Submission 002
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Parliament of Australia
House of Representatives
House Standing Committee on Infrastructure and Communications

Inquiry into ratio of cabin crew members on aircraft.

Submission

Current aviation safety regulatory system for aircraft operators in relation to the application of the cabin crew to passenger ratio including current exemption provisions

The rule change proposed is to allow a reduction of the cabin crew to passenger ratio from 1 crew member to every 36 passengers, "to a ratio of 1 crew member for every 50 passenger seats or part of that number. The proposed change will be applicable to aircraft with a passenger seat configuration of more than 36 but not more than 216,"

The current legal requirement in Australia is for the 1:36 ratio of cabin crew to passenger seats. One can only speculate that the rule change proposed by CASA 1:50 ratio crew to passenger seats, is to legitimize their already flawed process used to grant concessions to low cost carriers on single aisle aircraft.

It is falsely claimed by CASA that 1:50 is harmonisation with "world's best practice". 1: 50 is in fact - world's worst practice!

The last CASA regulatory review under the Howard Government 1997-98, subject to the economic rationalist thinking of the time, was extremely comprehensive**.** It needs to be noted; CASA accepted the findings of the review panel and retained the 1:36 rule.

However, within a few years CASA started granting dispensations against its Regulation on cabin crew ratios, despite the fact that there had been no new evidence presented to indicate that cabin hazards had changed and in fact terrorist activities, as in the 1980's have increased

On the 6th of May 2008 the Minister for Infrastructure, Transport and Regional Development, announced there would be "more money for security upgrades at regional airports". This security and surveillance is the current function of the regional and domestic cabin crew. The question to be asked is, would removing them on some commuter aircraft, and reducing their numbers on domestic aircraft and hence their capacity to do their job effectively, enhance "the protection of the traveling public" as is the governments stated aim?

A case in point, on 19th March 2010 Victoria's police chief was detected carrying bullets on a flight. It was reported "Mr. Overland was found to be carrying the ammunition magazine at Canberra airport on the way back to Victoria, but had already passed through security in Melbourne and flown to the capital with the ammunition".

Current ratio's are: Australia 1:36; Canada 1:40; USA 1:50

These ratios are not as straight forward as would appear: some countries require crew to have licenses for different aircraft types and restrict the types flown, others calculate by number of passengers onboard, whilst others, the number of seats fitted. Some airlines - particularly Japanese - require the selection of able-bodied passengers to assist in holding back the passenger so the cabin crew can open and operate the slides. The most flawed of the rules adopted by some jurisdictions, is one crew member to be responsible for a pair of doors. The task of controlling a door is to ensure passenger exit from the aircraft is rapid and streamlined. There is absolutely no way one crew member can control the passengers at two doors at the same time, it is not physically possible.

CASA's website states: *"Does CASA have any safety priorities?"*

"Yes. CASA gives priority to the safety of passengers. This is a policy that has been endorsed by Government and is implemented under regulations and other requirements that have been subject to Federal Parliamentary scrutiny. The policy means most of CASA's time and resources are allocated to maintaining and improving safety on passenger-carrying flights. People traveling on airlines – large and small – and charter flights are CASA's highest priority. Careful analysis and judgement of safety supports this allocation of priorities. 96% of Australians who fly do so on commercial airlines and they have a reasonable expectation that safety standards are applied. People who are flying on an Australian airline expect high standards of safety from their carrier, as well as responsible safety oversight by the aviation regulator. By making passenger-carrying flights a priority CASA can meet these expectations." (www.casa.gov.au)

CASA's mission statement is *Safe Skies for All*. The traveling public might expect that statement includes commuter, regional and domestic aircraft.

"The policy means most of CASA's time and resources are allocated to maintaining and improving safety on passenger-carrying flights."

The role of cabin crew in managing both passenger safety and security

Over the years the marketing departments of airlines have made a concerted effort to hijack the role of cabin crew, reducing their numbers and loading them with more and more service related duties, this impacts on their primary role, the safety and evacuation of passengers in emergencies. As was previously the requirement, if airlines want to provide more service, they must be required to allocate more crew to the flight and develop and implement procedures that ensure "the primary crew" safety and security duties are sacrosanct.

