

Roller Compacted Concrete in the Fayetteville Shale Play Area

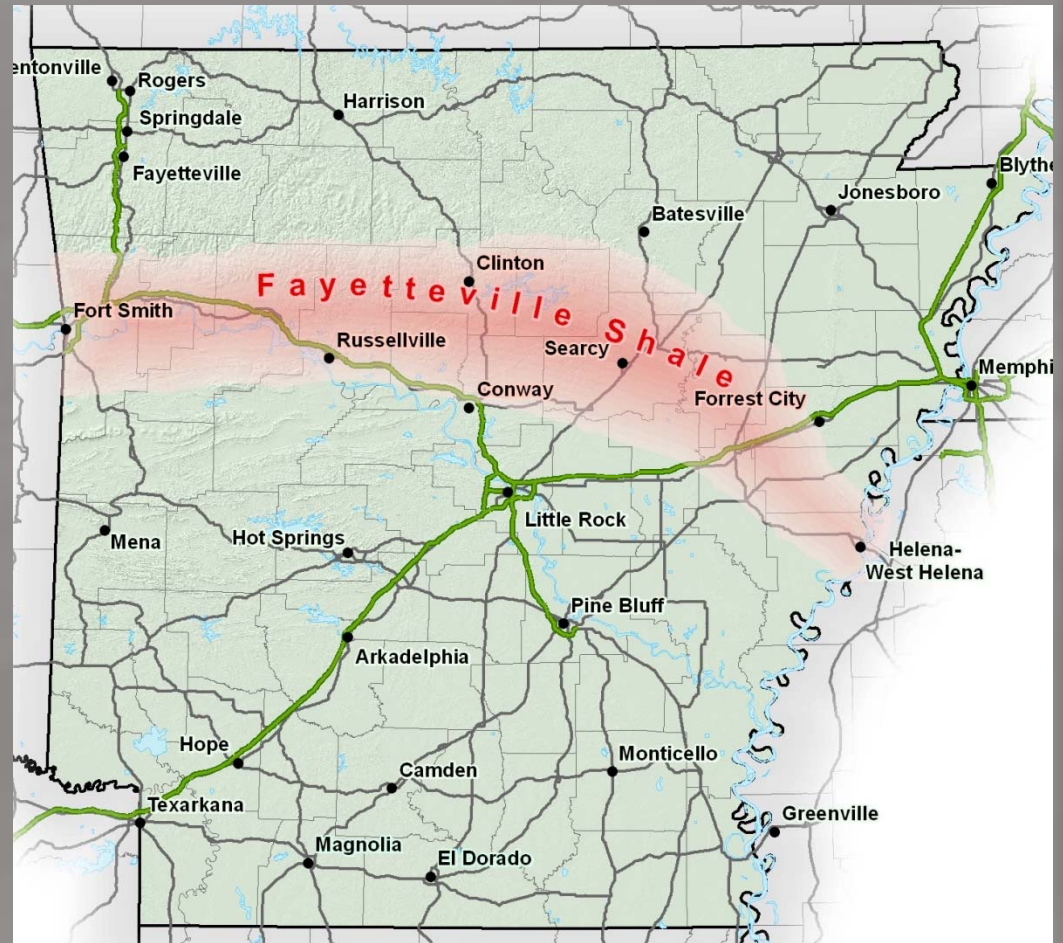
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Problem Statement

- More than 1,000 miles of roadways in Arkansas have been adversely affected by the increased traffic loadings in the Fayetteville Shale Play (FSP) area, leading to a sharp acceleration of pavement distress. The accelerated pavement distress that has become prevalent in the FSP area illustrates the need to examine cost efficient rehabilitation strategies that can provided a long service life.
- Roller-compacted concrete pavement (RCCP) is one such potential alternative. RCCP is a low-paste, zero-slump concrete mixture that is compacted with rollers and requires no forms, reinforcing, dowels, jointing, or finishing. The reduced cement content and ease of construction result in substantial cost savings. RCCP is very strong and well-suited for heavy traffic loadings.



