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A Study for the Effect of Fire Initiated Location on Evacuation Success Rate

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Abstract : As the number of fire accidents is gradually raising, many studies have been reported on evacuation. Previous studies have mostly focused on evaluating the safety of evacuation and the risk of fire in particular buildings. However, studies on effects of various parameters on evacuation have not been nearly done. Therefore, this paper aims at observing evacuation time under the effect of fire initiated location. In this study, evacuation simulations are performed on a 5-floor building located in Seoul, South Korea using the commercial program, Fire Dynamics Simulator with Evacuation (FDS+EVAC). Only the fourth and fifth floors are modeled with an assumption that fire starts in a room located on the fourth floor. The parameter for evacuation simulations is location of fire initiation to observe the evacuation time and safety. Results show that the location of fire initiation is closer to exit, the more time is taken to evacuate. The case having the nearest location of fire initiation to exit has the lowest ratio of successful occupants to the total occupants. In addition, for safety evaluation, the evacuation time calculated from computer simulation model is compared with the tolerable evacuation time according to code in Japan. As a result, all cases are completed within the tolerable evacuation time. This study allows predicting evacuation time under various conditions of fire and can be used to evaluate evacuation appropriateness and fire safety of building.

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