LUND UNIVERSITY

Jonathan Wahlqvist
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Invitation to Thesis Defence

On the 15th of June, I will defend my PhD thesis *Numerical modeling of the coupled feedback between pool fires and their environment*. You are most welcome to attend. In this invitation the background and content of the thesis are briefly explained.

Computational fluid dynamics (CFD) is often used within performance based fire safety engineering and its use has increased as available computational power has increased. However, there is still a need to improve CFD modeling to enhance it beyond its current usage limitations. Of course such steps must be accompanied by quality assurance by means of validation and verification. In this thesis three key problems were identified within performance based design; prediction of the mass loss rate that interact with the environment dynamically, understanding of fires in enclosures equipped with mechanical ventilation as well as taking the built environment, such as building materials, building geometry and various technical installations, into account when designing a fire scenario. In the presented work Fire Dynamics Simulator (FDS) was chosen as a modeling framework which could be expanded upon if needed to be able to perform predictions of the presented problems. A validation of FDS was done against experimental data obtained using the novel, non-intrusive technique ps-LIDAR. The built in HVAC (heating, ventilation, and air conditioning) model in FDS was validated against a series of full-scale fires using mechanical ventilation. A new pool fire sub-model, which takes reduction in oxygen concentration and external radiative heat flux into account when predicating the mass loss rate, was formulated, implemented in FDS and then verified and validated. The verified and validated model and sub-models were applied on two engineering problems; predicting fire growth related to building characteristics and predicting performance of measures against smoke spread in ventilation systems.

The thesis will be defended at 13:00 a.m. in lecture hall V:D, V-huset, John Ericsson väg 1, Lund. Faculty opponent is Professor Pascal Boulet, University of Lorraine. If you want to join for some light food and drinks afterwards please contact Heidi Francke (heidi.francke@byggtek.lth.se) no later than Monday, June 11. For only attending the thesis defence no prior notice is required.

Sincerely,
Jonathan Wahlqvist

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