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EXPLORING THE APPROPRIATENESS OF THE AVIATION INDUSTRY EVACUATION CERTIFICATION REQUIREMENTS USING FIRE AND EVACUATION SIMULATION

The evacuation certification trial is an aviation benchmark which requires that all the passengers must safely evacuate from the aircraft within 90 seconds through 50% of the available exits. Typically a single exit from each pair of exits is selected resulting in all the available exits being located along one side of the aircraft along the length of the aircraft. In this study, the influences of exit availability in post-crash aircraft fires on passengers' survivability are investigated using a narrow body aircraft, which satisfies the certification requirement. Two exit configurations are investigated: one complying with the typical certification trial configuration and the other one being an exit configuration commonly occurring in real accidents. The work is carried out using the fire and evacuation engineering tools, SMARTFIRE and airEXODUS. Under a post-crash cabin fire situation, the certification trial exit configuration produces a longer time to flashover, a shorter evacuation time and as a result a significantly smaller number of fatalities and severe injuries than the other investigated exit configuration. As a safety indicator of aircraft evacuation performance, the exit configuration in the certification trial is demonstrated to be less challenging and less representative of actual accident situations and so is considered inappropriate as a measure and demonstration of safety.

Professor Galea *is the founding director of the Fire Safety Engineering Group (FSEG) of the University of Greenwich in London where he has worked in the area of Computational Fire Engineering (CFE) research since 1986. FSEG are developers of the EXODUS suite of evacuation and crowd dynamics software and the SMARTFIRE fire simulation software. Prof Galea's personal research interests include human behaviour in emergency evacuation situations, crowd dynamics, evacuation and crowd dynamics simulation, fire dynamics and CFD fire simulation.*

His aviation based fire and evacuation projects include design and certification analysis for aircraft such as; A380, A340-600, BWB, Mitsubishi Regional Jet, Dash8-400, CS100, CS300 and VIP configured B747 aircraft. Other projects include; a study into human factors issues associated with the evacuation of the WTC, urban-scale evacuation modelling associated with large scale flooding funded by Fujitsu, an evacuation project associated with security bollards funded by CPNI, a Homeland Security project supported by the US DoD to develop a real time evacuation management system for the Pentagon building, and a project to explore improved wayfinding systems for rail stations funded by EU FP7.

He is the author of over 250 academic and professional publications and serves on a number of standards committees concerned with fire and evacuation for organisations such as; IMO, ISO, BSI and the SFPE Task Group on Human Behaviour in Fire. He has served on several major Inquires and legal cases as an expert in fire and evacuation including: the Paddington Rail Crash, the Swiss Air MD11 crash, and the Admiral Duncan Pub bombing.

His aviation related research has won a number of awards including:

- *2011 Royal Aeronautical Society's Bronze Award.*
- *2006 Royal Aeronautical Society's Gold Award and George Taylor Prize.*
- *2003 Royal Aeronautical Society's Hodgson Prize*
- *1999 Royal Aeronautical Society's Hodgson Prize*