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Prof. Galea Warns: Certification Rules for Aircraft Evacuation are not Adequate

Prof. Edwin Galea, Director, Fire Safety Engineering Group, University of Greenwich was invited by the Royal Aeronautical Society Hamburg Branch to talk at Hamburg University of Applied Sciences. The presentation with his warning message is now online (Galea 2014). With his team he developed a suite of evacuation and fire simulation software. He worked on aviation based fire and evacuation projects for aircraft such as A380, A340-600, BWB, Mitsubishi Regional Jet, Dash8-400, CS100, CS300 and VIP configured B747 aircraft.

Emergency evacuation rules require that passengers and crew members can be evacuated from the aeroplane to the ground under simulated emergency conditions within 90 seconds (CS-25.803). Not more than 50 % of the emergency exits in the sides of the fuselage of an aeroplane may be used for the demonstration (CS-25 Appendix J). One exit from each pair should be used (AC 25.803-1a).

Prof. Galea's findings based on the simulation of a typical evacuation scenario of a narrow body aircraft (http://fseg.gre.ac.uk/fire/13_30.pdf) show: Life ending high temperatures (above 185 °C) may develop only after 90 s following a crash (e.g. 120 s), but evacuation with a fire is much more difficult due to heat and smoke and will take much longer than 90 s (e.g. 260 s) when the scenario of available exits is more challenging than the easiest scenario prescribed by certification rules. This will cause a higher number of fatalities (e.g. 15 fatalities) than with the easy certification scenario (e.g. 1 fatality).

Prof. Edwin Galea concludes:

- Current certification rules are inappropriate as a safety indicator as they are not representative of likely survivable accident exit configurations.
- Current certification rules are inappropriate as a safety indicator as they are not a sufficiently challenging exit configuration.
- Modeling should also be used for certification analysis and used to investigate additional exit configurations and additional repeat cases (different certification compliant populations; randomized passenger seating allocation).
- The 90-second-rule is arbitrary. Instead coupled fire and evacuation simulations can provide more insight into the fire safety of aircraft cabins.

Get the presentation of the evening lecture at Hamburg University of Applied Sciences together with even more information from <http://hamburg.dglr.de>

References

GALEA, Edwin R., 2014. *Exploring the Appropriateness of the Aviation Industry Evacuation Certification Requirements Using Fire and Evacuation Simulation*. Lecture, 2014-10-16, Hamburg University of Applied Sciences. Available from: http://www.fzt.haw-hamburg.de/pers/Scholz/dglr/hh/text_2014_10_16_Fire_and_Evacuation.pdf