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Corrosion of Alternative Reinforcing Bars

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Abstract: Premature deterioration of concrete buildings and infrastructure due to corrosion of reinforcement is a severe challenge, both technically and economically. It has been estimated that Western Europe spends 5 billion Euros yearly for repair of corroding concrete infrastructures. Repair-work on the public transportation infrastructure are causing significant inconveniences and delays for both the industry and the general public, and are now recognized as a substantial cost for the society. Set of experiments were conducted in order to produce a description among bars of different types to assist engineers to better comprehend the relative corrosion resistance of those bars. The bars were degreased with solvent, rinsed with de-ionized water and air-dried. After that they were exposed to 5 % NaCl salt spray at 35^{o}C for up to 3 weeks. The exposure condition followed the ASTM B117 test protocol. During the test the following steps were conducted: Collection rate of salt spray flow was 3 ml/hr; pH adjustment or monitoring was not performed; Visual inspection of the samples was performed after 10, 60, 120, 180, 360 hours and 3 weeks of exposure; During the last three visual inspections, one bar per test condition was removed from the chamber and cleaned following ASTM G1-03 *Standard Practice for Preparing, Cleaning, and Evaluating Corrosion Test Specimens* methods; The bars were then weighed to obtain weight loss data which was used to calculate average corrosion rates. Stainless steel 316LN and 2205 bars were largely free of corrosion except some minor corrosion product near to cut ends. The coating applied to the cut ends may have generated crevices which are at least partially responsible for the observed corrosion. These two types of stainless bars exhibited phenomenal low corrosion rates, approximately 0.2 % of conventional steel.

Key Words: *corrosion, reinforcing, bars, rate, materials, experimental, quantity.*

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