

JOINT DETERIORATION MONITORING FOR SELECTION OF PROPER PRESERVATION TYPE AND TIMING

Research Problem Statement

Premature deterioration at concrete pavement joints reduces concrete pavement life on highway infrastructure as well as city streets and parking lots. This is a topic of the Concrete Pavement Roadmap that has resulted in multiple studies dealing with mechanisms that cause joint deterioration as well as prevention and mitigation methods. One of these studies reported that even small differences in construction-related activities can lead to differences in joint performance (Taylor et al., September 2011).

This problem statement deals with developing approaches that move practice toward joint preservation rather than repair when possible to extend pavement life in a more sustainable manner. The research should address the tasks outlined below:

- Task 1: Collect and review available literature, standard practices regarding premature joint deterioration mechanisms and preservation/maintenance techniques.
- Task 2: Determine optimal preservation types for the different mechanisms of joint deterioration. Special emphasis should also be placed on determining the optimal timing of each preservation technique for various stages of joint deterioration. An example issue that was posed by researchers in the TPF 5(224) study, “Do penetrating sealants applied to the joint provide any benefit, and when should we put what on?” should be addressed in this task as well as other pertinent issues as determined from the literature review.
- Task 3: Develop strategies for monitoring pavement joint deterioration development in terms of type of deterioration and extent. This should be done with the goal of providing the information needed to apply the correct preservation strategy with proper timing as determined in task 2. The monitoring should give information about issues such as a question posed by the TPF 5(224) study with regard to determination of the degree of saturation of concrete, or others such as determining the depth and extent of deterioration in the field. Special emphasis should be placed on developing strategies that are non-destructive in nature, can be productive to minimize traffic closure, and allow for strategies that preserve the pavement prior to the need for full reconstruction.
- Task 4: Develop techniques to assure quality of each preservation strategy when applicable. After the proper preservation strategy and timing is selected a technique should be developed to ensure that the applied preservation was constructed as designed so it can be corrected prior to reopening to traffic.
- Task 5: Based on the results of the work, develop a provisional specification for joint deterioration monitoring, preservation strategies and timing, and QA/QC of the different preservation activities.
- Task 6: Submit a final report that documents the entire research effort. The report shall include an implementation plan to facilitate the use of the results of this research.

Benefits

A paradigm shift from the incessant need for rehabilitation and repair to keep a road in service to an approach that achieves extended pavement life in a more sustainable manner through preservation. This should be accomplished through improved pavement joint deterioration monitoring for more effective preservation types, timing, and activities.

Products

The study will result in a report including specifications for preserving pavement joints with information on monitoring, preservation techniques and timing as well as QC/QA of preservation activities.

References

Taylor, P., Rasmussen, R.O., Torres, H., Fick, G., Harrington, D., Cackler, T., "Investigation of Jointed Plain Concrete Pavement Deterioration at Joints and the Potential Contribution of Deicing Chemicals." Federal Highway Administration, and State Departments of Transportation of Indiana, Iowa, Michigan, Minnesota, New York, South Dakota, and Wisconsin. Transportation Pooled Fund Study TPF 5(224). September 2011.