As with all emergency workers, we hope they never need to use their skills and when faced with an emergency, we trust they are available to help us.

With more reliable aircraft and improved survivability in aircraft cabins (still a long way to go) the role of the cabin crew has changed. There are now even greater passenger numbers, in turn this requires better systems of communications within the cabin and between the flight and cabin crew. Often a change to reduce one risk may produce another.

An example is the locking of the cockpit door which came about after the 9/11 hijackings and was implemented to stop hijackers entering the cockpit.

Prior to 9/11, airlines were developing improved systems of communications between flight and cabin crew as poor crew communication had been clearly identified as a causal factor in bad accident outcomes. The belief held was that if the communications between flight and cabin crew was improved, many risks could be mitigated and safety outcomes improved.

“Since September 11, 2001, an unlocked flight deck door has been considered a potentially hazardous condition. This is a different characterization than existed prior to September 11, but one that is both appropriate and applicable, given the potential consequences of an unlocked flight deck door.” (FAA Memorandum 21 Nov 2006) ref. 25.1309

The consequence of this rule making has been, according to some US flight attendants, they never see the flight crew. Australian crews report their contact is greatly reduced and hence the communications degraded. Flight attendants in the USA are trained to initiate an evacuation without reference to the pilots, whereas in Australia it has traditionally been the Captain who initiates the evacuation. Before I retired from the airline business it was proposed to amend the procedures to allow cabin crew to initiate an evacuation if they were unable to contact the pilots. With this isolation of the crews, there are some other potential risks that are so far not exposed. Effectively, with a locked flight deck door, the cabin crew role in managing the cabin during an emergency is even more critical.

Professor Helen Muir of Cranfield University in the UK (the institution charged by the UK Government to conduct cabin safety research after the 1987 Manchester accident) told me that her research which was done for a large overseas carrier based in the UK determined that the selection of crew should ensure they were intelligent, had the ability to think laterally and be able to think on their feet, as no two aircraft emergency situations are ever the same and as a result their role in each emergency will be different.

Cabin crews are the last line of defense in security of the aircraft must not only be vigilant during the flight, they are required to detect anything untoward during the boarding process. As a risk management exercise it is blatantly obvious that if you reduce the crew numbers you reduce surveillance and, as a consequence, this creates additional opportunities for hijackers and other less well-intentioned people to impact cabin safety.

On the 6th of May 2008 The Minister for Infrastructure, Transport and Regional Development, Anthony Albanese, announced there would be more money for security upgrades at regional airports. In a previous letter to the Minister involved I questioned, “Who has been providing this security and surveillance to date?” In addition, I suggested it is the current function of the regional and domestic cabin crew!

The question is would reducing, or removing cabin crew on commuter, regional and domestic aircraft affect their capacity to do their job effectively and as a result enhance “the protection of the traveling public” which is the Governments’ stated aim?

As a case in point, in March 2010 there was a breach of the Civil Aviation Act in which the Victorian Police Commissioner Simon Overland was detected carrying bullets on a domestic flight in March 2010. It was reported, “Mr. Overland was found to be carrying the ammunition magazine at Canberra airport on the way back to Victoria, but had already passed through security in Melbourne and flown to the capital with the ammunition”. (The Australian, 19/3/10)

Removing the security function from specifically trained cabin crew (responsibility of airlines) and giving it to poorly paid ground security staff (responsibility of airports) degrades the task. It is totally inappropriate to reduce the numbers of the very people who have the most interest in their own and the passenger’s survival and protection.

I firmly believe, no matter how many scanners or airport security personnel are employed, no single person whose feet stay firmly on the ground can share the same level of interest in the passengers and aircraft safety as those who fly on the aircraft. Put another way, the cabin crew would leave their safety wholly in the hands of ground staff, from my years of experience in the industry – a very frightening thought!

Factors that determine the cabin crew to passenger ratio

On Wednesday 16th March 2011 in the Sydney Morning Herald there was the following extract from an article titled “They Did Not Stand a Chance” in relation to people fleeing the Japanese tsunami:

“They climbed over those who were not moving or elbowed them aside. ‘I couldn't believe it,’ Saga said. ''They were even shoving old people out of the way. The old people couldn't save themselves.’ He added: ‘People didn't care about others. Then the doors burst open, and the water rushed in. It was quickly at waist level.’

