Estimations the Combined Flexural-Torsional Strength for Prestressed Concrete Beams Using Artificial Neural Networks

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When considering modern concrete structures, the significant role of torsional behavior is recognized in engineers' design considerations. In this paper, the practical efficiency of dissimilar Artificial Neural Networks ANNs in predicting the combined torsional strength of prestressed concrete beams is evaluated. The experimental data database on 345 rectangular pre-tensioned prestressed concrete (PC) and reinforced concrete (RC) beams often published in research literature had been used to establish an ANN model. The input parameters affecting torsional strength selected were moment, shear, distance, height, prestressed reinforcing steel strength, eccentricity, transverse steel ratio, longitudinal steel ratio, rupture strength, yielding conventional steel tension, and compressive strength of concrete. Each specification parameter was grouped into a neural network and the combined torsional strength of the prestressed concrete beam. The ANN models are designed and validated for any production and assessed across several layers of negative feedback. This study indicates that artificial neural networks have been reasonable correlated predictions of the ultimate torsional strength of prestressed concrete beams, about 92%. The analysis concluded that an ANN model measured the combined torsional strength by considering the importance factor.