

RESEARCH PROBLEM STATEMENT

DATE: 09/20/2018	PROJECT AREA: Pavements
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TITLE: Using High Density Polyurethane Foam as a Treatment for Concrete Pavements

PROBLEM STATEMENT:

A part of pavement preservation should include a developed strategy of cost effective treatments to an existing roadway system that preserves the infrastructure. One method ARDOT has tested is High Density Polyurethane (HDP) foam to correct differential settlement and to repair or prevent faulting in concrete pavements with mixed results. Other DOTs have tested HDP foam, which also generated conflicting experiences. Some DOTs reported an increase of IRI, joint faulting, and Load Transfer Efficiency, while others experienced a decrease of these indicators after application. Also, due to the lack of detailed ground investigation, some DOTs used more materials than specified, causing early hairline cracks to appear from excessive foam injection. For planning and design purposes, it is imperative to determine the extent of the instability through initial profiling of the roadway to determine where the pavement needs to be raised, as well as a variety of noninvasive geophysical and non-destructive testing. With the appropriate data, it can be utilized to approximate the total amount of injection material that would be needed to stabilize the area through the injection process.

OBJECTIVES:

1. Identify current pavement sections utilized HDP foam, verify foam application procedures, analyze conditions, and categorize pavement sections into positive and negative results.
2. Identify new pavement sections that would benefit HDP foam applications and complete a detailed ground investigation prior to HDP foam injections.
3. Schedule a progressive monitoring process of treated sections to capture long-term performance

FORM OF RESEARCH IMPLEMENTATION AND RETURN ON INVESTMENT:

1. Development of a standardized protocol for selecting pavement sections suitable for HDP foam treatments.
 2. Draft specifications for subsurface injections of HDR foam.
- ROI can be determined for HDP on the current rate of \$6/pound. In an estimated comparison between slab replacement, the savings could be approximately \$4/SY (i.e. For a 53.3SY project, the Total Cost for HDP = \$6,260 in 0.5 Days; Total Cost Slab Replacement = \$22,670 in 3.0 Days; Savings = \$16,410)

Estimated Project Duration: 24 Months

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