Research Performed

- Section 1
 - 7" RCC with Diamond Ground Surface
 - 6" Cement Treated Reconstructed Base (CTRB)
- Section 2
 - 8" RCC with Diamond Ground Surface
 - Over Existing Pavement (with level-up)



Results

Compressive Strength (psi)

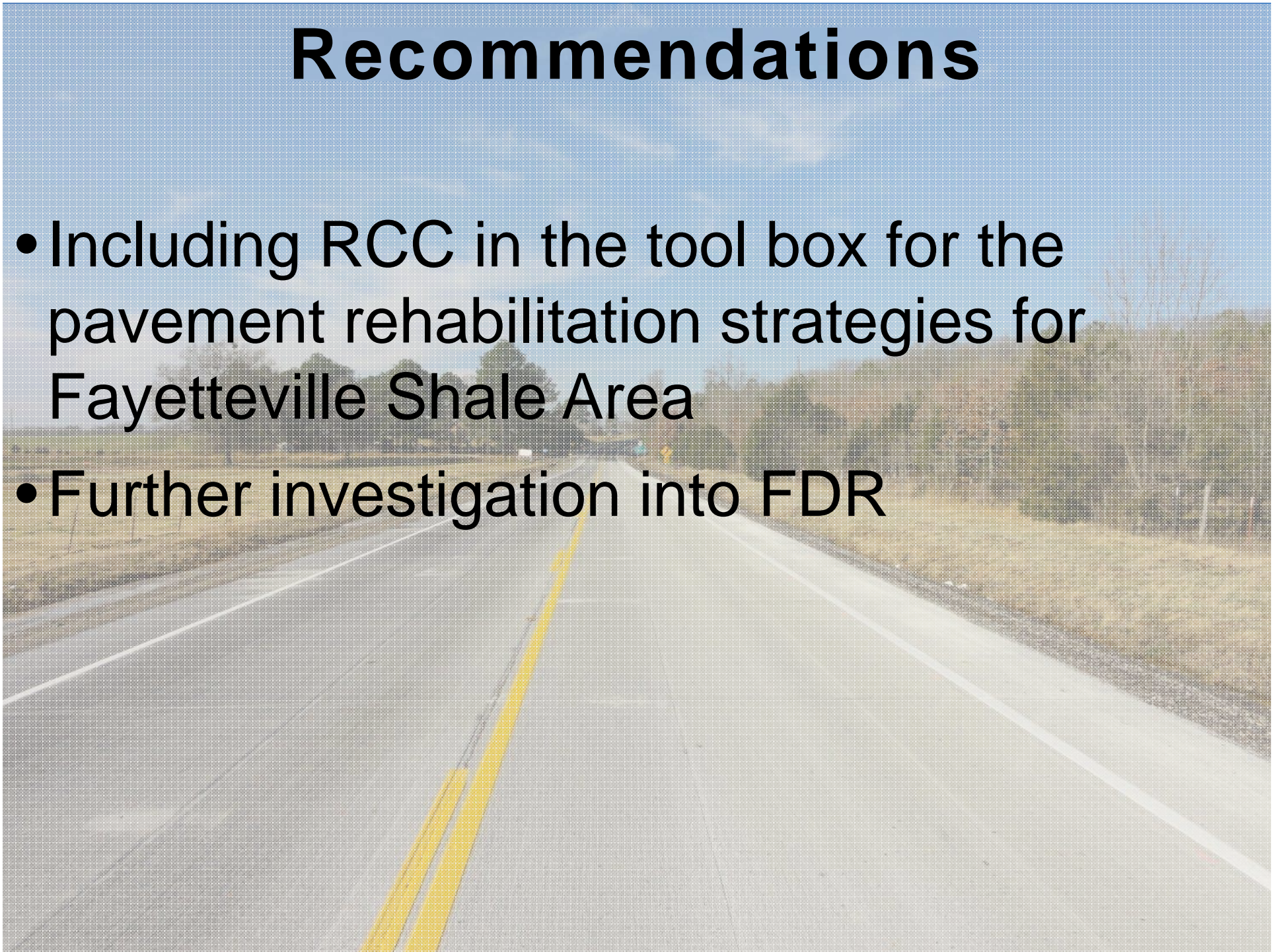
Station	1 day	3 day	7 day	14 day	28 day
194R	2096	4340	4837	5174	5722
114WB	2424	3956	4477	4558	4859
127WB	1729	3790	4081	4893	5028
119EB	4784	5909	6504	6371	6586

