

2019 UDOT RESEARCH PROBLEM STATEMENT

*** Problem statement deadline is Feb. 6, 2019. Submit statements to UTRAC@utah.gov. ***

Title: Field Testing of a Precast Panel Pavement Section with Embedded Electrical Charging **No. (Office Use):** 19.02.04

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Select ONE Subject Area Materials/Pavements Maintenance Traffic Mgmt/Safety Structures/Geotech
 Planning Perf Mgmt/Data Analytics Public Transportation Other

1. Describe the problem to be addressed:

Electric vehicles (EVs) have gained unprecedented interest in recent years. However, a major barrier to EV adoption is the driving range limitation of EVs. The technology of dynamic wireless power transfer (DWPT), which provides EVs with the ability to charge while in motion, can effectively alleviate the drawbacks of range limitation. One impediment to adoption of wireless power transfer technology is the question of durability and constructability of the embedded power electronics in full scale precast concrete panel sections subject to actual traffic loads and environmental loads.

2. Write the project objective (25 words or less):

The objective of this project is to field verify precast panel durability and constructability under full scale truck traffic loading as well as actual environmental conditions.

3. Explain why this research is important:

(In response, consider addressing specific UDOT goals, applicability in Utah or other states, etc.)

UDOT's mission is "Innovating transportation solutions that strengthen Utah's economy and enhance quality of life." Transportation electrification is critical to the stated UDOT mission. International Energy Agency (IEA) in its Electric Vehicle Outlook 2018 report predicted that the number of electric light-duty vehicles on the road will reach 125 million by 2030 globally, a 40-time growth from 2017. In addition, EVs produce zero tailpipe emissions, which will reduce emissions from the transportation sector and improve the quality life of the state's residents.

4. List the major tasks:

1. Literature review and study of current state of the practice both nationally and internationally.
2. Work closely with UDOT maintenance division to select an appropriate site for locating this field test.
3. Design prototype panels that are reasonably constructible in a pre-casting yard. Design an appropriate monitoring system to learn about traffic loads, environmental loads and structural behavior.
4. Cast and transport panels to selected site.
5. Install Panels
6. Collect data over a minimum 12 month period. If performing, continue monitoring
7. Provide final report documenting the design, construction issues, performance of these panels, maintenance and replacement challenges and future deployment recommendations.

5. List the expected deliverables (reports, manual, specification, design method, training, etc.):

1. Provide an interim report detailing design, construction and installation of panels
2. Provide a final report detailing the long term behavior and performance of the installed panels.

