Estimations of Passenger Evacuation According to Ventilation Modes for a Fire in an Underground Station

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The numerical predictions of passenger evacuation event under fire train stopping at underground station are performed. Three different smoke-control ventilation modes are considerd.

Fire heat and smoke behavior is in the underground station is estimated by using FDS (Fire dynamic simulator) [1]. Distributions of heat, carbon monoxide and visible range are compared above the platform. The numerical results show that air supply fan operation causes the smoke disturbance and a rapid spread of the smoke on the platform. The results also show that the switch ventilation mode with the platform and tunnel ventilation systems are better smoke rejection efficiency than the platform ventilation system only. The numerical predictions of passenger evacuation are considered by using buildingExodus [2]. Under various smoke-control modes passenger evacuation results are compared. Through the fire computation fluid dynamics and numerical prediction of passenger evacuation, recommendable smoke-control mode in the platform of underground station is suggested.

References

1. McGrattan, K.B.; Forney, G.P. (2006): Fire Dynamics Simulator (Version 4.07) - User's Guide. NIST Special Publication 1019, National Institute of Standards and Technology, Gaithersburg, MD.

2. Galea, E.R. et al. (2004) buildingExodus (Version 4.0) – User Guide and Technical Manual, University of Greenwich, London, UK.

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