Alkali-Silica Reactivity in the State of Montana
Phase I

Kickoff Meeting
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Background Information

- Concrete is susceptible to expansive reactions between alkalis in portland cement and silica in aggregates known as Alkali-Silica Reaction (ASR)
- Little research has been conducted on ASR in Montana but aggregates have been shown to be reactive
- Lack off documentation possibly due to Montana's relatively dry climate, and the use of supplementary cementitious material and chemical admixtures

Overall Objectives

- Evaluate the potential for deleterious ASR in the state of Montana
- Develop a testing protocol for identifying potential reactive aggregates
- Identify and document historical/existing ASR damage in the state
- Investigate the potential underlying geological features that may contribute to the presence of reactive aggregates
- Explore the efficacy of potential mitigation techniques employed to limit the effect of ASR

Objective – Phase I

- Develop an ASR testing protocol suitable for Montana aggregates
- Confirm and document cases of ASR damage in Montana

Research Methodology

- Task 1- Literature Review
- Task 2- Determination of ASR Testing Protocol
- Task 3- Identify and Document Cases of ASR Damage in the state
- Task 4- Analysis of Results and Reporting

Task 1: Literature Review

- Evaluate state-of-the-practice and recent advances in ASR detection and mitigation
- Investigation into existing specifications in regards to testing and mitigation by:
  - Federal Highway Administration (FHWA)
  - Federal Aviation Administration (FAA)
  - Neighboring state departments of transportation

Task 2: Determination of ASR Testing Protocol

- Learn from literature review… quick and reliable
  - Miniature Concrete Prism Test (AASHTO TP 110)
  - Rapid Chemical Method

Task 3: Identify and Document Cases of ASR Damage

- Survey the Montana Concrete industry:
  - Aggregate suppliers
  - Batch plant operators
  - Contractors
  - Concrete testing laboratories
  - Public agencies

Task 3: Identify and Document Cases of ASR Damage

- Identify concrete potentially damaged by ASR on:
  - Concrete roadways
  - Bridges
  - Buildings
  - Dams
- Investigate potential cases
  - Travel to sites
  - Extract samples for further testing

Task 3: Identify and Document Cases of ASR Damage

- Testing on sample
  - Los Alamos Staining method
  - Positively identified samples will have following tests completed
    - Comprehensive petrographic analysis per ASTM C856
    - Scanning electron microscopy with energy-dispersive x-ray spectrometry per ASTM C1723
    - Damage Rating Index analysis

Task 5: Analysis of Results and Reporting

- 7 Quarterly Progress Reports
- 2 Task Reports (Task 1 and Task 2)
- Annual/interim meeting
- Final Report
- Final Presentation
- Project Summary Report
- Implementation report & meeting
- Performance Measure
- Project Poster

Schedule

Task/Milestone	Quarter (after start of work)							
	1	2	3	4	5	6	7	8
Task 0: Project Management	X	X	X	X	X	X	X	X
Task 1: Literature Review	X	X					X	X
Task 2: Testing Protocol Development		X	X	X				
Task 3: Identify and Document Cases of ASR		X	X	X	X	X	X	
Task 4: Analysis and Reporting						X	X	X

Questions/Concerns