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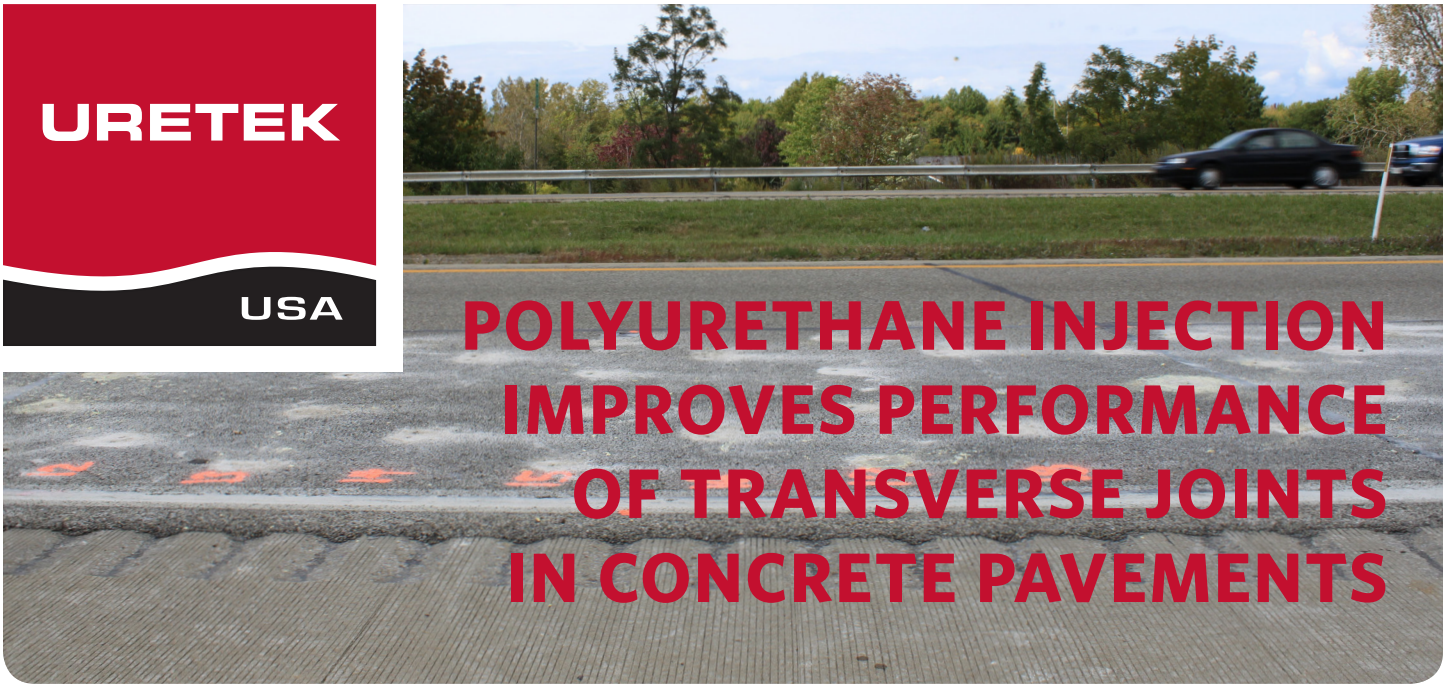

POLYURETHANE INJECTION IMPROVES PERFORMANCE OF TRANSVERSE JOINTS IN CONCRETE PAVEMENTS

PROBLEM

LOCATION: **I-90 Test Site (Erie County Segment 280, Offset 0010-0265)**

CLIENT: **Pennsylvania Department of Transportation (PennDOT)**

SITUATION:

Pursuant to meetings between URETEK USA and PennDOT, a cooperative pilot project was developed and executed in 2012. The purpose of the pilot project was to assess the improvement of transverse joint performance in concrete pavements following injection of high-density polyurethane. Expansive, high-density, two-component, water-resistant polyurethane was injected into the foundation soils of the pavement system using the URETEK Deep Injection (UDI) process.

LEADERSHIP

Leader in cost and time savings, accuracy and precision

Environmentally inert materials and processes

INNOVATION

Inventor of polymer-based technology in use today

Most patents in industry - Period

Ongoing engineering research and development

EXPERTISE

Developed the industry's most accurate, monitoring process

Developed URETEK 486 STAR material

Pioneered the URETEK Deep Injection Process

Most experienced technicians and best safety record in industry

PROVEN SUCCESS

85,000+ successful projects

25+ years experience solving complex soil/pavement problems

Industry-leading warranty and customer care

APPROACH

PennDOT provided URETEK USA the following information regarding the I-90 Test Site:

- Pavement Cross-Section
  - 0.625" Ultra-thin Friction Course
  - 13.0" PCC
  - 4.0" Open-Graded Subbase (OGS)
  - 6.0" A-2 Subbase
  - Subgrade = Composition Unknown
- Problems Cited by PennDOT
  - Poor joint load transfer
  - High incidence of water in base and subbase
  - Intermittent reflective cracking in friction course
- Pre-injection Falling Weight Deflectometer (FWD) data (see the PennDOT-provided table)

URETEK USA stabilized 140 continuous feet of the eastbound (EB) travel lane for a segment of I-90 (identified by PennDOT) using the traditional URETEK Deep Injection (UDI) process. In addition, URETEK USA also stabilized 6 transverse joints within that 140' test area using a specialized application of the UDI process known as Joint Vicinity Injection (JVI).

PennDOT performed post-injection Falling Weight Deflectometer (FWD) testing and analysis to assess void reduction and improvement in load transfer efficiency (LTE). Post-injection testing occurred at least 24 hours after completion. Post-injection results are also presented in the PennDOT-provided table.

Stabilization of Transverse Joints Using The URETEK DEEP INJECTION (UDI) Process

I-90 Test Site (PRE-INJECTION TESTING) Erie County Seg 280 Offset 0010-0265					Average % Improvement LTE 135.95	I-90 Test Site (POST-INJECTION TESTING) Erie County Seg 280 Offset 0010-0265				
Joint N0.	Load	Voids (mm)	LTE (%)	HD Polyurethane Stabilized	% Improvement LTE	Joint N0.	Load	Voids (mm)	LTE (%)	HD Polyurethane Stabilized
1	BJ	13.7	10%	X	200.00	1	BJ	0.3	30%	X
	AJ	9.47	11%	X	45.45		AJ	2.39	16%	X
2	BJ	11.62	24%	X	220.83	2	BJ	0.32	77%	X
	AJ	8.45	35%	X	97.14		AJ	0.68	69%	X
3	BJ	19.55	13%	X	269.23	3	BJ	0.51	48%	X
	AJ	10.3	13%	X	246.15		AJ	0.26	45%	X
4	BJ	10.11	27%	X	22.22	4	BJ	0.2	33%	X
	AJ	5.89	50%	X	-48.00		AJ	1.85	26%	X
5	BJ	15.65	18%	X	150.00	5	BJ	0.86	45%	X
	AJ	14.41	12%	X	208.33		AJ	0.23	37%	X
6	BJ	12.1	25%	X	88.00	6	BJ	-0.31	47%	X
	AJ	9.31	25%	X	132.00		AJ	0.2	58%	X

Calculation of % Improvement in Load Transfer Efficiency (LTE) =

((Post LTE-Pre LTE) / Pre LTE) * 100%

RESULTS

After injecting the test area using the URETEK Deep Injection (UDI) process, post-injection FWD testing and data analysis by PennDOT revealed:

- Significant reduction in the size of voids in the vicinity of the joints
- Dramatic improvement in the LTEs for the transverse joints

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