

INSTALLATION OF VERY EARLY STRENGTH LMC OVERLAYS

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Northeast Bridge Preservation Partnership
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IMPORTANT CRITERIA TO CONSIDER WITH DENSE CONCRETE OVERLAY DESIGN

- Strength (bending)
- Flexibility
- Resistance to Crack Propagation
- Adhesion / Bond
- Permeability
- Durability / Abrasion Resistance
- Construction Practices – Placement Experience



WHAT IS LATEX MODIFIED CONCRETE (LMC)?

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- Concrete “modified” by styrene butadiene polymers
- Latex dispersed as an emulsion into concrete thru mixing water
- Latex acts as a water reducer
- Most time-tested structural overlay system

WHO MANUFACTURES LATEX FOR LMC?

- BASF
- Trinseo

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VANDELAY INDUSTRIES
...latex and latex-related products



WHEN TO USE LMC

- New decks
- Good decks as preservation treatment
- Fair decks for minor restoration / preservation
- Poor decks as comprehensive rehabilitation with proper prep
- 2nd Generation overlay
- Not a solution for a failing bridge deck needing replacement

WHAT IS VERY EARLY STRENGTH LATEX MODIFIED CONCRETE (VESLMC)?

- Uses Calcium Aluminate type cement with latex modifier
- Produces a very accelerated mix (traffic ready in 3 hours)

WHAT IS VERY EARLY STRENGTH LATEX MODIFIED CONCRETE (VESLMC)?

- Uses Calcium Sulfo-aluminate cement with latex modifier
- Produces a very accelerated mix (traffic ready in 3 hours)
- Alternate mix: High Early Strength (HES) with Type III Cement
- 2500 psi to 3500 psi in 24 hours

WHEN TO USE VESLMC?

- Time is of the essence
- Lane closure time is limited
- Weekends
- Overnight in extreme situations

LMC / VESLMC MIX DESIGN

- LMC (Type 1 Cement)
 - 658 Lbs Cement
 - 0.40 Max Water/Cement
 - 1470-1785 Lbs FA
 - 1456-1176 LBS CA
 - 24.5 Gallons Latex
 - 3 to 7" Slump
 - 0 to 7 Air (non-entrained)
 - 4000 PSI (7 days)
- VESLMC (CTS Rapid-Set Cement)
 - 658 Lbs Cement
 - 0.42 Max Water/Cement
 - 1470-1785 Lbs FA
 - 1456-1176 LBS CA
 - 24.5 Gallons Latex
 - 6" to 9" Slump
 - 0 to 7 Air (non-entrained)
 - 3000 PSI (3 hours)
 - 5000 PSI (24 hours)
 - 6500 PSI (28 days)
 - Citric Acid (for retarding set)

THINGS TO CONSIDER WITH VESLMC

- Good Tight Spec and Inspection



THINGS TO CONSIDER WITH VESLMC

- Good Tight Spec and Inspection
- **Surface Saturation and Curing is critical**

CURING VARIOUS LMC TYPES

- Conventional Mix with Type 1 or 2 Cement (LMC)
 - 96 hour cure period (48 hours wet followed by 48 hours dry)
- High Early Strength Mix with Type III Cement (HESLMC)
 - 48 hour cure period (24 hours wet followed by 24 hours dry)
- Very Early Strength Mix (VESLMC)
 - 3 hour minimum wet cure only (and achieving design strength)

CURING VARIOUS LMC TYPES

- Conventional Mix with Type 1 or 2 Cement (LMC)
 - 96 hour cure period (48 hours wet followed by 4 hours dry)
- High Early Strength Mix with Type III Cement (HESLMC)
 - 48 hour cure period (24 hours wet followed by 24 hours dry)
- Very Early Strength Mix (VESLMC)
 - 3 hour minimum wet cure only (and achieving design strength)

