

3D Numerical modelling on the thermal performance of reinforced concrete encased wide-flanged steel column

ABSTRACT

This paper presents the development and verification of a three-dimensional (3D) numerical modelling to predict the thermal performance of reinforced concrete encased wideflanged steel (RCEWFS) column. The numerical model was developed using finite element software, ABAQUS. Then, the verified model was used to determine the suitable value for heat transfer conductance, time step and mesh size that provide the most reliable prediction against the experimental results. The parametric studies were also conducted to study the effect of rising time of fire exposure, section size, and flange width of I-section on the thermal performance of the RCEWFS column. From this study, it can be concluded that the predictions by the 3D numerical model are reliable and accurate. The study on the contour of the model shows that the thermal behaviour of concrete is non-linear.