Statement No. 25

Arkansas State Highway and Transportation Department
Transportation Research Committee

RESEARCH PROBLEM STATEMENT

DATE: 09/09/2016 | **PROJECT AREA:** Maintenance

TITLE: Developing a Bridge Anti-icing System Using Renewable Energy

PROBLEM STATEMENT:

Wintry mix creates dangerous road conditions at Arkansas bridges. Arkansas bridges are especially susceptible to ice formation and “black ice”. Although, manually applying deicing solvents is one solution to prevent ice formation, it warrants adequate AHTD personnel and equipment. However, other alternatives may prove to be viable solutions.
Fixed deicing systems have been tried in Minnesota and Virginia using chemical deicing solvents. Other states have incorporated embedded heat cables. The Nebraska Department of Roads (NDOR) investigated the use of conductive concrete for bridge deicing and anti-icing. In the NDOR study, the University of Nebraska, Lincoln developed an anti-icing system using conductive concrete with an embedded electrode grid. The NDOR study used grid electricity to energize the deck. Additional research using conductive concrete was conducted by the University of Arkansas, however substituting grid energy with solar energy. The UA research team found deficiencies with using conductive concrete: cost, uniform temperature distribution, and efficiency. However, during the research project the UA research team investigated the potential of using heat wires epoxied at the pavement surface. Slides are included showing results of preliminary work using embedded heat wires. The potential for heat wire usage incorporating solar energy should be investigated as well as examining other anti-icing systems, such as a hydronic system. A renewable energy system is already available at the UA.

OBJECTIVES:

The investigator should compare and summarize alternative solutions for bridge anti/deicing. The summary should include other state DOT's through a nationwide survey. The investigator will develop an anti-icing system that satisfies AHTD standards. The anti-icing system will be appropriate for existing bridge retrofitting and for implementation at new bridge construction.

FORM OF RESEARCH IMPLEMENTATION:

Results of this study will enable AHTD to improve safety at high-volume bridges in Arkansas that experience ice formation and “black ice”. The research will implement new technology that will incorporate renewable energy as its power source and therefore be grid independent.

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Estimated Project Duration: 24

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Standing Subcommittee Ranking	Advisory Council Ranking	Statement Combined with Statement Number(s)
5/6	29	