THINGS TO CONSIDER WITH VESLMC

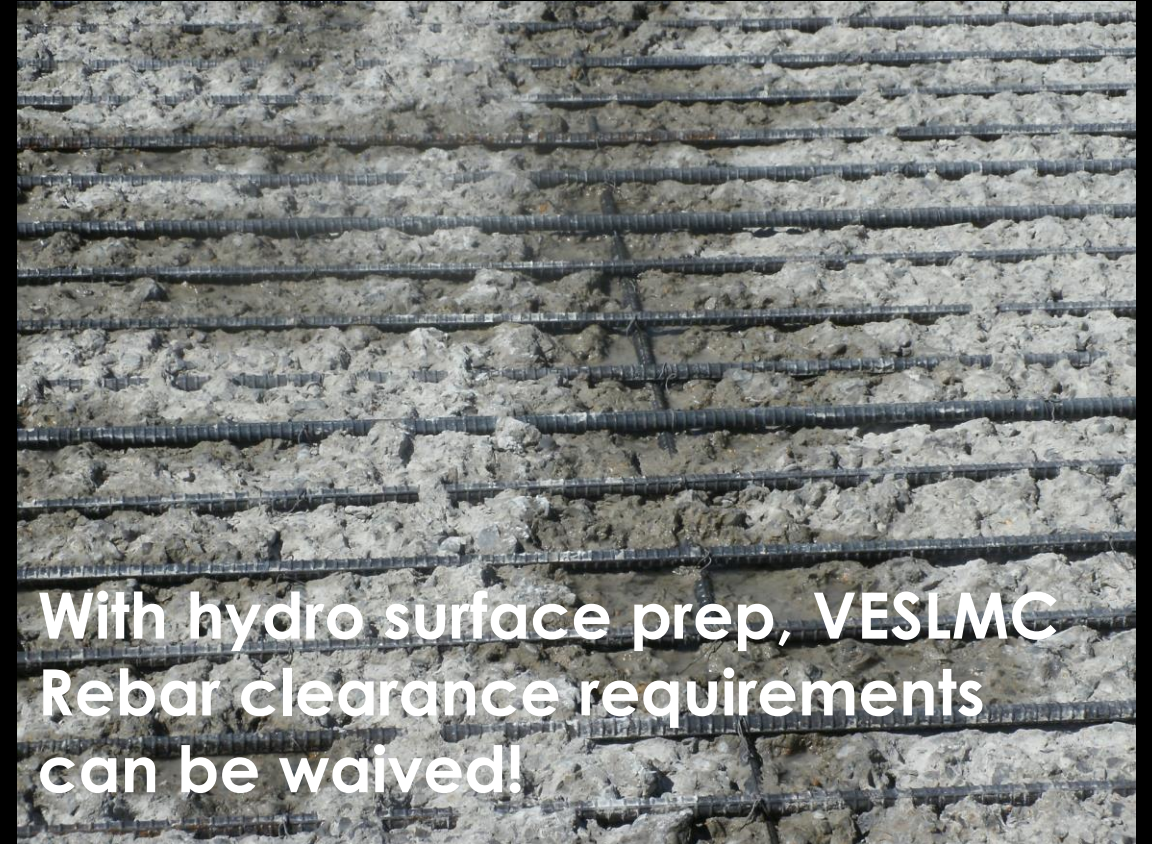
- Good Tight Spec and Inspection
- Surface Saturation and Curing is critical
- **Contractor experience**

THINGS TO CONSIDER WITH VESLMC

- Good Tight Spec and Inspection
- Surface Saturation and Curing is critical
- Contractor experience
- **Hydroblast for surface prep and selective removal**

THE FAST TRACK HYDRODEMOLITION PROCESS

Bondable surface and waiver of rebar clearance requirements



With hydro surface prep, VESLMC
Rebar clearance requirements
can be waived!

