

NUMERICAL STUDY ON COMPARTMENTAL EQUIVALENCE OF FIRE RESISTANCE RATING BASED ON AREAS BENEATHS METHOD

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ABSTRACT

Structural steel is most widely adopted construction material due to its eco-friendly nature, stiffness and ductility when subjected to external imposed loading. Nowadays, fire resistance of structural steel has been a serious concern among designers since the steel have to fulfill the deflection criteria requirement of EN 1363-1. However, the code provision provides fire resistance rating for a standard curve which might be different for different compartment which we term as natural curve. So, this study is performed to propose the computation method for development of natural fire curve which is actual fire resistance rating of structural steel from standard fire furnace rating based on ISO 834 standard to compartmental fire resistance rating based on natural iBMB curve. The steel section adopted in the study is from the O-NES tower office compartment. Further, numerical simulation will be performed to validate the documental experimental result. The modelling parameters of calibrated numerical model will then be used to simulated steel section of O-NES tower office compartment to obtain fire resistant rating. Also, study will be performed to predict equivalence of fire severity based on areas beneath the standard and compartmental temperature-time curves for office (iBMB). From the study it was observed that the studied section can fulfill the rating requirement. However, office compartmental (iBMB) equivalence of fire resistance rating based on areas beneath for SB45 was more than 3 hours. Although the studied structural steel section satisfies the Ministerial Regulation criteria for compartmental fire but could not satisfy the requirement of standard fire furnace test criteria based on ISO 834.

Keywords: Fire resistance rating, ISO 834 standard, Compartmental fire, Area beneath, Natural iBMB curve