



Communication Problems Contribute to Misperceptions of Evacuation Urgency

Inadequate procedures to ensure collection and evaluation of all relevant information — including the cabin crew’s post-accident observations of damage to the Boeing 747 — were among cabin safety issues identified by the Australian Transport Safety Bureau after the runway overrun in Bangkok, Thailand.

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FSF Editorial Staff

At 2247 local time Sept. 23, 1999, a Boeing 747-400 operated by Qantas Airways was landed beyond the touchdown zone on Runway 21L at Bangkok (Thailand) International Airport, hydroplaned on the wet runway and ran off the end of the runway. The airplane was substantially damaged in the accident, which occurred in conditions of darkness, heavy rain and thunderstorms. Aircraft rescue and fire fighting (ARFF) services arrived in about 10 minutes, and 20 minutes after the aircraft stopped, the captain ordered a precautionary disembarkation of the airplane; four emergency escape slides were used. None of the 410 occupants was injured seriously.

Among the airline’s emergency procedures, precautionary disembarkation is an alternative to emergency (immediate) evacuation for situations where, in the captain’s judgment, conditions allow adequate time to wait for the arrival of outside assistance. One reason for a captain to use precautionary disembarkation is to prevent passenger injuries that often occur during an emergency evacuation.

The Aircraft Accident Investigation Committee of Thailand delegated the accident investigation to the Australian Transport Safety Bureau (ATSB). ATSB said, in its final report on the accident, that the investigation “identified several unsafe acts and active failures that had a significant influence on the development of the accident.” These were:



- “The flight crew did not use an adequate risk-management strategy for the approach and landing;
- “The first officer did not fly the aircraft accurately during final approach;
- “The captain canceled the go-around decision by retarding the thrust levers;
- “The flight crew did not select (or notice the absence of) idle reverse thrust;

- “The flight crew did not select (or notice the absence of) full reverse thrust;
- “The flight crew did not consider all relevant issues when deciding not to conduct an immediate evacuation; [and,]
- “Some crewmembers did not communicate important information during the emergency period.”

The report said that “other significant active failures” identified during the investigation were the following:

- “The runway surface was affected by water; [and,]
- “The cabin interphone [system] and passenger-address [PA] system became inoperable.”

In its analysis of the captain's decision about evacuation, the report said that the airline's aircrew emergency procedures manual (AEPM) — and related information in the quick reference handbook (QRH) — showed four possible actions and related PA announcements after an emergency alert: an emergency evacuation, a precautionary disembarkation with steps (stairs), a precautionary disembarkation without steps, or cancellation of the alert. The report said that no company manual for flight crew or cabin crew provided guidance on evaluating available information to decide whether to conduct an emergency evacuation or a precautionary disembarkation. ATSB has used the final report as the basis for safety presentations to the industry.¹

The 16 cabin crewmembers on duty included a customer service manager (CSM), who had management responsibility for the aircraft cabin and cabin crew, and a customer service supervisor (CSS), who assisted the CSM. The CSM was assigned the Door L2 Primary position with no assist (flight attendant), and the CSS was assigned the Door L4 Primary position with an assist (flight attendant).

During the landing roll, cabin crewmembers and passengers experienced the following events:

