

Tenability analysis of office rooms using probabilistic fire load energy density data

ABSTRACT

One of the most important component in performance-based design is tenability analysis study in a compartment. What it means by tenability analysis in this study is by getting the Available Safe Egress Time (ASET) based on several tenability criteria parameters namely Fractional Effective Dose (FED) for gases and thermal, smoke layer and visibility. To perform the tenability analysis; (1) selection and measurement of place of study i .e. two different room size in Faculty of Engineering, Universiti Putra Malaysia, (2) conduct fire load energy density survey at the place of study, (3) simulate probabilistic zone model simulation using B-RISK design fire tool; and finally (4) the tenability analysis itself. As a conclusion from the work, the values for each tenability criteria and results from B-RISK simulations suggest that the ideal time taken for Toxicity (FED Gases) $\leq 60s$, Heat Transfer (FED Thermal) $\leq 60s$, and Smoke Layer Height $\leq 30s$. Thus, the ASET for both office layouts are set at 30s due to the shortest time to reach tenability criteria.

Keyword: Office rooms; Fire load energy density; Heat release rate; Toxicity; Smoke layer height; Visibility; Tenability analysis