“Many concrete distresses are a result of poor support conditions.”

Source:

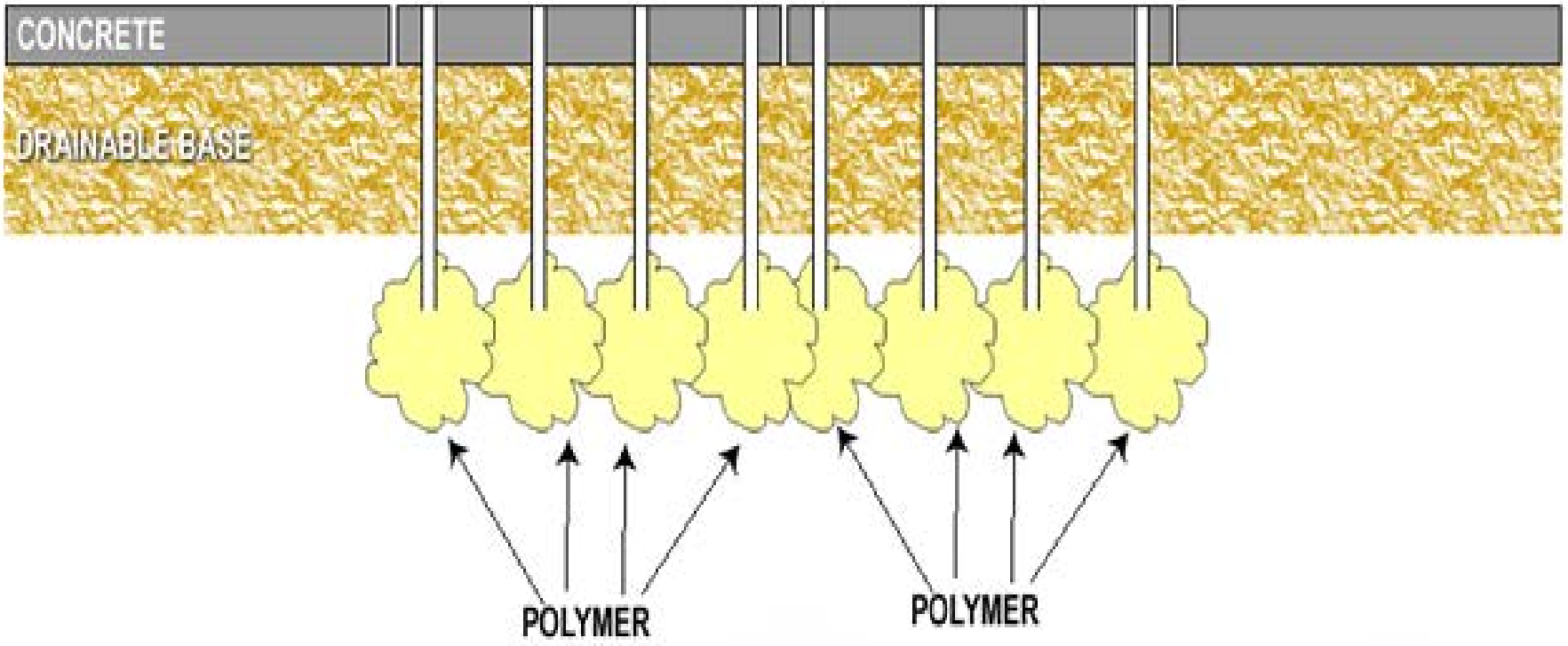
American Concrete Pavement Association, 1998

Technical Information: Concrete Pavement Engineering and Research, Page 1, paragraph 2

"Pavement with a substantial subbase will not likely be problematic…weak underlying support (little to no subbase and soft subgrade that is often saturated) can produce marginal stability"

Source:

Chapter 3, *Program Project 04-01 Processing Pavement Stability, Airfield Asphalt Pavement Technology,* by Mark Buncher, PhD, PE, Asphalt Inst.


CONCRETE
DRAINABLE BASE
POLYMER
POLYMER

Penn State June demonstration


CASE
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CASE
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- Typical Slab in Lane 3 (outside lane)
  - Length of Slab = 16'
  - Width of Slab = 10.5'
  - Slab Thickness = 10"

- Foundation Soils (see Attachments B and D)
  - Single Digit DCP Blow Counts to a depth near 10' (best case)
  - Low plasticity clay – CL

- Injection Information (details in Attachment E)

  - Polymer = URETEK 486 STAR
  - Injection depths of 36" & 72"

- Project Results

Joint	Pre-treatment LTE	Post-treatment LTE	% Improvement
20-2	17.43	89.20	411.76
20-3	81.53	88.16	8.13
21-2	15.73	87.82	458.30
21-3	55.43	86.35	55.78
22-2	50.34	83.69	66.25
22-3	64.71	88.47	36.72
23-2	33.22	92.21	177.57
23-3	30.47	88.18	189.40

CONCLUSIONS

- UDI dramatically improved LTE by stabilizing the foundation soils under the concrete slabs at the Cardinal Drive test site.

- The UDI treatment improved the performance of all 8 joints in the test area to well beyond the 80% acceptance criteria established by the TXDOT Beaumont Pavement Engineer.

