

Accidental Compartment Fire Dynamics: Experiment, Computational Fluid Dynamics Weakness and Expert Interview Analysis

Authors : Timothy Onyenobi

Abstract : Accidental fires and its dynamic as it relates to building compartmentation and the impact of the compartment morphology, is still an on-going area of study; especially with the use of computational fluid dynamics (CFD) modeling methods. With better knowledge on this subject come better solution recommendations by fire engineers. Interviews were carried out for this study where it was identified that the response perspectives to accidental fire were different with the fire engineer providing qualitative data which is based on “what is expected in real fires” and the fire fighters provided information on “what actually obtains in real fires”. This further led to a study and analysis of two real and comprehensively instrumented fire experiments: the Open Plan Office Project by National Institute of Standard and Technology (NIST) USA (to study time to flashover) and the TF2000 project by the Building Research Establishment (BRE) UK (to test for conformity with Building Regulation requirements). The findings from the analysis of the experiments revealed the relative yet critical weakness of fire prediction using a CFD model (usually used by fire engineers) as well as explained the differences in response perspectives of the fire engineers and firefighters from the interview analysis.

Keywords : CFD, compartment fire, experiment, fire fighters, fire engineers

Conference Title : ICFSSST 2017 : International Conference on Fire Safety Science and Technology

Conference Location : London, United Kingdom

Conference Dates : September 21-22, 2017