THINGS TO CONSIDER WITH VESLMC

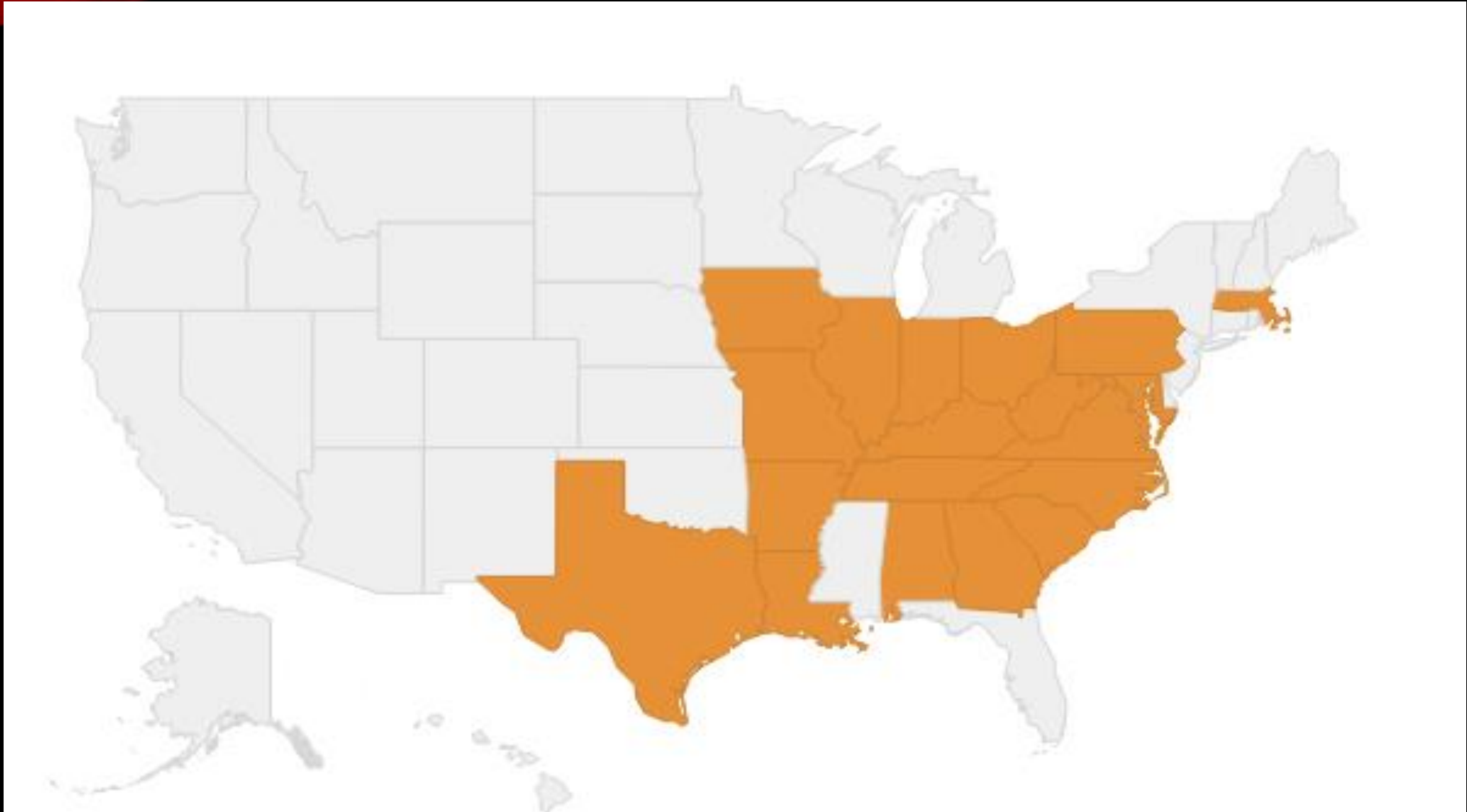
- Good Tight Spec and Inspection
- Surface Saturation and Curing is critical
- Contractor experience
- Hydroblast for surface prep and selective removal
- **Installation of VESLMC**

INSTALLATION OF VESLMC

Latex Modified Concretes are “specialty” mixes and require mobile mixers to discharge on site.



