



**Speed saves:** Assertive behaviour by cabin crew speeds up evacuation.

# "EVACUATE. EVACUATE. EVACUATE."

When you need to get out of the aircraft – fast.

**H**ow do you reproduce the chaos of a real aircraft evacuation in trial conditions? In the 1980s UK researchers working with the Civil Aviation Authority (CAA) ran a series of tests with and without an incentive payment to the first 30 volunteers who exited a Trident Three aircraft. The prospect of scoring an extra 5 pounds, on top of the 10 pounds they were already being paid for taking part in the evacuations, came close to mirroring the desperation of a real-life scenario.

As 60 people battled to be first through the doors, clothes were torn, shoes left behind and legs and arms stuck between seats. Some tests had to be abandoned halfway through because people became wedged in doorways, causing a build-up of pressure behind them. In the tests run without the 5-pound incentive, people worked more cooperatively and left the aircraft in an orderly manner, much like people react in a precautionary disembarkation.

The researchers observing the exits were dressed in flight attendant uniforms for the tests. They had done some airline cabin crew training and directed the evacuation as cabin crew members would, dictating the exits to be used and pulling people in the right direction and clearing them from obstructed doorways. They were jostled and knocked by the rush of bodies, and in at least one case, almost pushed out of the aircraft.

In situations like this, cabin crew assertiveness is the key to speeding up evacuation. In 1994, a joint CAA-Federal Aviation Administration (FAA) study tested passengers evacuating from a 60-seater 737 simulator with several different scenarios: two assertive cabin crew directing the evacuation; one assertive cabin crew; two non-assertive cabin crew and no cabin crew present during the evacu-

ation. The results were clear. The passengers exited the aircraft much faster when assertive crewmembers called them to the exits and encouraged them to move through as quickly as possible.

The non-assertive cabin crew asked people to come to the exits, and gave no physical assistance unless someone was in danger of falling over as they reached the vestibule area. The European Transport Safety Council report that cited this study recommended incorporating assertive behavior techniques into recurrent training, and suggested that assertiveness measures would be useful for cabin crew selection.

**"One flight attendant, on her own, tried the command 'move it' during the demonstration; we then realised that 'hurry' was a little too polite and not strong enough."**

The words and tone of voice used when ordering an evacuation can also have an effect. Lisa Kolodner, an aviation safety inspector (cabin safety) for the FAA, says that when the FAA conducted a test evacuation, cabin crew were directed to use the commands, "release seat belts, leave everything, come this way, hurry, hurry".

"One flight attendant, on her own, tried the command 'move it' during the demonstration; we then realised that 'hurry' was a little too polite and not strong enough. A more urgent undertone was helpful," Kolodner said.

It's also vital for cabin crew to act assertively when passengers try to take their personal be-

longings down escape chutes. Response to a frightening situation can lead people to cling to the familiar, such as cabin luggage. If they were thinking rationally, it might not be worth as much as their life – but in an unexpected emergency, familiar objects can take on a deeper significance.

In a Flight Safety Foundation (FSF) report, Robert Molloy, research analyst for the US National Transportation Safety Board (NTSB), said an evacuation study revealed that large framed pictures, crutches and a guitar were among items taken by people during real emergency evacuations.

“After one recent accident involving an active fire burning and crash forces that split the aeroplane fuselage, one person told the NTSB, [he] had to go back to get [his] violin,” Molloy said. “In interviews after that accident, others said that the flow had been slowed by people trying to grab their backpacks. One passenger blocked access to the exit for a whole row of passengers while he was trying to get his briefcase.”

Passengers taking luggage – or wearing high-heeled shoes – also risk damaging the escape chute as they slide down. A woman was

seriously injured during an emergency evacuation at Sydney Airport in 2003, when a slide deflated while she was on it. She landed heavily on the tarmac, receiving a fractured vertebra.

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An Australian Transport Safety Bureau (ATSB) investigation into the accident was unable to conclusively determine why the slide deflated. However, the ATSB report noted that deflation occurred 32 seconds after inflation, after a number of passengers had used the slide.

The ATSB also found there had been some confusion among cabin crew as to whether it was more important to get passengers off the Boeing 747-438, whose brakes had caught fire on landing, even if they were carrying cabin luggage – or insist the luggage be left behind. Some flight attendants let people take their be-

longings with them, while others followed operator procedures and forced people to leave their baggage on the aircraft.

Fortunately the fire had self-extinguished by the time the evacuation got underway. The 368 people on board left the aircraft within 90 seconds, even though not all emergency slides were available.

