PROJECT TITLE: SEISMIC EVALUATION AND RETROFIT OF DETERIORATED CONCRETE BRIDGE COMPONENTS

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Corrosion of steel bars in reinforced concrete structures is a major durability problem for bridges constructed in the New York State (NYS). The heavy use of deicing salt compounds this problem. Corrosion of steel bars results in loss of steel cross section, deterioration of bond between concrete and reinforcing bars, and more important, in most cases, it results in unsymmetrical concrete section that is susceptible to shear stresses produced by torsion.

Though earthquake frequency of occurrence and the expected ground accelerations in NYS is less than in western states, the potential for earthquake damage in or around NYS is still very real. Given the level of deterioration in many reinforced concrete bridges in NYS, they are considered very vulnerable to major damage during a moderate seismic event.

There is an urgent need for proper guide for evaluation of deteriorated reinforced concrete bridge components that could assist structural engineers estimate the reserved strength of deteriorated bridges, and design cost-effective methods for retrofit.

Proper evaluation and retrofit of existing deteriorated reinforced concrete bridges will limit the collapse of bridge during moderate seismic events in NYS and the surrounding states, and consequently save people's lives.

The findings of this investigation suggest the need for seismic retrofit of deteriorated reinforced concrete bridge columns, particularly, those with corroded lap splice in the longitudinal reinforcement. The study also suggests the need for retrofit of corroded pedestal over piers and abutments, as they may cause sudden unseating of girders.
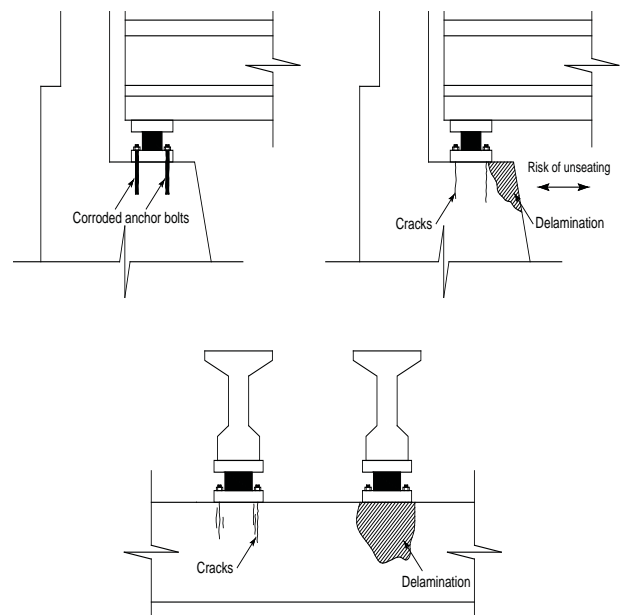

Fig. Spalling and delamination of concrete due to corrosion in anchor bolts