

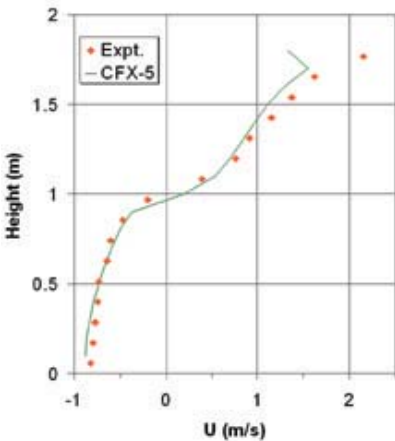
Predicted temperatures on the symmetry plane through the centre of the fire and the doorway.

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Field modelling is playing an increasing role in fire engineering and in the safety sphere generally, where CFX has been extensively validated and is widely used.

CFX-5 is newer in the field, but its coupled solver and facilities for unstructured, automatically adaptive meshing make it particularly user-friendly for fire safety engineers. At CFX, we are undertaking an extensive programme to ensure that our excellent track record in the field of fire and safety is enhanced through CFX-5. This is being achieved through various validation projects, such as the one described here, where we compare CFX-5.5 with the compartment fire experiment conducted by Steckler et al. in 1982.

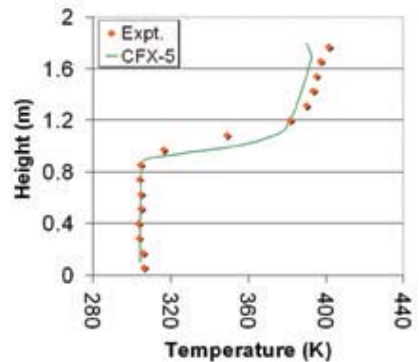
The experiments were conducted in a room of about 20 cubic metres with a



Comparison of horizontal speeds on a vertical line through the middle of the doorway. The predicted speed close to the top edge of the door departs from the measurements because the mesh is relatively coarse and large gradients exist there. Even a slight uncertainty in the position of the instrument produces a significant change in the measurement.

single door opening and a fire source, consisting of a round methane burner in the centre of the floor. The mesh is simple, with a uniform target element size throughout the domain, mesh controls near the fuel source and the doorway, and mesh inflation at the floor and burner. The domain also extends outside the door.

For turbulence modelling, we use the buoyancy-modified RNG k-ε turbulence formulation, and the radiating combustion process is modelled with CFX-5's single-step Eddy Dissipation and P1 radiation models.



Comparison of temperatures at the door centreline.

Preliminary validation of CFX-5 against the Steckler experiments has shown good agreement. Particularly encouraging are the correct prediction of the entrained flow of fresh air, associated with the negative velocity in the lower regions of the graph, and the location of the sharp interface at around 1m. More work is ongoing, but the results obtained so far enhance confidence in the reliability of CFX-5 in fire engineering.