Saga saw one older woman, without the strength or will to stand, sitting in water that rose to her nose. He said he rushed behind her, grabbed her under the arms and hoisted her up the stairs. Another person on the stairs grabbed her and lifted her up to another person. The men formed a human chain, lifting the older residents and some children to the top. 'I saw the ugly side of people, and then I saw the good side,'' he said. 'some people only thought of themselves'” (SMH, 16/3/11, page3)

Over my 25 year career I have been responsible for many investigations, discussed safety and survival with the most eminent people in the industry and unfortunately this account is typical of people's behavior.

In one European ferry disaster, young men trampling mothers with babies underfoot in their efforts to escape. People rarely behave in an orderly fashion in accidents, except where they are paralyzed by fear.

It is for this reason there must be sufficient crew onboard to control an evacuation. The notion that one cabin crew member could control passengers at two adjacent doors is farcical, such a ruling could only be made by someone who has no knowledge or experience.

Evacuation trials are conducted with fit people, typically wearing track suits and sneakers, subject neither to trauma, panic or the effects of smoke, fire and debris. They are not a legitimate representation of the typical passenger load on a commercial flight or a real emergency evacuation. There are no elderly people, no wheelchairs, no physical, mental, hearing, or sight impaired passengers, no mothers with multiple children and infants. All of the above mentioned people are excluded from evacuation trials for litigation and safety reasons. (appendix A)

In reality we need more crew in real emergencies rather than less crew. (appendix B) There are numerous accounts in US National Transport Safety Board reports in which the success of an evacuation relied on the assistance from other crew and some of the most significant were where there were an entire second crew dead heading on the flight.

The following passage is from an article in Flight International 22/08/08.

A380 Airbus certification trial. Participant quote: "The pool of more than 1,000 test volunteers was drawn equally from among Airbus staff and local Hamburg gym-members. The regulations required that 35% of the participants were aged over 50, a minimum 40% were female, and 15% were female and over 50. A small number of dolls were carried to represent babies."

Professor Helen Muir, Cranfield University UK: "One of the challenges will remain getting a realistic test without putting an individual at any physical or mental danger. I mean, at the end of the day, how could anyone really test for the real panic experienced by real passengers?"

"It could be argued that the certification trial may provide a false sense of security to the traveling public and parts of the aviation industry, who may assume that if the aircraft is certified, it must be 'safe'," says Professor Ed Galea Director of fire safety engineering at the University of Greenwich in London.

The British Airtours accident in Manchester in 1985 was an important accident with respect to cabin safety. There were 55 fatalities, after an aborted take-off, the last passenger escaped the aircraft 5 .5min after the aircraft had ceased moving. Where as, fifteen years before, the entire load of passengers and crew evacuated in 75sec in the UK certification trial." (Source: Flight International 22/08/08)

Aircraft Accident Investigation Board UK - Aircraft Incident Report No: 8/88 (Manchester)

made the following recommendations:

As a result of early opening of the L2 door which allowed smoke from the fuel fire to enter the cabin the AAIB made the following recommendation:

4.13 "Operators should adopt a policy of distributing the most experienced cabin crew throughout the passenger cabin."

With this in mind, if junior/inexperienced trained crews are unable to adequately assess the conditions outside the aircraft, how does CASA expect naïve passengers to perform and how do you distribute experienced crew when you have so few onboard?

In a private conversation Professor Muir told me if anyone thought one flight attendant could control the evacuation of adjacent doors they were very mistaken. Helen also confided, her research in the UK for an airline indicated that for selecting cabin crew the optimum individual was a person with "a few brains, the ability to think laterally and think on their feet".

With respect to aircraft accidents and the ability of airframe manufacturers and regulators to learn from mistakes in an expeditious manner is minimal, accident reports take years to be issued. If design flaws are identified, the likely hood of rectification is very remote as aircraft models stay in production for a minimum of 20 years or more. The practice of grandfathering, in which the manufacturer only has to meet the design criteria at the time the original aircraft was certified, is common. As a result problems continue for decades. The design of the 737 is a good example, the bulkheads and aisle widths on this aircraft were a major contributor to the fatalities in the Manchester accident, no airlines to my knowledge ever retro-fitted them to remove the bottlenecks that caused people to die and they remain in service in Australia. In another instance the flight attendant seat harness design was shown to be deficient and caused severe injuries in an Australian B737 event. The same harness is still certified and in use throughout the world.

