

Sealing New Jersey DOT Bridge Abutments with High Molecular Weight Methacrylate



Northeast Bridge Preservation Partnership
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**NEW JERSEY DOT HAS EXPERIENCED AN INCREASING
NUMBER OF BRIDGE ABUTMENTS EXHIBITING SIGNS
OF EXTENSIVE CRACKING.**



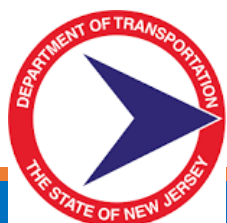
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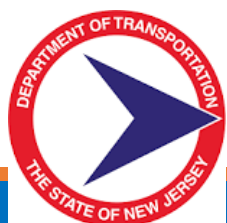
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NEW JERSEY DOT AND TRANSPO INDUSTRIES WORKED TOGETHER TO TEST 2 SIMILAR MATERIALS AND 2 DIFFERENT METHODS OF APPLICATION.

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



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LOW PRESSURE INJECTION APPLICATION



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VERTICAL ROLLER APPLICATION



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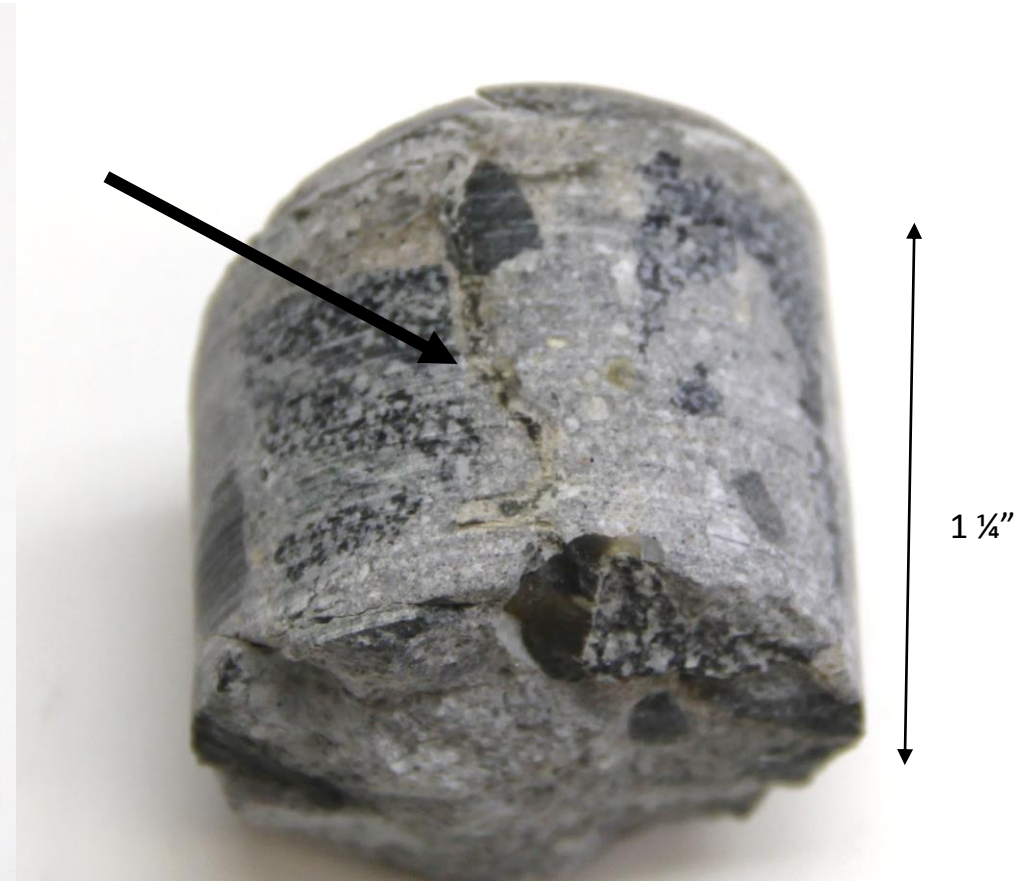
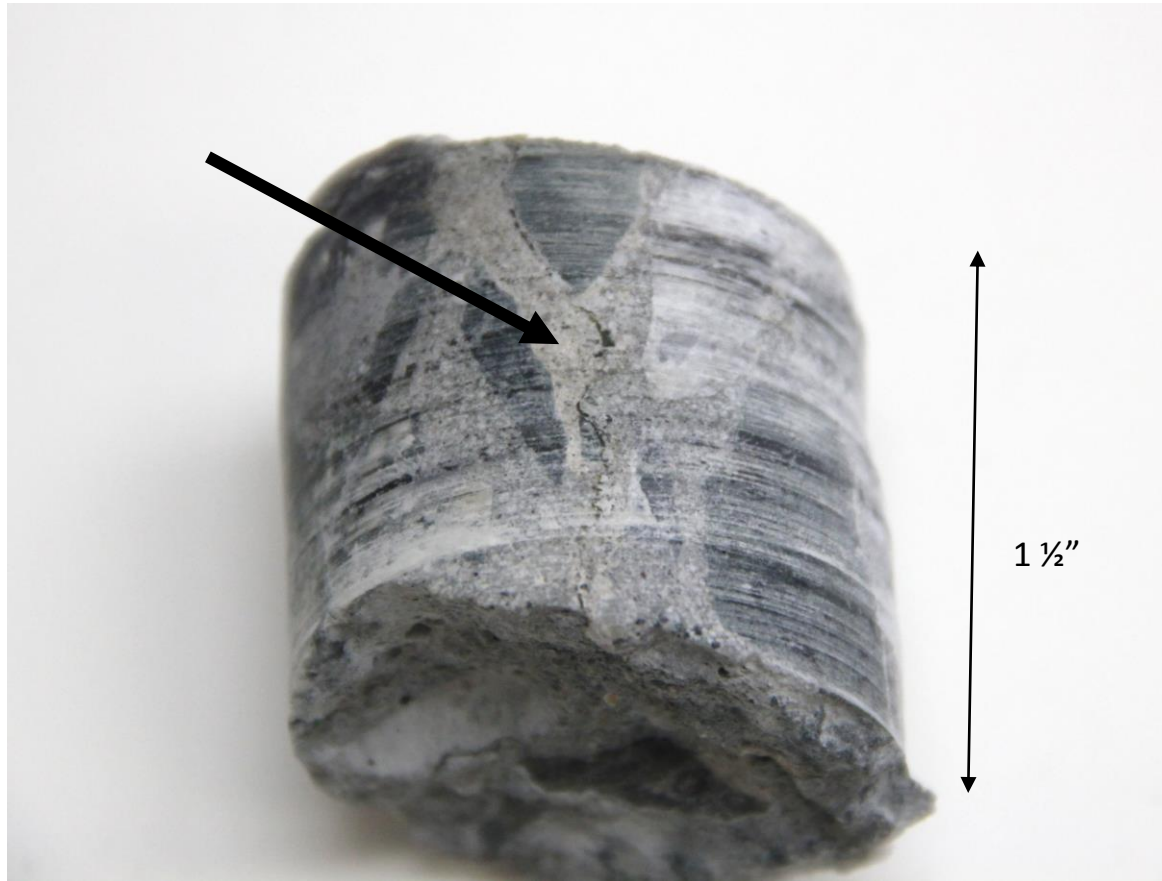
VERTICAL ROLLER APPLICATION