The incident highlights the problems faced by cabin crew when people try to take belongings with them when evacuating. Do they insist the baggage is left on board and risk a confrontation that could delay other passengers? Do they confiscate the baggage and risk having it piling up in exits, aisles and crossovers? Do they toss the baggage out of the aircraft where it might injure someone on the ground?

There are no right answers to these questions. It's up to cabin crew to make a judgment at the time, based on the specific situation. The priority is getting passengers out of the aeroplane as safely and quickly as possible. Cabin crew should not compromise their position in the doorway to retrieve a bag.

**Are you listening to me?** Cabin crew are used to the glazed looks that appear on passenger faces when the safety briefing gets underway.



**Sydney evacuation:** A Boeing 747-400 passenger jet sits at its arrival gate at Sydney Airport with its escape slides activated after the captain ordered passengers to evacuate when smoke was detected coming from one of the brakes on Wednesday July 2, 2003. One of the slides deflated during the evacuation, injuring a passenger.



SPIN

IT WAS ONLY NATURAL TO EXPECT SOME EVACUATION DIFFICULTIES WITH THE NEW SUPER-SUPER-JUMBO-JUMBOS



Safety briefings are based on several assumptions: passengers will always read or pay attention to pre-flight instructions; they will understand the instructions; they will remember them; and they will apply them in an emergency situation. Unfortunately this has not always proved to be the case.

Recently a US airline released results of its surveys of passengers who were involved in 18 aircraft evacuations between 1997 and 1999. The main reasons given for lack of attention to safety briefing were that the passengers:

- Had seen the briefing previously.
- Believed the content was common knowledge.
- Were reading during the safety briefing (or listening to recorded music).
- View of safety briefing was obstructed.
- Repetition meant they believed they had already learned the safety information.

## CROWD CONTROL

Emergency procedures are coming under increased scrutiny as very large transport aircraft come into service.

**S**ometime early next year, the giant new A380 Airbus will face one of its biggest challenges – safely evacuating more than 800 passengers and crew within 90 seconds. Successfully deplaning so many people out of such a large aircraft rests on the design of the emergency evacuation equipment, design of the cabin areas, and the ability of cabin crew to successfully marshal people to the right place.

One concern with the A380 design is the two-storey configuration that has more than 300 people on the upper deck, 8 m from the ground. Early tests showed that some people balked when they got to the top of the double-decker slide – it just seemed so far off the ground. Since then, the slides have been redesigned with sides high enough to block the view of the ground on each side. The slides are also flatter at the top, so passengers are already on their way down before they register the steepness.

CASA cabin safety inspector, Russell Higgins, has been working with regulators and Airbus Industrie to identify cabin safety issues that could affect the A380.

“We’re looking at a very large number of passengers on an upper deck which we haven’t seen before,” he says. “We’ll look at things like potential migration of passengers from the upper deck down those very wide staircases to the main deck. This could be a problem because it has the potential to create a bottleneck effect down on the main deck at those forward doors where those extra passengers could end up.”

Higgins says this could require mitigating factors such as cabin crew stationed at the top and bottom of the stairs to redirect passengers.

He sees good passenger management as the key to ensuring that cabin crew can direct a successful evacuation.

“It’s not just dealing with your own door – if the flow of passengers is drying up at your

door and you see there’s a blockage – it’s looking around and having the presence of mind to change your commands to adapt, to redirect people away from that clog to your free-flowing exit.”

An 18-month study by the Joint Aviation Authorities (JAA) in Europe recommended cabin crew do the following to overcome the special problems presented by large aircraft cabins:

- Develop an adequate mental picture of the whole cabin, and provide passenger guidance to prevent spatial disorientation.
- Visually assess obstruction of aisles, cross-aisles and situations at the opposite side of the cabin or in remote areas of the cabin.
- Conduct empty-cabin checks.
- Visually assess the aircraft attitude, the usability of the slides (including whether they extend to the ground) and ground conditions at the base of slides.

“All very large transport aircraft (VLTA) cabin crew members should have the same



**Top deck:** Rigorous tests will be required to make sure that all 800 passengers – 300 on the upper deck – are able to evacuate the A380 within 90 seconds.



**A380 slides:** The A380 evacuation system uses extendable slides to handle variation in door sill heights.

- Underestimated the probability of survival following an accident, and didn't see there would be a need to use the safety equipment.
- Saw themselves in a passive role, where cabin crew manage safety and airlines are responsible.
- Were unaware of the underlying reasons for the safety instructions.
- Were too optimistic, believing that nothing would happen.
- Experienced social pressure to ignore the safety briefing to show others they were seasoned travelers.
- Overestimated their knowledge of safety aspects and didn't realise that safety equipment could differ from one aircraft to another.
- Were unaware that in an emergency situation, passengers should follow specific procedures.

