

# 2016 UDOT RESEARCH PROBLEM STATEMENT

\*\*\* Problem statement deadline is March 14, 2016. Submit statements to Tom Hales at [tahales@utah.gov](mailto:tahales@utah.gov). \*\*\*

**Title:** Review and Specification for Shrinkage Cracks of Bridge Decks Phase II

**No. (office use):** 16.01.08

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**UDOT Champion (suggested):** Bryan Lee, Scott Strader, or Tom Hales

**Select One Subject Area**

Materials/Pavements

Maintenance

Traffic Mgmt/Safety

Preconstruction

Planning

Public Transportation

## 1. Describe the problem to be addressed.

Concrete mixtures designed or constructed incorrectly as bridge decks can lead to shrinkage cracking. There have been lots of cracking found on bridge decks in Utah. The new shrinkage cracking apparatus built at UDOT can be used to verify in advance if the mixture design can lead to a potential shrinkage cracking problem.

## 2. Explain why this research is important.

The Phase I of this project resulted in building the apparatus to test restrained shrinkage of mixture designs. A Phase II is needed now to understand how specific mixture changes can affect restrained shrinkage crack potential.

## 3. List the research objective(s):

1. Determine mixture proportions and admixture effects on the age of cracking based on the UDOT modified restrained ring shrinkage test.

## 4. List the major tasks:

1. If needed, the test apparatus from Phase I may be further refined or modified (such as applying humidity controls).
2. Recreate and test restrained shrinkage of bridge deck mix designs identified from Phase I.
3. Test changes to mixture proportions (potentially including adding water in the field) and different material effects (potentially including lightweight aggregates, or dosage of water-reducers) on restrained shrinkage.

## 5. List the expected results:

1. Determine if any existing approved Utah bridge deck mixtures can cause restrained shrinkage issues
2. Determine if changes to mixtures can cause shrinkage issues.

## 6. Describe how this research will be implemented.

From Phase I, the apparatus to test the restrained shrinkage has been built at UDOT's central materials lab. This research will use this equipment. The results of this will be used to aid UDOT in determining the quality of bridge deck mixtures (both past and future mixtures).

**7. Requested from UDOT:** \$60,000  
(or UTA for Public Transportation)

**Other/Matching Funds:** \$TBD

**Total Cost:** \$

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

Each mixture takes 2-3 months to test on the ring shrinkage apparatus. In the meantime, mixture workability and free shrinkage properties can be tested at the University of Utah campus. It is anticipated that it will take 2 years to complete the testing of all the mixtures anticipated for this Phase II.