

**RESEARCH PROBLEM STATEMENT**

<b>DATE:</b> 09/07/2018	<b>PROJECT AREA:</b> Maintenance
<b>TITLE:</b> Thin Epoxy Overlays to Reduce ASR and Freeze-Thaw	
<b>PROBLEM STATEMENT:</b>	
<p>Thin epoxy overlays are being used around the state to improve ride quality on Arkansas portland cement concrete pavements. These overlays may also provide a barrier to moisture ingress that causes expansion in the concrete due to alkali-silica reaction and freeze thaw, but there is no testing to support this theory. This project will evaluate the ability of epoxy overlays to improve the service life of concrete pavements. In addition, this project will include tests of a new system for reducing expansion in concrete pavements, glycerol epoxy overlays. Glycerol is a dessicant, meaning it causes drying. If the thin epoxy overlays already used on Arkansas pavements included glycerol, these overlays could also serve to draw excess moisture out of the pavements, further limiting expansion and even potentially reversing it. Since these overlays are already used on Arkansas highways, it is expected that this additional drying method will be easy to apply using current methods. Lab and field testing will be used to compare untreated, epoxy coated, and glycerol-epoxy coated samples.</p>	
<b>OBJECTIVES:</b>	
<p>A lab testing protocol will be developed to compare the ability of epoxy coatings and epoxy-glycerol coatings to (1) remove moisture from concrete samples, and (2) reduce expansion due to alkali-silica reaction. Next, the two methods will be applied to a concrete pavement in Arkansas that is already being considered for an epoxy overlay. Gauge targets will be countersunk in the pavement to compare expansion in untreated sections to treated sections over time. Any changes in expansion of the concrete will be noted and the final report will provide recommendations on what methods are most effective to reduce pavement expansion.</p>	
<b>FORM OF RESEARCH IMPLEMENTATION AND RETURN ON INVESTMENT:</b>	
<p>The field tests will provide "real world" guidance on whether epoxy overlays are an effective maintenance strategy for pavements subjected to ASR and freeze-thaw deterioration. This will help ARDOT determine whether this is a good procedure for use in the future. If the glycerol-epoxy combination is effective, ARDOT will have another tool to extend the life of its concrete pavements.</p>	
<b>Estimated Project Duration:</b> 24 Months	
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Standing Subcommittee  
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