CORROSION BEHAVIOR OF STEEL BARS IN REINFORCED CONCRETE SLABS REPAIRED BY PARTIAL PATCHING

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This study aimed to clarify the long-term behavior of macro-cell corrosion of steel bars in reinforced concrete slabs repaired by partial patching. The macro-cell corrosion current in patched test slabs was periodically measured for about two years as shown in **Picture 1**. To enable the measurements, segmented steel bars as shown in **Figure 1** were embedded in patched test slabs. Three points of interest are discussed on the basis of the test results: 1) the mechanism of macro-cell corrosion of steel bars in patched concrete, 2) the effect of steel bar joints on macro-cell corrosion behavior, and 3) the probability of steel bar corrosion in a patched section. Analysis of the test results as shown in **Figure 2** leads to the following conclusions: 1) the steel bar in the chloride-contaminated concrete near the joint acted as a macro-cell cathode in the early stage of exposure, however the electrochemical incompatibility in the RC member made the steel bar anodic, 2) corrosion currents at joints in the chloride-contaminated concrete were remarkably high at an early stage of exposure because, it is thought, of a two-dimensional electrical current flow, 3) steel bars in a patched section may suffer from macro-cell corrosion formation.

Picture 1 Overview of macro-cell corrosion measurement

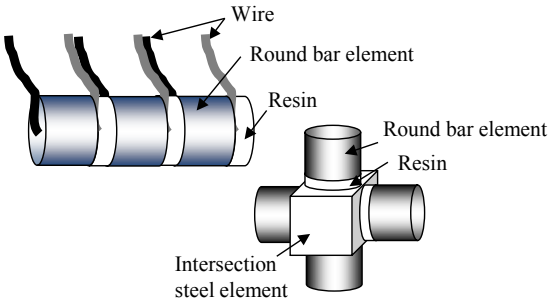
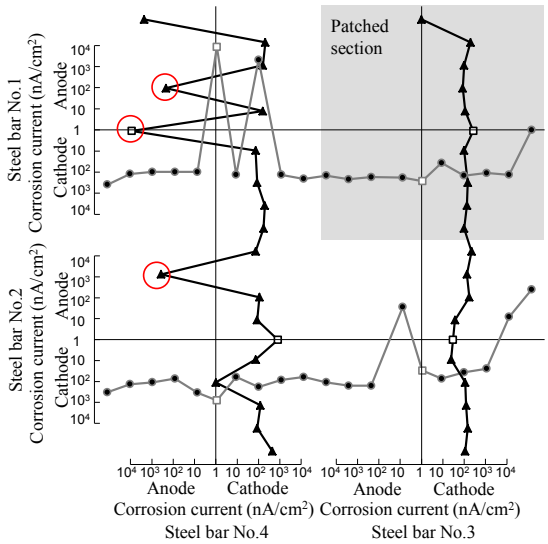
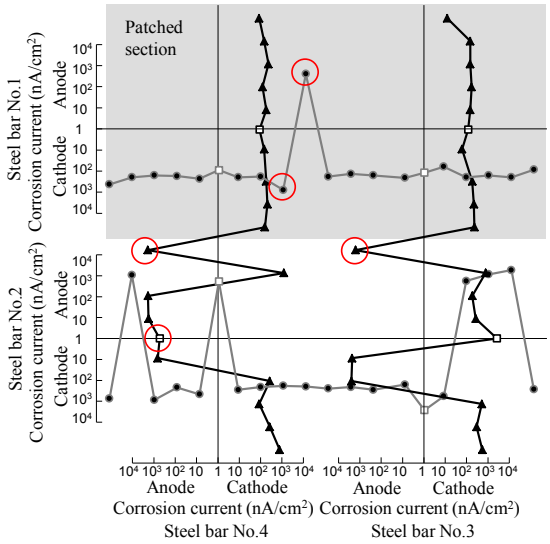


Figure 1 Segmented steel bars



a) Partial patching of 1/4 volume (62 days exposure)



b) Partial patching of 1/2 volume (517 days exposure)

Figure 2 Macro-cell corrosion current distributions