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CORES TAKEN AFTER APPLICATION



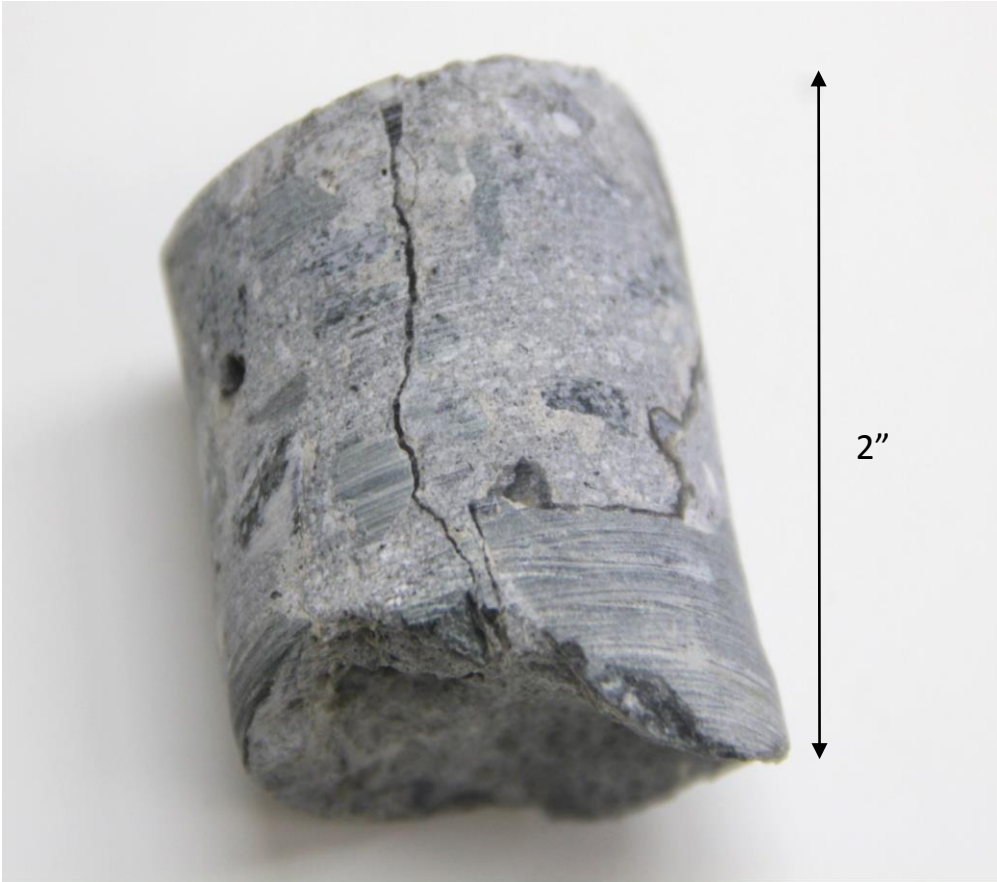
Injection Method



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CORES TAKEN AFTER APPLICATION



Roller Method



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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



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