PURPOSE

Most concrete serves its intended function satisfactorily for its design life. Occasionally, however, certain combinations of materials, workmanship and/or environmental conditions arise that hasten concrete deterioration. This seems to be especially true in the varied and often harsh environment of bridges and pavements. Because the final aspect of deterioration is physical, chemical causes, if they occur, are frequently overlooked.

Even if chemical reactions are recognized as contributing factors to the deterioration, their exact nature is usually not completely understood. The alkali-aggregate reaction is one that fits this category and it has been well established that this reaction is potentially detrimental to concrete.

Concrete affected by alkali-aggregate reactivity often has a characteristic appearance such as map-cracking, popouts, gel exudation, and damp spots. Not all of these features are observed on any one particular structure or pavement, but certain similarities do exist wherever the affected concrete is located.

The alkali-silica reactions were the first of the alkali-aggregate reactions to be recognized and they appear to be the most frequent cause of serious problems. While the other types of alkali-aggregate reactions were not ignored, only the alkali-silica reactions were considered in this study.