

**P 21. PURE TORSIONAL MOMENT CAPACITIES OF FULL-SCALE REINFORCED
CONCRETE BEAMS SUBJECTED TO CORROSION**

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ABSTRACT: The negative results resulting from the corrosion of reinforced concrete reinforcement are important for the investigation of corrosion in the reinforced concrete reinforcement. Corrosion affects the performance levels of reinforced concrete structures in addition to shortening the service life of the economic sense, and in the following stages of the destruction of structures can lead to destruction. With the resulting corrosion; the reduction of the reinforcement cross-sectional area leads to negative results such as the volume increase caused by the corrosion product and the decrease in the bond strength between the concrete and the reinforcement. With these results, the bearing capacity, bending and torsional strength of reinforced concrete elements are reduced, and the targeted building performance is avoided. Studies on estimating the bending behavior of rusted reinforced concrete elements are sufficiently available in the current literature; The behavior of rusted reinforced concrete elements under the effect of simple torsion has not been studied yet. This behavior, combined with the primary crack widths formed by corrosion, adversely affects the torsional stiffness according to the cracked section. For this purpose, 6 reinforced concrete beams of C25 concrete class were rusted at different rates by using accelerated corrosion method. In order to obtain the real corrosion rates, the reinforced concrete reinforcements were removed by mechanical and chemical cleaning before the beams were removed after the loading tests. In order to find the actual mass losses of all windings and longitudinal reinforcements, the masses of the reinforcements in the precision balance were recorded and compared with the first masses and the actual corrosion rates were also obtained. At the end of the experiment, the effects of the actual corrosion rates on the torsional moment capacity of the reinforced concrete beams, moment-curvature relations, crack width and distribution were investigated. Corroded reinforced concrete beams torsion behavior by examining; It is thought that torsional strength can be a model for estimating the torsional moments of corroded reinforced concrete beams with the help of empirical model which is developed depending on the corrosion rate and thus to evaluate existing structures.

Keywords: corrosion; steel bars; pure torsion; beams; reinforced concrete.