

## **Effectiveness of travel time during evacuation in high-rise residential buildings: a case study in Selangor, Malaysia**

### **ABSTRACT**

**Purpose:** In recent years, the number of high-rise buildings in Malaysia has been increasing. Therefore, it is essential to take evacuation into consideration especially for emergency conditions such as fire, explosion and natural disasters. This research aims to evaluate the effectiveness of the escape time in typical Malaysian high-rise residential buildings. **Design/methodology/approach:** This work comprises simulation on three buildings around the Selangor area in Malaysia. Quantitative methodology is adopted using Pathfinder software to simulate the evacuation process and time of the three typical Malaysian high-rise residential buildings. Four parameters were studied namely, the occupant load density, walking speed of first and last occupants, average of evacuation time per floor for the three buildings and effect of placement of emergency staircase on travel time. **Findings:** Findings show that 12 m<sup>2</sup> which is double the allowable occupants' density in Malaysia increases evacuation time by 67.9% while the placement of the emergency staircase on the left and middle section of a building significantly affects the evacuation time by 21.2%. In conclusion, from the simulation studies, it is recognized that a higher occupant's density affects the evacuation time. **Originality/value:** This work could provide information on escape time for future construction of high-rise buildings in Malaysia. Hence, the specification and design of buildings could be reviewed based on the results obtained from this simulation. This information could be beneficial to the building regulators and developers thus enhancing the knowledge of building constructor and possible issues in the design of staircases, corridors and height of buildings.

**Keyword:** Evacuation; Travel time; Pathfinder simulation; High-rise residential buildings; Emergency staircase