- At 2246:30.1, the main wheels of the airplane contacted the runway 1,002 meters (3,287 feet) from the runway threshold at a speed of 156 knots and in a normal landing attitude. The flight crew later said that the touchdown was smooth and data from the digital flight data recorder also showed a "very soft" touchdown. The CSM began the normal PA announcement at touchdown but stopped when he sensed that the landing was not normal. "Some cabin crewmembers ... also sensed that the landing was not normal and adopted the 'brace for impact' position," the report said;
- The aircraft overran the stopway (the end of the paved surface) at a speed of 88 knots. The report said, "When the aircraft left the paved surface, there was a series of impacts and noises before it came to a stop eight seconds later. ... Normal cabin lighting failed, and emergency cabin lighting illuminated;" and,
- The aircraft collided with an instrument landing system (ILS) localizer antenna structure at a speed of 79 knots. The structure was located about 117 meters (384 feet) beyond the end of the stopway. The report said, "After the first impact, six cabin crew seated [near the overwing exit doors] started calling 'heads down, stay down' or 'brace, brace, brace' [and continued these calls until shortly after the airplane stopped]. ... No other cabin crew made any calls, even though all perceived aspects of the landing to be abnormal. ... A passenger in [the forward lower-deck area of the aircraft later] reported that she fell to the floor after she [unfastened] her seat belt during the landing roll to put down her blanket. ... A cabin

crewmember seated on the right side of the cabin observed 'flashes' from an engine during the landing roll. ... [The airplane had] continued for a further 103 meters [338 feet] through very wet, boggy soil before coming to a stop 18 meters [59 feet] right of the runway extended centerline, with the nose resting on an airport perimeter road."

Externally, the collision initiated the collapse of the nose landing gear and the right-wing landing gear. Inside the aircraft cabin, some ceiling panels, passenger service units (PSUs) and lavatory fittings were dislodged and/or damaged.² Four passengers later said that they had been struck by PSUs, and various objects from overhead bins, galleys and various storage locations littered the cabin floor.³

From the time the aircraft stopped, the captain was unable to communicate directly with passengers using the PA system or with the CSM using the crew interphone because aircraft damage made these systems inoperable. During this time, flight attendants moved from their seats to assigned emergency positions at doors to be ready for an evacuation command. The second officer and CSM assessed conditions in the cabin and told the captain that there was no fire, that some damage had occurred, that there were no injuries and that the situation in the cabin was under control. The flight crew discussed whether to conduct an emergency evacuation or a precautionary disembarkation.

The accident aircraft had a total of 12 doors: 10 doors on the lower deck and two doors on the upper deck, all equipped with slides. The doors were numbered from the front to the rear of the aircraft and each door also was designated left or right.

Air traffic controllers did not know immediately that an accident had occurred because of a loss of radio communication for a few minutes and their inability to see the B-747 because of reduced visibility. The wet, boggy ground required the ARFF personnel to operate vehicles on paved surfaces rather than driving their vehicles directly to the scene. When emergency vehicles arrived on the scene and the chief of emergency services determined that there was no fire, fire hoses were run from the vehicles to the airplane as a precaution.

"They attempted to communicate with the [aircraft] crew by tapping on the fuselage of the aircraft," the report said. "The crew did not notice these communication attempts. The chief of the emergency services contacted the control tower to inform the pilot to open the doors, but this communication apparently did not reach the aircraft. The emergency service personnel then waited for the evacuation to commence."

The captain then began to provide the following instructions to the other pilots and to the cabin crew:

- "After approximately one minute, the second officer came down the stairs [from the upper deck of the B-747] and told the CSM at Door L2 to instruct passengers to remain seated, and to tell cabin crew to remain by their doors and



Substantial damage to the Boeing 747-400 during the runway overrun included collapse of the nose gear and the right-wing landing gear. The aircraft was in a nose-low position and a slightly right-wing-low position during the precautionary disembarkation. (Australian Transport Safety Bureau Photo)

await further instructions. The CSM instructed the [Door] R2P cabin crewmember to relay the instructions to all other cabin crew. The second officer returned to the flight deck;

- “Shortly after, the second officer returned to Door L2 with instructions from the captain for the CSM to report to the flight deck. When the CSM went to the flight deck with the second officer, Door L2 became unattended. When the CSM returned from the flight deck, he conducted a cabin assessment, moving through the upper deck and main deck. He told [the cabin] crew and passengers that there was no sign of fire or danger and that the situation was being assessed before disembarkation. He then returned to the flight deck;
- “Some [flight attendants] called out to ask passengers if anyone had been injured, but [they] were reluctant to leave their assigned emergency positions to check the cabin for injuries in case an immediate evacuation was required. Others moved a short way into their [cabin] zones to check the status of passengers;
- “The [Door] L3A cabin crewmember observed that the fallen ceiling panel ... was blocking an exit way, and moved the panel to the Door 2 galley;” [and,]
- “Some passengers began making calls from mobile telephones. They were directed by cabin crew to turn the equipment off.”

