

Alkali Silica Reaction Mitigation and Prevention Measures for Arkansas Local Aggregates

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Abstract : The objective of this research is to mitigate and prevent the alkali silica reactivity (ASR) in highway construction projects. ASR is a deleterious reaction initiated when the silica content of the aggregate reacts with alkali hydroxides in cement in the presence of relatively high moisture content. The ASR results in the formation of an expansive white colored gel-like material which forms the destructive tensile stresses inside hardened concrete. In this research, different types of local aggregates available in the State of Arkansas were mixed and mortar bars were poured according to the ASTM specifications. Mortar bars expansion was measured versus time and aggregates with potential ASR problems were detected. Different types of supplementary cementitious materials (SCMs) were used in remixing mortar bars with highly reactive aggregates. Length changes for remixed bars proved that different types of SCMs can be successfully used in reducing the expansive effect of ASR. SCMs percentage by weight is highly dependent on the SCM type. The result of this study will help avoiding future losses due to ASR cracking in construction project and reduce the maintenance, repair, and replacement budgets required for highways network.

Keywords : alkali silica reaction, aggregates, mixture, cracks, Mortar Bar Test, supplementary cementitious materials

Conference Title : ICSRD 2020 : International Conference on Scientific Research and Development

Conference Location : Chicago, United States

Conference Dates : December 12-13, 2020