**Exit seat:** International Air Transport Association (IATA) guidelines for seating passengers

in exit rows emphasise the need for all air carriers to have clear policies about exit-seat assignments. The guidelines stress that cabin crew are responsible for reseating passengers, regardless of seat assignments by check-in agents, if they become aware that the passenger is mobility-impaired or too young.

Australian regulations allow cabin crew to restrict exit row seating to passengers who appear to be "reasonably fit, strong, able and willing to assist the rapid evacuation of the aeroplane in an emergency".

The Civil Aviation Safety Authority encourages airlines to provide procedures that enable cabin crew to conduct "structured personal conversations" with people seated in exit rows, beyond the general oral briefings given to all passengers. Some cabin crew even test people sitting in exit rows to check that they have thoroughly read and absorbed the emergency exit procedures.

level of emergency training and be interchangeable in their abilities to conduct crowd control, use passenger-communication systems and conduct evacuations from the upper deck and the main deck," the report said.

It also noted that emergency procedures might need to be expanded to include marshalling the 800-plus passengers once they are on the ground, while rescue and firefighting operations are being carried out. Currently, cabin crew are expected to stay on the aircraft until all the passengers have left. However, there have been situations where passengers were hit by rescue vehicles after being evacuated from an aircraft. The report commented that the minimum number of cabin crew might need to be reassessed for VLTA.

The JAA report also warns that its experiments showed that passengers became unpredictable in emergency situations.

"The situation could rapidly become out of control with all the cabin crew busy at their own doors... Large numbers of passengers behaving in an uncontrolled manner, perhaps in the presence of smoke or with the airframe in an uneven attitude, may inevitably lead to serious injuries and possible fatalities."

The report saw effective communication as the best defence against VLTA evacuation problems.

"A complete communication loop (including efficient message-feedback for common

situational awareness) and standardized VLTA emergency phraseology will be especially important," the report said.

Higgins said the regulators were looking at VLTA evacuation tests to identify potential new problems, rather than going over old ground.

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"We know a lot about evacuations so we're looking for unique things we haven't seen before. We're hoping to have video from cameras inside the cabin made available to us after the A380 evacuation. A lot more will come out of that than watching people evacuating from aircraft for 90 seconds. We'll analyse those videos, concentrating on the critical areas, and draw conclusions accordingly."

**Sources:** "Specialists Study Evacuation Challenges of Very Large Transport Aircraft" (July-August 2004) Cabin Crew Safety, Flight Safety Foundation: [www.flightsafety.org/ccs\\_home.html](http://www.flightsafety.org/ccs_home.html)

The VERRES report: [fseg.gre.ac.uk/fire/VERRES\\_Project.html](http://fseg.gre.ac.uk/fire/VERRES_Project.html)



**Safety briefing:** Surveys show that many passengers are not paying attention

This ensures that passengers can hear, understand and speak the language used by the crew. It also gives passengers a chance to ask questions and find out why the procedures are necessary, and to indicate their willingness to assist in an emergency.

Tests carried out by the CAA in the 1980s also assessed the difficulties faced by passengers exiting from Type III over-wing exits. This followed fatal aircraft fires where passengers died despite being seated close to the exits while other people seated further away survived. The ease of operation of an escape exit, whether passengers can easily open it, and whether they know where to put the exit hatch after its removal, affected the speed of evacuation.

An FAA review of worldwide research into evacuations noted that the reason for passengers having difficulty with the exit was not caused by the design, but by lack of instruction. "Information materials, such as safety briefing cards, related to emergency evacuation activities have been poorly rendered, as passengers either cannot understand the intent of the materials, or do not seem obliged to read and follow the instructions."

The importance of getting passengers to understand their responsibilities when sitting in exit rows was highlighted recently in an Embraer 190 evacuation test. The aircraft failed certification because a person seated next to an over-wing exit had not followed the safety briefing and did not know what to do when the evacuation started. The test had to be rerun.

**Sources:** "Many Passengers in Exit Seats Benefit from Additional Briefings" (May-June 2001); "Attempts to Retrieve Carry-on Baggage Increase Risks During Evacuation" (May-June 2004), Cabin Crew Safety, Flight Safety Foundation: [www.flightsafety.org/ccs\\_home.html](http://www.flightsafety.org/ccs_home.html)

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The VERRES report: [fseg.gre.ac.uk/fire/VERRES\\_Project.html](http://fseg.gre.ac.uk/fire/VERRES_Project.html)