Unusual odors, fumes, breathing difficulties and watering eyes caused the following concerns among flight attendants and passengers in some parts of the cabin:

- The Door L3P flight attendant noticed an odor “like burning wires” in the mid-cabin area of the main deck. He told the second officer, and the captain told the CSM to assess the area. Other passengers and crewmembers smelled what they described as “fumes” and they were told that the captain and CSM knew about the fumes;⁴
- The CSM told the captain about an unpleasant odor in that area of the cabin but said that the odor was not smoke, and the captain told the CSM to ventilate the cabin by opening overwing Door L3 and overwing Door R3; and,
- The second officer, after assessing the electrical odor and the reported eye irritation in a different area of the main deck, told the captain that there were no fumes or odors of concern.

Some flight attendants were told by other flight attendants that the flight crew knew about fumes in the cabin; they did not report fumes to the flight crew although fumes and their effects (breathing difficulty and watering eyes) became stronger.

The cabin crew conducted the precautionary disembarkation using doors specified by the captain on the right side because doors on the left side were higher above the ground, lacked any lights, and — in some instances — were close to trees. Proximity of an emergency vehicle to one door on the right side initially precluded its use.

The report said, “The CSM went to [the area near the overwing exit doors] and briefed the cabin crew and passengers simultaneously about the precautionary disembarkation and instructed the CSS to open Door R4. The CSM then opened



Four passengers in the cabin of the Boeing 747-400 said that they were struck by dislodged passenger service units (PSUs) that dropped below overhead bins. Only minor injuries occurred among 38 passengers who reported injuries. (Australian Transport Safety Bureau Photo)

Door R2. The CSS repeated to passengers in [the aft lower-deck area] the CSM's instruction regarding the disembarkation and then opened Door R4."

Some flight attendants who had been stationed at left-side doors moved to assist flight attendants conducting the precautionary disembarkation from right-side doors; the captain and second officer assisted the cabin crew in the main cabin, while the first officer remained on the flight deck to ensure that the flight deck was secured. Flight attendants also remained at the overwing doors that had been opened for ventilation to prevent use of these exits in the precautionary disembarkation.

The report said, "Cabin crew reported that some passengers ignored instructions to leave bags. Where the crew attempted to enforce these instructions, the passenger flow to exits was less orderly. Duty-free [bags] and other bags were taken from passengers as they moved toward exits, and some items were placed in galleys or on seats. Some cabin crew allowed passengers to take cabin bags."^{5,6}

A buildup of passengers occurred in mid-cabin, and a bottleneck (constriction of flow) occurred at Door R2 because passengers were descending the stairs from the upper deck cabin. In response, the crew opened Door R5 — where the slide was steep but usable — and Door R1 to improve the passenger flow (upper deck slides were not activated during the disembarkation).

The report included the following analysis of the performance of the cabin crew:

- "In the circumstances, the crew appeared to have adapted to the situation relatively well. Most of the doors were attended throughout, some relevant pieces of information were gathered and passed to the flight crew, and the cabin crew and passengers were given an adequate briefing on the situation soon after the accident. ... By initiating a precautionary disembarkation when they did, the crew was able to ensure an orderly process. The absence of any serious injuries during the disembarkation indicated that the result was consistent with the intention;
- "Use of the handset [by the CSM for the PA announcement] during the landing may have prevented or delayed the CSM adopting the brace position and presented an exposure to injury from crash impact. It could also have led to the handset being dropped or left unstowed and becoming a source of injury or obstruction;
- "When the overwing exit doors ... were opened for cabin ventilation, it was necessary to disarm the doors (to deactivate the emergency escape slides) before they were opened. Had there then been a need to conduct an immediate evacuation, the escape slides could not have been deployed until the doors had been closed, rearmed and opened again. The time taken to complete this process could have been critical. In addition, closure of the door could have been restricted by structural deformation of the door frame;
- "A cabin crewmember located at the opened overwing exit door at [Door] R3 observed that the no. 3 engine