I noted recently that a problem I personally identified to the FAA some fifteen years ago as a design flaw in aircraft doors, subsequently verified, has only just recently been written into the FAA design rules criteria.

If regulators consider reducing crew number and fail to have sufficient crew to operate all the exits and control the passenger flow then they do so in ignorance. Believing naïve/untrained passengers can operate doors and equipment is a dangerous mistake. (appendix C)

The USA National Transport Safety Board's (NTSB) research indicates that passengers seated in exit rows can have problems performing the tasks required of them, the most serious being determining when it is appropriate to open the door in an emergency. The NTSB has documented cases of passengers allowing smoke into the cabin, or opening doors into flames. (Flight Safety Australia, March-April 2001)

Measures to enhance aviation safety that may be considered in future requirements on aircraft operators for a safety risk management plan covering the cabin crew to passenger ratio.

As for the process of "risk assessment" of cabin procedures, it is my experience that risk assessments are frequently made by people using Key Performance Indicators linked to the profitability of the airline, or at the very least, under commercial pressure to achieve a positive economic result for their employer. These assessors lack subject expertise, thereby inhibiting their ability to adequately identify the risks and assign realistic probability and consequence in relation to those risks. It is my belief that a big part of the risk assessment process is for the purpose of diluting accountability and to ensure no one person could be made legally liable.

Safety cases are often presented with minimal *if any* scientific basis, with proposed mitigating strategies little more than the subjective opinion of the very party that stands to gain from a successful submission. Analysis of disasters almost always shows a combination of technical and managerial flaws that have contributed to the event occurring, with the decision-making done by people who "don't know what they don't know". I have personal experience with risk assessment processes where agreed procedures which were aimed at mitigating risks, were never implemented. A successful risk assessment or safety case system should be carried out under a competent and independent regulator with adequate legal powers. The regulator must ensure the operator will carry out the process of preparing the assessment/case in a rigorous manner, with the knowledge that if it is not done properly it will be challenged. Although CASA will argue they are proposing a process that does just that, I do not believe they have the level of experience or training programs required to equip their inspectorate to challenge where necessary the claims made by Airlines.

Having spent 15 years as an active contributing member of the SAE Aerospace Committee, and several years as chairperson of the Cabin Safety Provisions sub committee, whose task it is to develop Aerospace Recommended Practice documents used by the Federal Aviation Authority as the basis of their regulations, I am entirely familiar, with the regulatory process in America and the rationale behind it. America bases its system on risk, blame and litigation.

Future requirement in Australia should include:

Designated crew allocated mid-cabin to control overwing exits. (appendix A. B & C)

No exemptions to the 1:36 ratio.

No exemptions to allocated crew at all floor level exits.

The Manchester 737 accident had 129 passengers and four cabin crew which is a ratio of 1 to 32, one to each main door front and rear, but no one could move into or take control of the mid-cabin exits.

Safety recommendation Chief Pilot- accepted 1998: "It is our opinion that in the event of any incapacitation, carrying the minimum of four crew would severely compromise our performance in the event of an evacuation, particularly given the difficulties of the 737, single aisle and limited egress as concluded in the Boeing 737-236 Manchester Airport Accident 1985, and the subsequent research by Professor Helen Muir".

I understand this has been revoked, but the aircraft remain!

There are two significant requirements for survival of an aircraft accident:

- Knowing and adopting the brace position and
- Well trained assertive cabin crew

Yours sincerely,

Bev Maunsell,

Air Safety Investigator/Cabin Safety Specialist - retired
Past Chairperson S9C Cabin Safety Provisions Committee, SAE Aerospace (USA)
Founding member of the Australian Society of Air Safety Investigators
Cabin Safety Working Group.