- UDI is a cost-effective alternative to reconstruction of the rigid pavements on Cardinal Drive.

- From Mr. Donahue's analysis:
  - **Average increase in subgrade modulus after UDI = 60%**

    Brown's Comment: This finding means UDI produces an increase in soil stiffness which results in the pavement system being better able to support loads
  - **Average decrease in maximum deflection after UDI = 35.1%**

    Brown's Comment: This finding means UDI produces an increase in soil stiffness that reduces deflections which results in longer pavement life

CONCLUSIONS

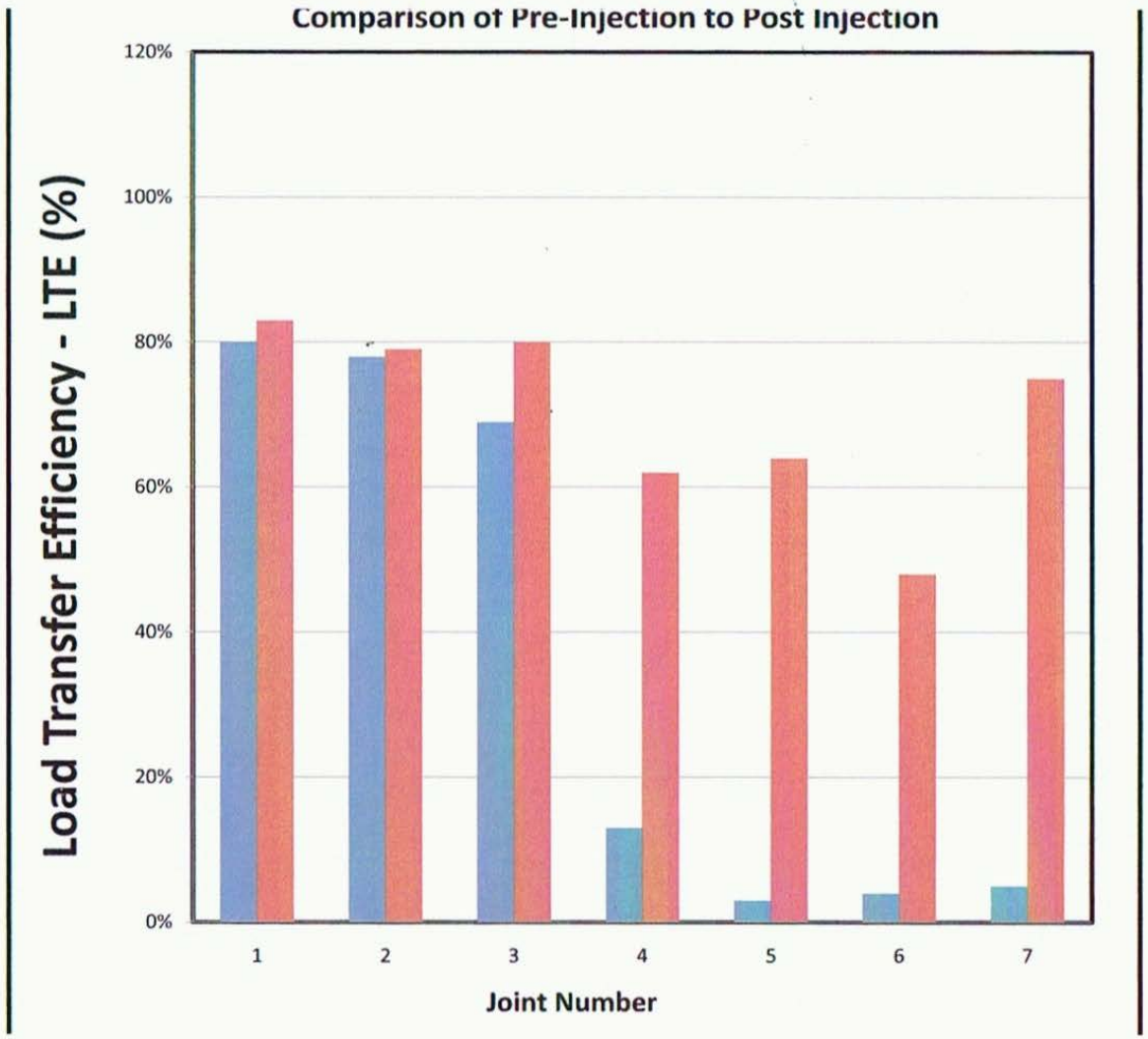
- **Based on feedback from MODOT, UDI was the critical component in stabilizing the roadway in a timely manner so the roadway could be opened to traffic.**
- **Mr. Donahue's extensive FWD analysis provides valuable objective data to support the espoused claims regarding UDI.**

Please advise if I can assist further.

Randall W. Brown

Randall W. Brown, PhD, PE
Vice President for Engineering

- **Appendix A – Project Summary Report (Gatewood)**
- **Appendix B – Project Photos with Commentary**
- **Appendix C – DCP Report (pre-treatment)**
- **Appendix D – FWD Analysis (Donahue)**


Comparison of Pre-Injection to Post Injection
Load Transfer Efficiency - LTE (%)
120%
100%
80%
60%
40%
20%
0%
1
2
3
4
5
6
7
Joint Number

Dr Randall Brown, PE, PhD