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Thesis

Modelling Occupant Evacuation during Fire Emergencies in Buildings

Abstract

Computer models are becoming essential to the building design process, striving for better fire safety designs. One such model is being developed at Carleton University. It evaluates the most likely fire scenarios and their impact to life and property based on fire growth, smoke movement, building integrity, fire protection system effectiveness and occupant response and evacuation.

The occupant evacuation model developed uses environmental inputs and occupant response characteristics to simulate emergency evacuations. Experiments were conducted to quantify the effect of visibility on occupant speed and the findings are implemented in the model. It was found that gender was more influenced by smoke than age.

Case studies were conducted with the model to demonstrate its effectiveness in simulating building evacuations. The results indicate that alarm systems affect evacuation times significantly. Risks to life calculations indicate that fire services and sprinklers each reduce the probability of injury or death.

Degree

M.A.Sc.

Completion

2004

Supervisor

Hadjisophocleous