Appendix A

APPENDIX A TO THE DISSENTING POSITION SUBMITTED ON BEHALF OF MEMBERS REPRESENTING AFA, APFA, ETF, HTF, IAM, IBT, AND ITF, IN CONJUNCTION WITH SCISAFE.

This statement is submitted by the Association of Flight Attendants (AFA), the Association of Professional Flight Attendants (APFA - not an ITF affiliate), the European Transport Workers' Federation (ETF), the Swedish Transport Worker' Federation (HTF), the International Association of Machinists & Aerospace Workers (IAM), the International Brotherhood of Teamsters (IBT), and the International Transport Workers' Federation (ITF), in conjunction with SCISAFE.

In April 2000, representatives of the ITF submitted an in-depth review of research-to-date on evacuation studies for Type III exits. This review was presented at the April 2000 meeting of the Cabin Safety Harmonization Working Group. Essentially, the report summarized the efforts of researchers over the past 10 years to evaluate the effect of various factors (including pathway width, seat encroachment, smoke, and hatch weight) on how quickly test subjects can evacuate at the overwing. The review document described several concerns with the various research projects, including the fact that the age and health status of test subjects did not reflect that of the flying public, and that the subjects were often either briefed multiple times on how to evacuate, or actually given practice sessions before their evacuations are timed. Whether or not the research methodologies are *scientifically* sound, it is our opinion that results collected under test conditions that do not reflect true emergency conditions, should not be used to justify or propose regulations that apply to true emergency conditions.

Appendix B

Extracts Air France A340 accident May 2001

Transport Safety Board of Canada

AVIATION REPORTS - 2005 - A05H0002

The Air France Airbus A340-313 aircraft (registration F-GLZQ, serial number 0289) departed Runway 09L at Paris-Foissy-Charles-de-Gaulle International Airport (LFPG),[1] France, at 1153 Coordinated Universal Time (UTC)[2] as Air France Flight 358 (AFR358) on a scheduled flight to the Toronto/Lester B. Pearson International Airport (CYYZ), Ontario, with 297 passengers and 12 crew members on board

1.15.1 General

The passenger load comprised 297 passengers: 168 adult males; 118 adult females; 8 children; and 3 infants. Adult passengers included: three wheelchair passengers and one blind passenger. Three non-revenue passengers were seated in crew seats: one in the third occupant seat of the flight deck, and two in the flight crew rest area.

The dynamic loads generated in this occurrence were within range of human tolerance. However, given the number of serious impact injuries incurred by passengers and crew located in the flight deck and forward cabin, it is apparent that significant forces were experienced in those areas of the aircraft.

