

2016 UDOT RESEARCH PROBLEM STATEMENT

*** Problem statement deadline is March 14, 2016. Submit statements to Tom Hales at tahales@utah.gov. ***

Title: Feasibility of Instrumenting and Monitoring Designated Roadway Sections in Utah **No. (office use):** 16.01.11

Submitted By: David Stevens

Organization: UDOT Research

Email: davidstevens@utah.gov

Phone: 801-589-8340

UDOT Champion (suggested): Lonnie Marchant

Select One Subject Area

Materials/Pavements

Maintenance

Traffic Mgmt/Safety

Preconstruction

Planning

Public Transportation

1. Describe the problem to be addressed.

UDOT region and central materials divisions are periodically approached by product suppliers regarding trying out new products or construction methods that could improve pavement construction, maintenance, or rehabilitation. These may or may not meet current UDOT standard specifications or standard drawings. Also, UDOT engineers may also develop their own ideas for improved pavement design, construction, and maintenance and may want to test these out under traffic loads. To learn the most about performance of a pavement test section, ideally there would be instrumentation installed within the pavement structure, sensor data collected regularly, periodic visual evaluation and coring/physical testing performed, and data analysis performed. This level of effort could prove difficult when considering impacts to traffic and general operations of the highway system, while maintaining the pavement test section and collecting samples and data multiple times for the performance evaluation over several years.

2. Explain why this research is important.

UDOT and our industry and agency partners could benefit from UDOT designating a few key roadway sections in Utah where traffic impacts from pavement test section instrumentation and performance evaluation would be minimal, and from UDOT managing a new research program in which multiple test sections could be installed and monitored in an organized manner and on a recurring basis at the designated roadway sections. Taking this idea to the level of a dedicated test track with accelerated loading by trucks (such as at the NCAT facility) or a dedicated bypass road to allow test section work to occur on a monitored freeway mainline (such as at the MnROAD facility) could be possible in Utah at some future date. However, UDOT currently operates several ports-of-entry (POE) around the state, where the paved ramps may be prime candidates for instrumented pavement test sections and performance evaluations. These locations represent various pavement types and conditions, truck traffic loading, and climates. To conduct test sections on the POE ramps, an auxiliary lane would likely need to be present to carry trucks when needed and not significantly impact traffic or general operations. There may be additional roadway sections in Utah with multiple lanes and pavements of interest that could be designated as instrumented roadway sections. This initial research would assess the feasibility of designating, constructing, instrumenting, and monitoring a number of roadway or POE ramp sections as test sections. Along with overall feasibility, the study could also evaluate potential costs and benefits, UDOT and partner roles, funding sources, and timing of the potential new research program with instrumented pavement sites. This would help the affected UDOT region and central divisions to make informed decisions regarding moving forward with a potential new research program of this type and at what scale.

3. List the research objective(s):

1. Assess the feasibility of designating, constructing, instrumenting, and monitoring a number of roadway or POE ramp sections as test sections in Utah, as part of a new and long-term research program for UDOT pavements of interest.
2. Evaluate potential costs and benefits, UDOT and partner roles, funding sources, and timing of the potential new research program with instrumented pavement sites.
3. Draft a roadmap to establishing and monitoring instrumented roadway test sections in Utah.

4. List the major tasks:

1. Perform a literature review and/or survey on similar types of established, instrumented pavement research programs.
2. Explore funding and participation interest from industry partners, product manufacturers and suppliers, UDOT divisions, contractors, consultants, universities, university transportation centers, and other agencies.
3. Identify pavement types, conditions, treatments, and products of interest to UDOT engineers for potential inclusion in the program. This may include asphalt and/or concrete test sections in new, aged/treated, or rehabilitated condition.

4. Identify possible organizational structures for establishing, maintaining, monitoring, and data reporting from the test sections. (This may include oversight by a multi-agency or agency-industry steering team for prioritizing and running the program.)
5. Identify possible processes for selecting projects, test sections, products, contractors, and researchers as well as developing work plans.
6. Identify likely construction/project mechanisms for establishing instrumented test sections, along with the likely specification requirements and flexibilities for this pavement research program.
7. Identify the desired properties and performance measures that should be monitored using instrumentation within the pavement section and testing/observation methods, as well as the instrumentation, coring/sampling, and other methods to be used.
8. Identify likely or preferred POE ramps or other roadway sections for use as instrumented pavement test sections.
9. Identify possible needs and mechanisms for establishing auxiliary lanes at POE ramps.
10. Identify additional POE concerns to address when establishing and managing a pavement research program like this.
11. Identify best available methods for measuring traffic volumes/loading and climate conditions at the preferred sites.
12. Recommend typical layouts of test sections at POE ramps or other roadway sections, including instrumented test sections and control sections with appropriate number of replicates.
13. Identify likely duration and the short and long-term goals of potential test sections. Also, identify likely methods of pavement performance comparison such as observed vs. predicted in pavement design.
14. Explore the need and possibility of also including durability studies of surface treatment/maintenance items and pavement striping at the instrumented test sections.
15. Assess the feasibility of having some of the test sections re-instrumented when they are later rehabilitated or reconstructed, as long as the research/partner funding is still available and the steering team supports the continuation of the program.
16. Outline the potential costs and benefits likely to be associated with establishing and maintaining the test sections.

5. List the expected results:

1. Results of literature searches and surveys.
2. Interim and final reports summarizing feasibility/preference findings and recommendations for action by UDOT.
3. A draft roadmap to establishing and monitoring instrumented roadway test sections in Utah.

6. Describe how this research will be implemented.

This would help the affected UDOT region and central divisions to make informed decisions regarding moving forward with a potential new research program of this type and at what scale. Depending on the results of the feasibility study and subsequent decisions made, some initial test sections could be established at some POE's using additional funding and following the proposed roadmap and process.

**7. Requested from UDOT: \$30,000
(or UTA for Public Transportation)**

Other/Matching Funds: \$

Total Cost: \$30,000

8. Outline the proposed schedule, including start and major event dates.

Approximately six months, August 2016 through January 2017.