pod was resting on the ground. Cabin crew at the overwing doors saw dirt and mud on the upper surface of the wings. Other cabin crew noted that the galley floor between Doors L1 and R1 had been deformed upward. None of this information reached the flight crew;

- “A number of company personnel [cabin crewmembers who had been scheduled to fly the next sector on the accident airplane and had arrived from the airport terminal to offer assistance] boarded the aircraft prior to the completion of the [precautionary] disembarkation. The condition of the aircraft, and the potential hazards associated with the terrain, wreckage and cargo were unknown to them. Their actions in attending the site and boarding the accident aircraft exposed them to potential injury; [and,]
- “Control of the passengers after they left the aircraft was inconsistent and, in many cases, passengers were not given appropriate directions. All passengers should have received clear directions, from either emergency services or the aircraft’s crew, to immediately move away from the aircraft.”

In the analysis of communication problems confronting the aircraft crew, the report said, “The loss of the PA and cabin interphone systems was potentially hazardous. It disrupted the normal means of communication between the flight deck and the cabin. The loss also forced crewmembers to convey information by moving through the cabin. This, in turn, contributed to various communication difficulties and [to] key personnel leaving their stations. ... A passenger in [the forward lower-deck area], who had experience as an aircraft engineer, recognized the smell of hydraulic fluid but did not pass this information to any crewmember. The captain later said that he was never made aware of the presence of fumes in the cabin.”

For example, the CSM had an excessive workload, and his actions restricted the communication channels and caused a gap in the chain of cabin information, the report said.

Some flight attendants, who did not use brace commands when abnormal sensations occurred during the landing roll, later said that they “did not understand the distinction between the ‘brace, brace, brace’ call and the ‘heads down’ and ‘stay down’ calls.” The report said, “Neither the company’s [AEPM] nor the cabin crew training process clearly reflected the distinction between, and intent of, the ‘brace, brace, brace’ call and the ‘heads down’ and ‘stay down’ calls. Similarly, the importance for crewmembers to issue the commands even when they were uncertain of the precise nature of the situation, or when their field of view of the cabin was limited, was not emphasized.” [An air carrier’s procedures might require the flight crew to use a “brace, brace, brace” PA announcement to alert the cabin crew to imminent impact, and all cabin crewmembers to alert passengers to assume the brace-for-impact position by using

the synchronized command “brace, brace, brace” (or “brace, brace, brace, heads down, stay down” or “heads down, stay down” — depending on how passengers have been briefed before a planned-emergency situation or an unplanned-emergency situation). Cabin crewmembers then might be required to repeat the call “heads down, stay down” (or to continue the initial brace command) to ensure that passengers comply and know to remain in the brace-for-impact position until the aircraft stops.]

The report said that cabin crewmembers cited the influence of the following factors on how they conducted their duties under the circumstances:

- “They were concerned primarily about the possibility of fire and, therefore, they were reluctant to leave their doors;
- “Some ... received little ongoing information about what was happening in the period prior to the [precautionary] disembarkation; [and,]
- “Two flight attendants said that they did not know that a precautionary disembarkation had been initiated until they heard the sound of evacuation slides being activated.”

