Evaluation of Tin Slag Polymer Concrete Column Compressive Behavior Using Finite Element Analysis

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Abstract In this study, numerical analysis software is used to model the behavior of Tin Slag Polymer Concrete (TSPC) Column under compression. Concrete damage plasticity (CDP) model approach is employed to describe the TSPC property in the finite element (FE) model. FE model is developed based on experimental work data conducted by previous researcher. FE modelling of the TSPC column is performed with purpose to present baseline data for future improvement of the modelling as well as to facilitate future parametric study. The reason is that TSPC is a new material and there was no available previous FE model reported in previous literature as references. The FE model was validated by comparing the simulation results and experimental data for TSPC column under compression. The results indicate that FE model has achieved compressive strength of 37.65 MPa compared with experimental data of 37.62 MPa indicating 0.08% deviation and almost similar location of failure mode. Stress–strain curve indicating that FE model is stiffer than experimental specimen. In conclusion, the stress–strain curve and failure modes for the FE model must be further improved by adjusting CDP parameter in FE model to be able to describe TSPC column specimen accurately. However, the parameters applied can be used as references for future modification on modelling of the TSPC column under compression.

Keywords TSPC column · Compressive behavior · FE · Concrete damage plasticity · Stress–strain curve

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