Sealing New Jersey DOT Bridge Abutments with High Molecular Weight Methacrylate
NEW JERSEY DOT HAS EXPERIENCED AN INCREASING NUMBER OF BRIDGE ABUTMENTS EXHIBITING SIGNS OF EXTENSIVE CRACKING.
Safer Transportation Through Innovation
NEW JERSEY DOT AND TRANSPO INDUSTRIES WORKED TOGETHER TO TEST 2 SIMILAR MATERIALS AND 2 DIFFERENT METHODS OF APPLICATION.

Materials
- High Molecular Weight Methacrylate (HMWM)
- Modified HMWM for Vertical Application

Application Methods
- Low Pressure Injection
- Hand Roller Application
HMWM was developed to fill and seal cracks in concrete on horizontal surfaces using gravity-fed process

- Seals cracks down to 0.10 mm
- Low viscosity > (25 cps) enables deep penetration
HMWM APPLICATION ON VERTICAL SURFACES PRESENT A CHALLENGE FOR A LOW VISCOSITY MATERIAL.

- Maintain material on vertical surface while penetrating pores and cracks.
- The new formulation with viscosity > 1,500 cps can be applied on vertical surfaces.
- Rollers need to apply enough pressure to force HMWM into pores and cracks.
TWO LOCATIONS WERE SELECTED FOR TESTING THE DIFFERENT MATERIALS AND METHODS

- US-130 over I-295 (constructed in 1968)
- Oak Grove Road over I-295 (constructed in 1966)
**INSPECTION RESULTS PRIOR TO TREATMENT:**

- Extensive surface cracking up to 3” in depth
- No delaminations
- No previous treatments or repairs
NJ DOT GOAL:

- Stop the progression of abutment cracks.
- Reduce potential for spalling due to moisture and freeze/thaw effects.
- Increase time until abutment rehabilitation is required.
LOW PRESSURE INJECTION APPLICATION
LOW PRESSURE INJECTION APPLICATION
VERTICAL ROLLER APPLICATION
VERTICAL ROLLER APPLICATION
Cores taken after application

Injection Method
Cores taken after application

Roller Method
NEW JERSEY 1966
CONCLUSION

INJECTION

- Preparation was difficult for the extensive crack patterns that existed.
- Actual process was easy using only hand tools.
- Excellent penetration deep into cracks.
- Process is more applicable to structures with individual cracks and not for extensive pattern cracking.
CONCLUSION

VERTICAL HAND APPLICATION

- No surface preparation is required other than to remove loose material and dirt from the surface.
- Simple mixing and roller application.
- Larger cracks had material are worked into the cracks with putty knife.
- Multi coats may be required when excessive absorption leaves concrete surface without HMWM resin film.
- Large areas are treated in minimal time with little labor and low HMWM material usage.
CONCLUSION – BEFORE & AFTER