1.15.4 Use of Emergency Exits

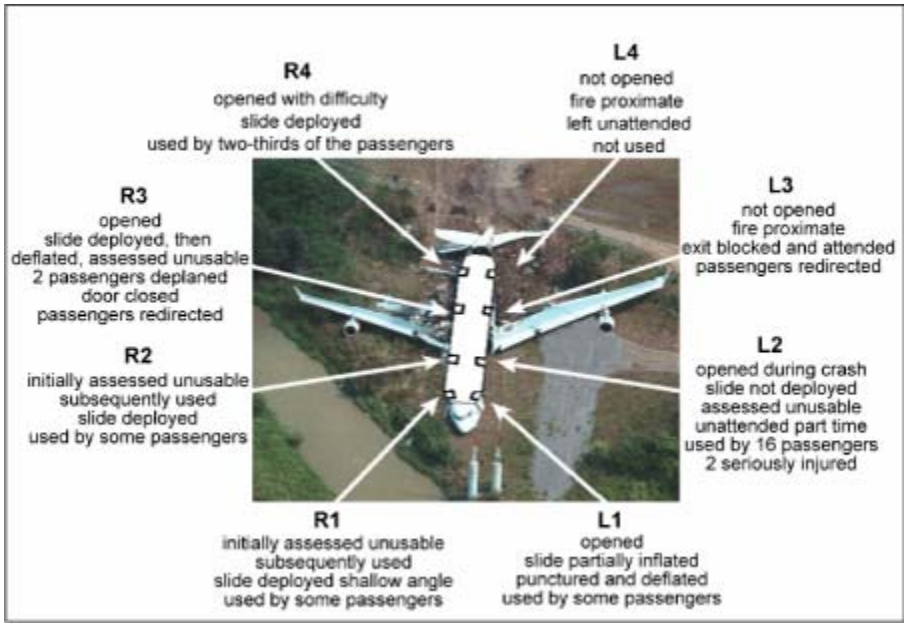

Figure 4. Emergency exits

At the onset of the evacuation, exits R1 and R2 were assessed by cabin attendants as unusable because the creek was immediately outside the exits. Both attendants followed the prescribed procedure for unusable exits. As the evacuation progressed, the attendants reassessed their original decision regarding the usability of exits R1 and R2, and concluded that they would have to be used to expedite the evacuation in light of the ever increasing amount of smoke in the cabin.

The forward purser knew that opened exit L2 was unusable because of the fire outside and because the slide had not deployed. However, when the aircraft came to a stop, he realized that the chief purser was not aware that the aircraft was already on fire. He rushed over to him and advised him that an evacuation was required. This action likely enabled the evacuation to begin sooner. In doing so, he did not have time to close the exit door and left the open exit unattended for an undetermined period of time. In his absence, at least 16 passengers egressed via exit L2. Two of the passengers incurred serious injuries-one when he jumped from the exit, a height of 10 to 12 feet, and the other when pushed out of the exit by other passengers. The purser subsequently returned to the L2 emergency exit and redirected passengers to the L1 exit.

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When exit R3 was opened, the slide deployed but immediately deflated when it contacted debris, making it unsafe for use. As the responsible cabin attendant proceeded to close the exit door, two passengers forced their way by and jumped from the exit. It is not known what, if any, injuries they incurred. Exit R3 was subsequently closed by the cabin attendant and he redirected passengers to another exit.

Fire outside the aircraft rendered emergency exits L3 and L4 unusable. The L3 cabin attendant blocked the unusable exit and redirected passengers to the nearest available exit as per the operator's prescribed emergency procedures. The aft purser, stationed at the L4 emergency exit, did not block the unusable exit nor assign an able-bodied passenger or supplemental cabin crew member to block it; it was evident that the exit could not be used because of the fire on that side.

The R4 door was difficult to open, requiring two cabin crew members to lift the door control handle to the fully up position and push the door out. Once outside the door frame, the door moved forward easily. It appeared to cabin crew that the door assist did not engage; however, after the occurrence, the emergency operation cylinder pressure gauge was documented as being in the red zone, indicating that it functioned as designed. Approximately one door width forward of the R4 door was a permanent fold in the outer fuselage skin, indicating that the location was subjected to a substantial bending force. The deformation of the fuselage was very likely transmitted to the door frame and would explain the difficulty experienced opening exit R4.

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Fire rendered two of the eight exits (L3 and L4) unusable for evacuation. Exits L2 and R3, although the slides had either not deployed or had deflated, were used by a few passengers, some of whom incurred injuries. Exits L1, R1, R2, and R4 were used. Two cabin crew members blocked access to unusable exits and redirected passengers to the nearest available emergency exit, as per the company's emergency procedures manual.

Four of the eight exits were therefore unsafe for use, or unusable: L2, L3, L4, and R3. However, L2 and R3 exits could have been used, had other options not been available. The L3 and R3 cabin crews remained at their exits, as per their emergency procedures, directing passengers to alternate available exits. Following the occurrence, the L2 cabin crew member was unable to recall very much about his actions during the evacuation. The L4 purser also left her exit unattended (unusable because of fire/never opened) while she commanded the evacuation at exit R4. The R4 cabin crew had been directed by the L4 purser to evacuate and help passengers at the foot of the slide.

Approximately two-thirds of the passengers evacuated via exit R4. The remainder evacuated via exits L1, R1, and R2, and a few evacuated at exits L2 and R3. It is estimated that the aircraft was evacuated in a little more than two minutes. A number of passengers took their carry-on baggage with them; in view of the urgency to egress rapidly because of the smoke in the cabin and the fire, this action presented a significant risk to safety.

During emergency procedures training, cabin crews are taught to use a megaphone when wearing a smoke hood so as to make themselves heard/understood. The L3 cabin crew did not have ready access to either of the megaphones on board the aircraft.

