Grouped Passenger Behaviors during Emergency Evacuation

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Abstract

Computer simulation of aircraft evacuation has been reported in the recent years. However, there is only very limited study on the grouped passenger behaviors during emergency evacuation. On the other hand, group passengers such as families and friends travel together may be reluctant to separate from the group during the emergency evacuation. At the same time, the "leader" of the group may wait for the rest of the group members in order to ensure safety for the entire team. This scenario might affect the evacuation patterns and ultimately affect the evacuation time of the entire plane. In this study, data from computer simulations of the grouped passenger behaviors are compiled and analyzed. Group parameters, such as passenger combinations of the groups, number of groups, seating locations of the groups, random and pre-defined, and moving speed of groups are studied using Monte Carlo Simulations. Emergency evacuations of airplane with grouped passengers and without grouped passengers are compared in terms of total evacuation time and each egress usage.

Aircraft Emergency Evacuation Study with Injured Passengers

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Abstract

FAA regulations require that all on board passengers must be able to evacuate from the aircraft with half of the exits blocked during any emergency. Real life evacuation exercises are used to test the safety of aircraft cabin design. A very real situation that might hinder the evacuation process is the presence of injured passengers. The injury may occur before or even during the evacuation process. In either case, it becomes a very important factor for the entire aircraft evacuation process. However, it is very dangerous to have injured passengers participating in the real life evacuations due to extremely high liability risk.

In this study, a computer simulation tool is used to evaluate the aircraft emergency evacuation with injured passengers. Injured passengers are modeled with different slow walking speed for the level of injury during evacuation. Simulation results of evacuation with injured passengers are compared with evacuation with no injured passenger. Total evacuation time and individual evacuation time of each injured passengers are tracked and analyzed. Impact on the seating locations of injured passengers and number of injured passengers are also presented.

Computer Simulations on Interior Access Vehicles for Emergency Evacuation

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Abstract

During aircraft emergency evacuation, the passenger fatality can be greatly reduced if airport fire fighters can join the flight crew on the evacuation of the passenger before the fuselage is compromised. Therefore, the feasibility of a new concept vehicle called Interior Intervention Vehicle (IIV) has been studied in recent years. The primary function of this new concept Interior Intervention Vehicle is to aid fire fighters in making a safe and rapid entry into an aircraft fuselage, as well as assist in the egress of passengers, while adding a fire fighting capability. To evaluate the effectiveness of the Interior Intervention Vehicle, a Monte Carlo Simulation based aircraft emergency evacuation program that was developed. Various Interior Intervention Vehicle emergency deployment scenarios to both single aisle aircraft and double aisle aircraft are modeled and studied. In each configuration, the deployment time of Interior Intervention Vehicle is modeled firstly as 0 second delay and with 10 seconds increment until it reaches 80 seconds delay. Simulation results and some conclusion remarks will be presented.