**A machine learning model to predict the lateral-torsional buckling critical moment of I-shaped steel beams according to draft Vietnamese standard TCVN 5575:202X**

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**Abstract.** The draft Vietnamese steel structure design standard TCVN 5575:202X is nearly issued with many changes compared to the current version. Some recent research results have been updated in this version, for example, section classification, plastic stress distribution, etc. Even so, determining the critical moment for lateral-torsional buckling according to TCVN 5575:202X is still quite complicated with many calculation steps. This paper proposes a new approach to predict the critical moment of steel beams using machine learning. Firstly, a large amount of data is generated in which the inputs are the span, the effective length as well as the section dimensions, while the output is the corresponding critical moment values that are determined using the procedure described in TCVN 5575:202X. The dataset is then split into two parts, one for training model and the other for testing model. Several machine learning regression algorithms, including Support Vector Machine, Decision Tree, Random Forest, Artificial Neural Network, and Adaptive Boosting, are employed to build the prediction model. The performances of these models are compared through three metrics: MAE, RMSE, and the coefficient of determination R-squared. The otained result confirms the applicability of machine learning for predicting the buckling strength of steel beams.

**Keywords:** Steel Structure, Lateral-Torsional Buckling, Critical Moment, Steel Beam, TCVN 5575:202X, Machine Learning.