Post-Test Computations of the Virginia Tech Propane Fire Compartment Study Using FDS v2

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ABSTRACT

Recently, version 2 of the NIST Fire Dynamics Simulator (FDS v2) was released[1,2]. A number of major changes were made to version 1 including new combustion and radiation sub-models. These features were added to improve the simulations of flashover, but they require validation against experimental data. The Virginia Tech (VT) Fire Research Laboratory is currently undertaking a study of compartment fires[3] using a half-scale ISO 9705 compartment. Fires studied in this compartment span a wide range of heat release rates, thus providing an excellent set of data with which to validate the new sub-models. FDS v2 was used to simulate 8 tests in the VT compartment. Comparisons to experimental data were made. The comparisons indicate the new sub-models perform well for flashed over compartments. Major species, mass flows, and temperatures are all reasonably predicted. However, predictions of minor species and mass flow rates for well-ventilated tests indicate that further refinement of the new sub-models is needed.

KEYWORDS: computational fluid dynamics, CFD, FDS, compartment fire, validation