Although some flight attendants said that they believed that passengers appeared to be calm and that no signs of panic were evident, passengers said, in their responses to ATSB’s post-accident survey, that they perceived the following cabin situation:

- Of the 24 percent of passenger respondents who said that there should have been a faster evacuation of the aircraft, some said that their belief was related to anxiety about the possibility of fire. The report said, “The level of apprehension was high prior to the precautionary disembarkation, and the principal concern was fire. ... One passenger said, ‘At one stage, I was going to open the emergency exit myself because of my concern for my daughters and risk of fire;’
- “Absence of information from the crew and the delay in conducting the precautionary [disembarkation] increased passengers’ apprehension; [and,]
- “Flight attendants who remained at their assigned doors were perceived by passengers to be ‘doing nothing.’”

In turn, passenger perceptions and/or absence of information affected the actions of passengers as follows:

- “Forty-one percent of [passenger] respondents said that they were alerted [to the emergency] by bumping or shuddering or some other similar aspect;
- “Seventy percent of [passenger] respondents said that they did not hear any instructions from the flight attendants during the landing, 16 percent said that they

heard the instruction ‘heads down’ or ‘stay down’ and 12 percent said that they heard the instruction ‘brace;’

- “Thirty-eight percent of [passenger] respondents said that they simply remained seated during the landing;
- “Forty-five percent of all passengers, predominantly from [the area near the overwing exit doors], reported that they braced or put their heads down during the impact sequence. Seventeen percent said that they ‘just held on tight’ while 38 percent remained in their normal seated positions and ‘did nothing,’ even though some heard the brace calls;
- “A number of passengers put their feet up, or arms out in front of them, in a way that exposed them to injury;
- “Twenty-two percent of [passenger] respondents said that the flight attendants gave instructions or provided information during the landing. Other respondents said that the flight attendants did nothing (40 percent) or that they could not be seen (36 percent). (In some sections of the cabin, the flight attendants were seated behind the passengers.);
- “Four [passenger] respondents said that their seat belts were not fastened at the time of landing ... Three passengers [later] reported that as the wheels touched down, an infant was passed across the aisle to a passenger seated in the adjacent aisle seat;”
- “Two of the four [passenger] respondents who were nursing an infant without the use of an extension [seat] belt reported that they had difficulty in holding the infant during the landing. The [passenger] respondent nursing an infant with the assistance of an extension belt did not report any difficulty in holding the infant;
- “Almost all [passenger] respondents (89 percent) reported receiving information or instructions from the flight attendants within five minutes of the aircraft coming to a stop; [and,]
- “The majority (63 percent) of [passenger] respondents said that the first instructions or information that they received was to stay seated. Almost all said that the cabin crew provided this information. ... Reports of instructions to stay calm were also widespread. ... Some [passenger] respondents from all zones of the aircraft reported being told that there was no fire, or likelihood of fire, after the aircraft came to rest. ... Some passengers said that they mistook camera flashes for electric arcing [in dark recesses of the ceiling where dislodged ceiling panels had dropped].”

Because of the rain and the abnormal position of the aircraft, which resulted in wet slides with either a steep slope or a

shallow slope, 38 percent of respondent passengers said that they had some difficulty moving down the slides although passengers typically said that they had received specific instructions for special circumstances such as negotiating these slides and carrying infants or lap children.⁷

The captain told ATSB investigators that he initiated the precautionary disembarkation when he received advice from the airline that buses were on the way. The ATSB report said that the following factors were considered by the captain in determining the appropriateness of a precautionary disembarkation: low impact loads on the aircraft during the overrun, possible invisible external hazards because of absence of external lights, heavy rain, delayed arrival of ARFF vehicles, absence of signs of fire, readiness of the cabin crew to conduct an immediate evacuation, risks of panic and serious injury, and risk that some passengers might walk across the active Runway 21R to the airport terminal.

Nevertheless, the report said that the gaps in information about the external damage to the aircraft and about the risk of fire and other possible hazards were not given appropriate consideration by the captain, so that “the most appropriate option in these circumstances would have been to conduct an immediate evacuation.”

