USING ARTIFICIAL INTELLIGENCE TECHNIQUES FOR THE ACCURATE ESTIMATION OF THE ULTIMATE PURE BENDING OF STEEL CIRCULAR TUBES

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In this paper, the potential of building more accurate and robust models for the prediction of the ultimate pure bending of steel circular tubes using artificial intelligence techniques is investigated. Therefore, a large database composed of 104 tests for fabricated and cold-formed steel circular tubes are collected from the open-source literature and used to train and validate the proposed data-driven approaches. The data set has four input parameters, namely the tube thickness, tube diameter, yield strength of steel and steel elasticity modulus, while the ultimate pure bending is chosen as the target output variable. The obtained results are compared to the real test values through various statistical indicators such as the root mean square error, confidence index and determination coefficient. Besides, global criteria as the performance index and Taylor diagram are utilized to estimate the overall performance of the artificial intelligence models. The results indicate that using the artificial intelligence techniques can provide an accurate solution for modelling the complex behaviour of the ultimate pure bending for steel circular tubes.