

Abstract

Experimental Test on Flexural Performance of Prestressed Concrete Beams Damaged by Corrosion [†]

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Abstract: Prestressed reinforced concrete beams are widely used in industrial and commercial buildings, which are commonly exposed to aggressive environments and damaged by corrosion. This precast construction technique has also been used for the last 50 years in most viaducts and bridges built in many countries like Italy. According to previous literature results, the corrosion of prestressed concrete structures causes the size reduction of strands, degradation of mechanical properties of steel, cracking of the surrounding concrete and bond decay at the steel-to-concrete interface. The mixing of these effects strongly reduces the bearing-capacity of prestressed reinforced concrete members, changing the failure mechanism as well. In the framework of the OPTION research project between Niccolò Cusano University and Oslo Metropolitan University, an experimental campaign investigates the behavior of corroded prestressed beams. Four prestressed beams (cross section size 200 × 300; total length 3000 mm; clear span 2700 mm) were first subjected to artificial corrosion, to obtain different damage levels, and were then tested in four-point bending. The goal is to estimate the corrosion level that makes a deteriorated prestressed reinforced concrete beam less ductile while keeping the strength unchanged. In the present study, the first experimental results and some details about the laboratory procedure are presented.

Keywords: strand corrosion; P/C beams; experimental tests; accelerated corrosion



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