Among the report’s findings related directly to cabin crew were the following significant latent failures:

- “Procedures and training for cabin crew in identifying and communicating relevant information during an emergency were deficient;
- “The processes for identifying hazards were primarily reactive and informal, rather than proactive and systematic;
- “The processes to assess the risks associated with identified hazards were deficient; [and,]
- “The design of operational procedures and training were over-reliant on the decision-making ability of company flight crew and cabin crew, and did not place adequate emphasis on structured processes.”

Among recommendations related to cabin crew, ATSB said that the Civil Aviation Safety Authority of Australia should consider the following “as requirements of operators during its current development of new legislation in the area of emergency-procedures training [Safety Recommendation R20000234]”:⁸

- “How flight crew should gather and evaluate relevant information and decide which type of emergency response is most suitable;
- “How cabin crew should communicate with one another and the flight deck in emergency situations (in terms of

technique, terminology and methods to ensure that accurate information reaches the flight deck);

- “How cabin crew should communicate during an emergency on the ground when there is a loss of PA [communications] and interphone communications;
- “How cabin crew should systematically and regularly identify problematic situations in an aircraft during an emergency (including guidelines on what types of information are most important and ensuring that all areas of the aircraft are examined);
- “Leadership and coordination functions of cabin crew supervisors during an emergency situation. For example, how the supervisors should assess the situation (particularly in circumstances that had not been clearly defined), assign roles and responsibilities among the cabin crew, coordinate the gathering of information and coordinate the distribution of information;
- “How cabin crew should effectively obtain information from passengers concerning safety-related issues;
- “How cabin crew should effectively use language and assertiveness skills for crowd control and managing passenger movement toward exits during emergency situations, as well as passenger control outside the aircraft; [and,]
- “Provision of cabin crew supervisors with appropriate resources to ensure that they can effectively communicate with other areas of the cabin during emergency situations (e.g., providing the supervisor with ready access to an ‘assist’ crewmember at their assigned location).”⁹

The report said that ATSB research into these cabin safety issues revealed continuing efforts in several countries to identify problems and to develop solutions.♦

[FSF editorial note: This article, except where specifically noted, is based on Australian Transport Safety Bureau Investigation Report no. 199904538, “Boeing 747-438, VH-OJH, Bangkok, Thailand, 23 September 1999.” April 2001. The 170-page report contains diagrams, tables, photographs and appendixes.]

Notes

1. Thomas, Peterlyn. “Evacuation in Bangkok.” Presented by the Australian Transport Safety Bureau (ATSB) at the International Aircraft Cabin Safety Symposium, March 4–7, 2002, Los Angeles, California, U.S.
2. The ATSB report said, “Passenger service units [PSUs] house flight attendant call lights, reading lights and passenger emergency breathing masks.”