IRI

Direction	IRI Prior to Grinding (inch/mile)	IRI Post Grinding (inch/mile)
Section 1		
Eastbound	267.8	71.6
Westbound	276.7	73.5
Section 2		
Eastbound	218.7	77.6
Westbound	246.53	75.4

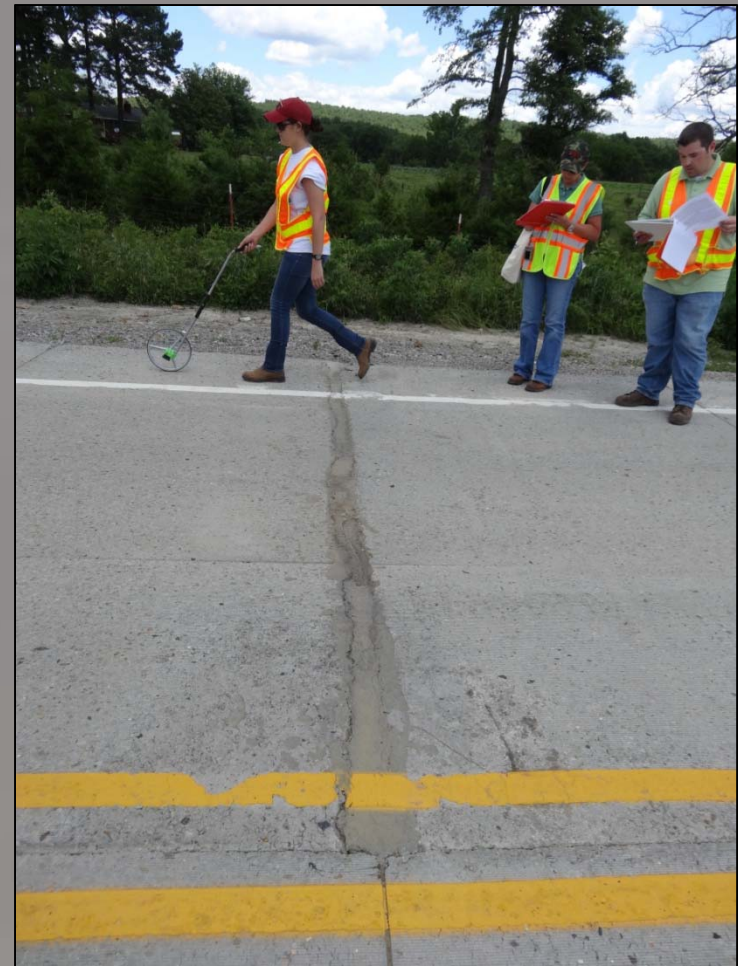
Recommendations

- Including RCC in the tool box for the pavement rehabilitation strategies for Fayetteville Shale Area
- Further investigation into FDR



Implementation Status

- Still in the monitoring and evaluating process



Implementation Strategy

- Refine the existing specification
- Changes will include
 - High density paver
 - Plant set up modification
 - Smoothness specification
 - Prohibiting fly ash in future RCC mix design

Value of Implementing the Research

- The project took less time and money than reconstructing the existing two-lane rural road.
 - Construction of both miles took approximately one month. Reconstruction would have taken most of a construction season.
 - The cost for the project was \$1,983,072.33 for the two miles;
 - On average Arkansas spends \$3,000,000 per mile for reconstructing a two-lane rural roadway.
 - This project saved Arkansas approximately \$2,000,000 per mile when compared to traditional asphalt reconstruction and the
 - RCCP is expected to withstand the increased weight loads from the heavy vehicle traffic.

Value of Implementing the Research

- Highways for Life Grant (FHWA)
 - Innovative Ideas
 - Speed on construction
 - Remained open to traffic
 - Safety Improvements
 - Safety Edge
 - Wider Shoulders
 - Pilot car