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1.15.5 Exit Slides

The L1 slide partially deployed/inflated. Given the nose-down, left-wing-high attitude of the aircraft, neither the intermediate tie restraint device nor the toe tie restraint device separated from the slide. As a result, the slide came to rest folded in half against the fuselage. When passengers jumped from exit L1, some became trapped in the folded portion of the slide and were unable to extricate themselves before other passengers jumped on top of them. During the evacuation, the slide deflated completely. Post-occurrence examination of the slide revealed that it had been punctured in two areas. The tears measured 18 cm and 13 cm in length.

The L2 slide failed to deploy, rendering the exit unsafe, although a few passengers jumped out of that exit. Because exits L3 and L4 were not opened, the slides at those doors were not actuated. The R1 slide deployed automatically as designed. However, the angle of the slide was very shallow because it was almost perpendicular to the aircraft. As a result, the rate of descent was slowed considerably. At the bottom of the slide, vegetation on either side of the deployment path pushed against the slide, causing it to curl inward, forming a tube. At one point, the R1 cabin attendant had to stop the evacuation to wait for passengers already on the slide to pass through this tube. As more passengers used the slide, the bottom of the slide flattened. The operation of the R2 slide was unremarkable. The R3 slide deployed as designed; however, immediately thereafter, the slide deflated. The R3 cabin crew closed the door to prevent injuries to passengers who might try to use that exit. It was subsequently determined that the

slide had torn on a piece of wreckage. The R4 slide deployed as designed. Passengers evacuated single file on dual-lane slides at positions R1, R2, and R4.

1.18.11 Viewing Windows - Assessing Exterior Hazards in an Evacuation

When the aircraft was certified, there was no requirement to equip emergency exits with viewing windows. Nevertheless, the aircraft had viewing windows in each emergency exit door. The radius of the circular prismatic lens in the viewing windows was approximately 15 cm (6 inches). The angle of vision for the outside view was approximately 31º symmetrical in all directions. Outside viewing, with a distance of 1 m between the eyes and the inner pane of the viewing window, provided a cone of visible area of 62º.

Air France procedures for emergency evacuations call for cabin crew to assess the exterior conditions before opening an exit to determine if there are hazards that would preclude using the exit. Cabin crew are trained to complete this task by looking through the viewing window in the exit door or the nearest cabin window. In this occurrence, the L3 cabin attendant did not use the viewing window to assess the exterior conditions because it was too small for her to clearly observe the conditions outside. She left the attendant station, went into the passenger seating area, looked out a cabin window, and saw the fire outside. She subsequently returned to the emergency exit, blocked it, and redirected passengers.

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The only thing visible to the L1 cabin crew through the viewing window was light. When the emergency exit was opened, it was usable.

The R3 cabin attendant assessed the exterior conditions using the viewing window but did not see the fire below the exit or the wreckage in the slide deployment path. When the emergency exit door was opened, black smoke entered the cabin and the slide deflated when it contacted sharp pieces of wreckage.

The R1 cabin attendant assessed the exterior conditions using the viewing window, but did not see that there was a creek outside until the exit was opened. When the slide deployed, the foot of it was very near the water. The cabin crew blocked the exit and redirected passengers.

Although it was raining heavily, none of the cabin crew felt that their ability to visually assess the outside conditions was hampered by the rain.

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In a 1992 investigation, the NTSB identified the risk to passenger safety created by cabin crew when they leave their emergency exit and enter the passenger seating area to assess exterior conditions. On 30 July 1992, during daylight hours, a Lockheed L-1011 was destroyed by fire after the crew executed a take-off followed by an immediate emergency landing at KJFK. The cabin attendant responsible for exit L2 was unable to clearly see the conditions outside through the viewing window, and left her exit and moved to a passenger window to see the conditions outside. After assessing the conditions through the

passenger window, she found it impossible to return to her exit because passengers blocked the aisle leading to it. Another cabin attendant assumed her position at the exit and, when told by the L2 cabin attendant that it was clear outside, opened the exit door, allowing passengers to escape from the burning aircraft.