3. The ATSB report said, “Five ceiling panels on the left side of the aircraft between rows 48 and 54 were dislodged during the [impact] sequence. One panel fell and blocked the aisle while the others were misaligned. ... The panels were made of composite material. They measured approximately 1.0 [meters] by 1.7 meters [3.3 feet by 5.6 feet] and weighed approximately 3.5 kilograms [7.7 pounds]. ... Boeing advised that the damage to the panels indicated that deceleration loads and fuselage deformation, associated with separation of the nose [landing gear] and right-wing landing gears, caused the panels to move inboard against the [mounting] rail. The load transferred to the latches on the outboard side, breaking the hooks and allowing one panel to fall down. ... Most of the dislodged PSUs ... remained hanging from their respective cables and feed lines. However, the length of cables and feed lines allowed some PSUs to be close to level with the top of the seat back, making them a possible source of injury and hindrance during the [precautionary] disembarkation. ... Boeing advised that the probable reason for the PSUs being released was flexing of the [mounting] rails during the impact sequence.”
4. The ATSB report said, “The fumes noted in the aircraft cabin ... probably came from discharge of hydraulic fluid, and possibly friction-heated rubber from the rotating nose-landing-gear wheels briefly contacting the fuselage.”
5. The ATSB report said, “The cabin crew did not uniformly enforce the requirement for passengers to leave [cabin] baggage behind for the [precautionary] disembarkation. The retrieval of cabin baggage can slow down the disembarkation/evacuation process. Cabin baggage can also damage escape slides and injure passengers at the bottom of a slide. ... They allowed some passengers latitude to carry small articles because the disembarkation was not a ‘full emergency’ situation, or because they did not wish to confront [passengers] or upset passengers. They also reported that some passengers argued with cabin crew who tried to enforce the company safety requirements. ... Seventy-one percent of [passenger] respondents [to an ATSB survey] said that they took some personal items with them when they left the aircraft [41 percent took a passport, medication, mobile phone or camera; 29 percent took nothing; 24 percent took a handbag or a bag of duty-free goods; and 4 percent took a handbag carried around their necks or positioned with the strap diagonally across their bodies to board the slide].” Based on a June 2000 report — *Safety Study: Emergency Evacuation of Commercial Airplanes* (Report no. PB2000–917002) — the U.S. National Transportation Safety Board (NTSB) Recommendation A-00-88 to the U.S. Federal Aviation Administration (FAA) said, “Develop advisory material to address ways to minimize the problems associated with carry-on luggage during evacuations.”

6. The NTSB report said, "Passengers exiting with carry-on baggage were the most frequently cited obstruction to evacuation [in this study of 46 evacuations between September 1997 and June 1999]. ... [NTSB's] review of the material received [from 15 U.S. air carriers] indicates that the training that flight attendants receive with regard to passengers retrieving carry-on baggage does not address what to do when passengers do not follow the command to leave everything behind. ... Techniques on how to handle passengers who do not listen to flight attendants' instruction [to leave everything behind] need to be addressed." On July 24, 2000, FAA issued Advisory Circular 121-29B, *Carry-on Baggage*, and in July 2001, FAA Order 8400.10, paragraph 1984, directed FAA principal operations inspectors and cabin safety inspectors to encourage air carriers to ensure that specific procedures are included in appropriate crewmember manuals and training programs to address the handling of carry-on baggage during an emergency, including clear direction and guidance to minimize problems with carry-on luggage during evacuations.
7. The *Cabin Safety Compendium*, published by the Global Aviation Information Network (GAIN) in December 2001, includes the following recommendations among its evacuation procedures and commands relevant to special circumstances in this precautionary disembarkation. If the angle of the emergency escape slide is steep or shallow, the cabin crew should shout commands — for example, for a

shallow slide angle, "Run down slide, roll off the side." When evacuating nonambulatory passengers, with time permitting and following the main flow of traffic, the cabin crew should instruct able-bodied passengers to assist in lowering nonambulatory passengers to the floor, then ensure that each passenger is assisted to the correct exit and evacuated. The GAIN recommendations said, "The preferred method for a physically disabled passenger to evacuate is via an escape slide, feet first." When an adult passenger is evacuating the aircraft with an infant or lap child, the cabin crew should instruct the adult passenger to jump into the slide in a sitting position, holding the child on his/her lap with arms wrapped around the child.

8. ATSB cited the finding in the NTSB report that U.S. pilots were not receiving consistent guidance — particularly in flight operations manuals and safety manuals — about when to evacuate an aircraft.
9. On March 2, 2002, the Civil Aviation Authority of Australia said that cabin safety requirements identified in these ATSB recommendations were addressed comprehensively in a notice of proposed rulemaking for Civil Aviation Safety Regulation Part 121A, *Air Transport Operations – Large Aeroplanes*, and that Civil Aviation Order 20.11 6A was "amended to require the carriage of portable megaphones on all aircraft engaged in regular public transport activities or charter operations with a seating capacity of more than 60 seats."

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