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Award-winning papers in 2013

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Award-winning papers in 2013

Papers published in *Engineering and Computational Mechanics* are eligible for awards from the Institution of Civil Engineers. Papers from any of the ICE journals can be nominated for several awards. In addition, each journal has awards dedicated to their specific subject area.

On Friday 17 October 2014, ICE president Geoff French presented awards to the following papers published in *Engineering and Computational Mechanics* in 2013. The editorial panel nominated their best papers and an awards committee chaired by Quentin Leiper allocated the awards.

Telford Medal

The Telford Medal, ICE's highest award for a paper, was awarded to Giannakopoulos *et al.* (2013).

Abstract

The present paper explores the influence of room geometry on the overturning of smoke owing to a centrally located floor fire, and examines the implications on smoke filling times. The focus is on presenting practical design guidelines based on the theoretical predictions of the model of Kaye and Hunt. An engineering platform is developed for the prediction of smoke filling times, and a rational basis is provided by way of which smoke behaviour can be specified for simple room designs. The time taken for smoke to fill a room to a given height is critically affected by the room aspect ratio and the characteristic size of the buoyancy source. At large times, taller (small aspect ratio) rooms are shown to fill with smoke at a faster rate than wide (large aspect ratio) rooms owing to large-scale overturning and engulfing of ambient air during the initial transients. Larger area sources of buoyancy also decrease significantly the smoke filling times, with important implications for fire and smoke safety design. Simplified design curves incorporating the main findings have been developed for use as a tool by practising fire-safety engineers.

Gary Hunt receiving the Telford Medal from ICE President Geoff French

Telford Premium Prize

The Telford Premium Prize was awarded to Kuang and Yuen (2013).

Abstract

In engineering practice, a competent and effective numerical tool for the comprehensive and accurate analysis of infilled frame structures subjected to different complex load patterns has not been developed. Here, a discrete method of analysis with the damage-based cohesive crack modelling technique is proposed for numerical simulations of masonry-infilled reinforced concrete frame failure. The proposed approach employs the surface-based interaction modelling technique to simulate the interfacial traction-separation behaviour, including mixed modes of fracture, crack propagation, post-fracture behaviour, and finite sliding and separation of the bonded surfaces, between contacting surfaces of masonry units. Applicability of the modelling approach for both masonry and infilled frame structures subjected to different load patterns is checked by performing computer simulations with the proposed model; the model is verified by comparing the results of experimental data. To demonstrate the wide variety of applications of the verified cohesive crack modelling technique, case studies on the non-linear behaviour of infilled frame structures under combined in-plane and out-of-plane loads and subjected to seismic excitation are conducted.

JS Kuang and YP Yuen receiving the Telford Premium Prize from ICE President Geoff French

REFERENCES

Giannakopoulos BA, Kaye NB and Hunt GR (2013) The influence of room geometry on the overturning of smoke owing to a floor fire. *Proceedings of the Institution of Civil Engineers – Engineering and Computational Mechanics* **166(2)**: 68–87, http://dx.doi.org/10.1680/eacm.9.00005.

Kuang JS and Yuen YP (2013) Simulations of masonry-infilled reinforced concrete frame failure. *Proceedings of the Institution of Civil Engineers – Engineering and Computational Mechanics* **166(4)**: 179–193, http://dx.doi.org/10.1680/eacm.13.00002.