**Problem Title**:

Capturing Joint Seal Damage and/or Loss in Jointed Concrete Pavement using Automated Pavement Data Collection.

**Background:**

Joint Seal Damage and/or Loss in Jointed Concrete Pavement is a critical distress in the determination of pavement deterioration of concrete pavements. It is a leading indicator of future pavement deterioration and by extension, the maintenance and preservation treatments needed to address the issue. The early identification and maintenance of the pavement joint seal has a direct relationship to the life expectancy of jointed concrete pavement. However, automated pavement data collection technologies struggle to properly identify Joint Seal Damage and/or Loss. Common issues with identifying the distress include:

* Identifying the difference between a joint and a crack or other break in the pavement slab such as a patch edge.
* Determining the difference between an intact joint and a damaged joint due to shadows and lighting effects.
* Determining the difference between a lost joint seal and a damaged joint seal.
* Determining the difference between deleterious materials filling a failed joint versus an intact joint seal.
* Identifying if the joint seal is in proper placement (i.e. constructed properly in the first place)

In order for pavement management systems to make effective maintenance, preservation, and rehabilitation recommendations on jointed concrete pavements, identifying Joint Seal Damage and/or Loss is extremely important. Agencies that have adopted automated pavement data collection technologies must know the limitations that exist in identifying this distress.

**Research Objectives:**

1. Determine the state of the practice among agencies to determine which states track this distress specifically.
2. Determine from the agencies that do track this distress, what is the practice of identifying this distress, either by manual or automated methods.
3. Determine the technical capabilities, both equipment and processing algorithms, of data collection vendors to identify Joint Seal Damage and/or Loss.
4. Develop processes and/or tools that an agency can adopt to ensure the accurate collection of Joint Seal Damage and/or Loss.
5. Make recommendations for alternatives that could be used in lieu of Joint Seal Damage and/or Loss to trigger maintenance and preservation treatments for jointed concrete pavements from a pavement management system related to the pavement joint.

**Potential Benefits:**

The following are the potential benefits of this study:

1. Agencies can begin to target maintenance, preservation, and rehabilitation treatment recommendations from their pavement management systems.
2. Early identification of this distress is critical to the longevity of jointed concrete pavements.
3. Data collection vendors can begin to adopt automated methods of collecting this distress instead of relying on manual identification; this will result in faster return of data to the agency.

**Relationship to Existing Body of Knowledge:**

A number of State DOTs collect Joint Seal Damage and/or Loss according to various data collection manuals found online. FHWA has developed the Concrete Pavement Preservation Guidei that defines this distress and preservation techniques to mitigate its effects. FHWA has also provided the Distress Identification Manual for The LTPP that provides a definition of this distressii. However, the author was unable to find specific research on automated data collection of Joint Seal Damage and/or Loss. This research study will focus on ways to improve the automated pavement data collection capabilities to properly identify this distress.

**Tasks:**

The research will include the following tasks:

1. Conduct a literature review of state of the practice in State DOTs collecting Joint Seal Damage and/or Loss.
2. Conduct a literature review of the technical capabilities, both equipment and processing algorithms, of data collection vendors to identify Joint Seal Damage and/or Loss.
3. Develop processes and/or tools that an agency can adopt to ensure the accurate collection of Joint Seal Damage and/or Loss.
4. Make recommendations for alternatives that could be used in lieu of Joint Seal Damage and/or Loss to trigger maintenance and preservation treatments for jointed concrete pavements from a pavement management system related to the pavement joint.
5. Identify Future Research Needs.

**Sponsoring Committee:** AFD20, Pavement Monitoring and Evaluation

**Co-Sponsoring Committees:** AFD10, Pavement Management Systems

**Funding:** $100,000-$150,000

**Research Period:** 12 Months

i Smith, K., et. al., FHWA Publication No. FHWA-HIF-14-014, “Concrete Pavement Preservation Guide, 2nd Edition”, September 2014.

ii Miller, John S., Bellinger, William Y., FHWA-RD-03-031, “Distress Identification Manual for the Long-Term Pavement Performance Program (Fourth Revised Edition)”, June 2003.