

Torsional Resistance of Strengthened Concrete Elements with Nonconventional Reinforcement Technique

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Abstract. Concrete is widely recognized as a primary structural material worldwide and is extensively employed across diverse construction sectors. It ranks as the second most consumed material by humans, following water. While past research has predominantly focused on assessing the static and dynamic performance of concrete, there has been a noticeable lack of discussion regarding its torsional resistance, primarily due to challenges associated with testing methodologies. This study investigates the torsional resistance of concrete elements confined with various durable geogrid types using four distinct concrete mixtures. Experimental evaluations were conducted to assess the compressive strength, indirect tensile strength, and torsional resistance of each group. Findings reveal that all concrete mixtures achieved the targeted compressive strength of 30 MPa. Furthermore, the incorporation of different geogrid reinforcements notably enhanced the tensile strength and torsional resistance of the concrete elements by up to 87% and 43.75%, respectively. Notably, among the tested specimens, those reinforced with tri-axial geogrid demonstrated superior tensile and torsional resistance properties.

Keywords: Angle of twist; Concrete; Geogrid; Tensile; Torsion; Torque.

