Up

Thin Polymer Overlay – NCDOT Special Provision Specification

Layer	Material	Application Rate	Thickness
① Primer on substrate ¹	Matacryl Primer CM	0.008 to 0.012 gal/f ²	13 to 20 mils
Broadcast aggregate	Quartz 0.3 to 0.7 mm	0.06 lb/f ²	
② 1 st Wearing Coat ²	Matacryl WLV+ Slurry 1 gal slurry = .584 gal WLV+ 9.6 lbs SNL/L Filler blend	0.125 gal/f ²	200 mils
Broadcast aggregate	Trap Rock	1.5 lbs/f ²	
③ Seal Coat	Matacryl WLV+	0.020 gal/f ²	40 mils

¹ Matacryl Sealer used on prepared concrete to seal microcracking and densify concrete.

² Wearing Coat is a 1:1 slurry of WLV+ and the L/SNL Filler Blend



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