VESLMC INSTALLATIONS









POWHITE PARKWAY INSTALLATION WITH VESLMC

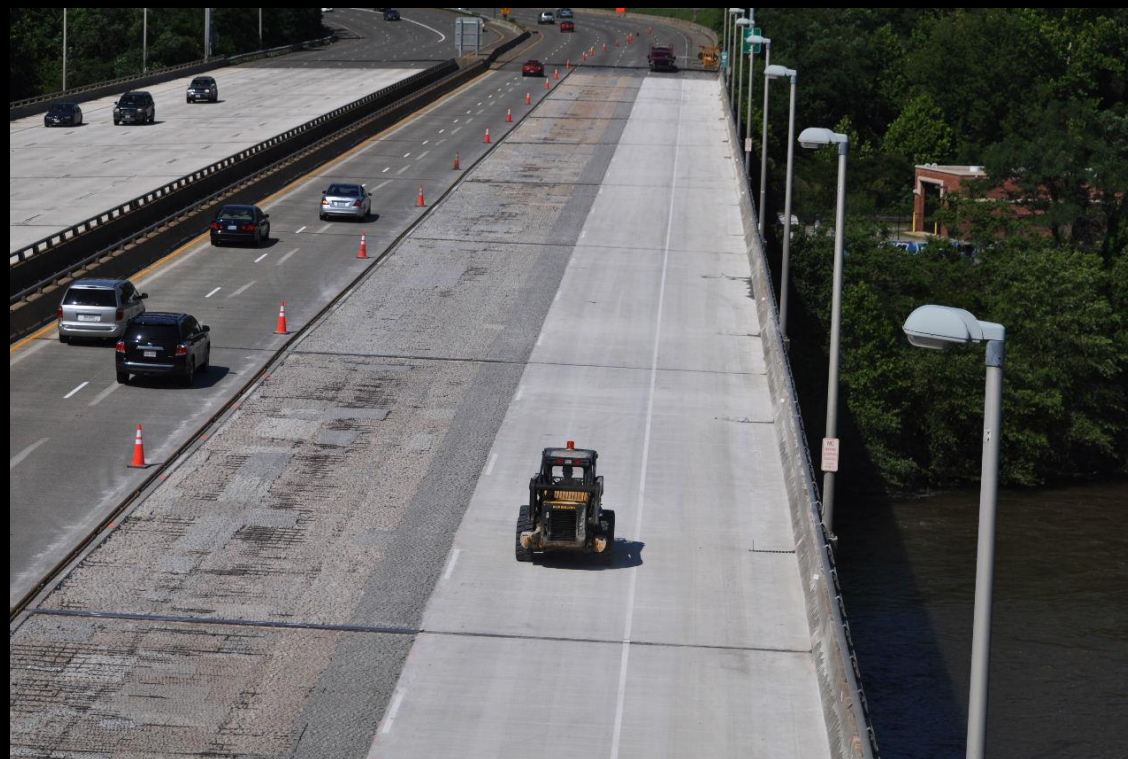


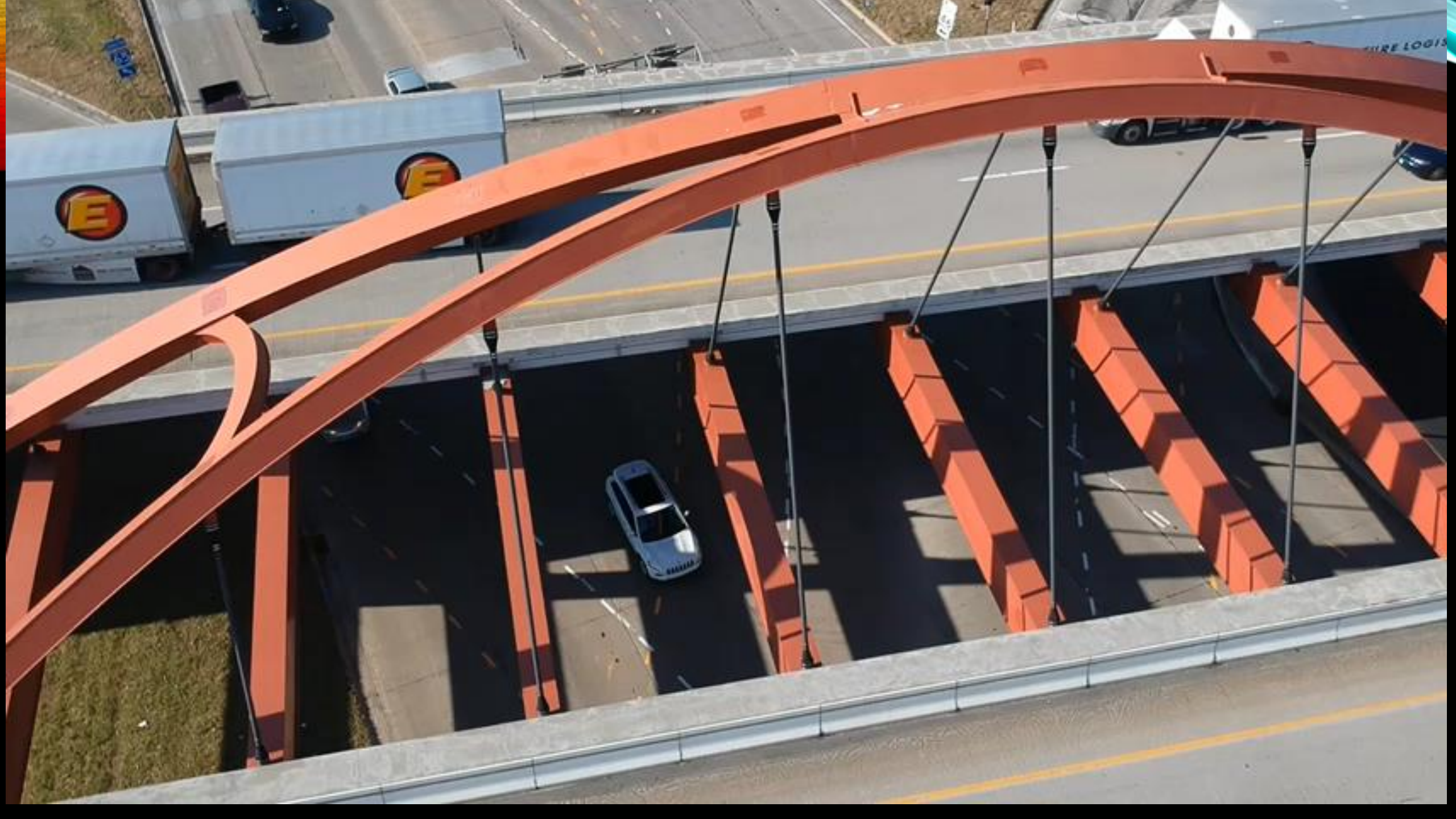
POWHITE PARKWAY INSTALLATION WITH VESLMC



Powhite Parkway (NB)

- RMA
- 1971 feet x 68 feet
- 14,883 SY in 3 weekends
- 1123 CY of VESLMC







LMC WORKING GROUP MISSION

- ✓ Actively engage in and support various trade and standards organizations
- ✓ Develop and publish technical and field data
- ✓ Develop and conduct training programs for designing and installing LMC overlays
- ✓ Use various electronic media for promotion and updates of recent LMC events
- ✓ Produce and circulate promotional and marketing materials to industry contacts



LMC WORKING GROUP SCOPE

Education and Training:

- ✓ Supply and use of quality raw materials
- ✓ Batching, placement and curing to provide high quality overlay
- ✓ Proper equipment and calibration
- ✓ Monitoring long term performance



VANDELAY INDUSTRIES

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I'm disturbed, I'm depressed,
I'm inadequate. I've got it all!



FOOD FOR THOUGHT



A **shark** in a **fish tank** will grow 8 inches, but in the ocean it **will grow** to 8 feet or more. The **shark will** never outgrow its environment and the same is true about you. Many times we're around small thinking people so we don't **grow**. Change your environment and watch your **growth**.

VESLMC INSTALLATIONS



THE END