The NTSB examined a viewing window on another Lockheed L-1011 operated by the air carrier to determine why the cabin crew had been unable to clearly see the conditions outside through the viewing window. They found that several of the outside window panes were crazed or scratched to the extent that it was difficult to view the ground clearly. Some other window panes also had scratches or crazing that interfered with a clear view, especially when looking aft. Due to extensive fire damage, it could not be determined if the condition of the viewing windows on AFR358 contributed to the cabin attendant's difficulty in assessing the conditions outside the aircraft in this occurrence.

2.6 Survivability

2.6.1 General

The evacuation was successful due to the training and actions of the whole cabin crew. With few exceptions, the performance of the cabin crew was exemplary and professional, and was a significant factor in the successful evacuation of the accident. There was effective communication between the flight crew and the cabin crew. Because the cabin crew were advised of the possibility of a missed approach, they were in a state of heightened awareness during the landing phase and were, therefore, prepared to respond immediately in the event of an emergency.

The availability of three supplemental cabin crew members on AFR358 undoubtedly contributed to the success of the evacuation, as evidenced by the roles they played during the evacuation. Two were in command of passenger evacuations at emergency exits and the third played a pivotal role in opening an emergency exit and subsequently assisted passengers at the foot of the R4 slide.

2.6.4.6 Cabin Crew Actions and Communications

The lack of emergency power rendered the PA system inoperable, introducing the risk that the onset of the evacuations would be delayed, jeopardizing passenger safety. This risk was particularly significant because the aircraft was on fire. Given that the PA system and the evacuation alert system were supplied by the same emergency power source, the evacuation alert system also did not activate. A different source of emergency power for each system, and a less vulnerable emergency power system would increase the chances that the PA and the emergency evacuation alert systems would continue to operate after a survivable crash.

Although the protective breathing units (smoke hoods) provided for cabin crew were certified in accordance with TSO-C116, the one cabin crew who donned a smoke hood for personal protection was unable to communicate in an intelligible manner. While wearing the smoke hood, she was unable to

communicate emergency instructions, directions, and commands to passengers in a manner that could be understood. There was no megaphone by her station, and she removed the smoke hood to make herself understood. A megaphone at each cabin crew station would enhance the crew's ability to make themselves heard by passengers while wearing the smoke hood.

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Overall, there was effective communication among the cabin crew during the emergency situation. The PA made by the aft purser stating that there was a fire and that she was commencing an evacuation at R4 facilitated a coordinated emergency response by the cabin crew. In addition, the PA provided direction to those passengers who understood French.

There was effective risk assessment and decision making. The aft purser effectively assessed the risks to passenger safety, given the presence of fire, and did not hesitate to take the decision to immediately initiate an emergency evacuation. Other cabin crew also exhibited effective risk assessment and decision making as evidenced by the actions of the R1 and the R2 cabin crews. They had initially correctly determined that their emergency exits were unusable given the creek flowing just outside the aircraft; however, as the amount of smoke in the cabin worsened, they quickly reassessed the overall risk to passenger safety and concluded that the risk presented by the creek was not as great as the immediate threat presented by the smoke in the cabin. Both crew members took actions to commence evacuation at their respective exits. When the R3 cabin crew saw that passengers were not following his emergency instructions to not use that exit, he quickly assumed a much more assertive manner, resulting in passengers responding quickly and appropriately to his commands. In spite of the fact that the L2 door opened while the aircraft was still moving and the fact that its associated slide did not deploy, the evacuation was successful, primarily due to the training and actions of the whole cabin crew.

Appendix C

Report by The Chairman of the US National Transportation Safety Board (NTSB) Survival Factors Group in December 1999.
American Airlines Flight 1420 overran a runway and crashed in Little Rock, AR (NTSB, 1999). Eleven people were killed. Interviews with the passengers assigned to open the four overwing exits revealed that they all had considerable trouble doing so.

“Male passenger seated at 21D reported that he *"tried to throw the exit out, but it hit something, so he dropped it inside the airplane… Many of the passengers slipped or tripped at the opening. The exit plug was in the way…"*

Male passenger seated at 22E reported that *"he had not been told specifically that he was in an exit row, and did not realize it until the crash. He had never opened an emergency door before. He looked at the exit and saw the word "pull" on the handle. He assumed the door would open."* (Page 25)”

Appendix C