



Aviation Safety Council

Taipei, Taiwan

**GE235 Occurrence Investigation
Factual Data Collection
Group Report**

Survival Factors Group

July 2, 2015

ASC-FRP-15-07-006

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Contents

I. Team Organization	1
II. History of Activities.....	2
III. Factual Description	3
1.2 Injuries to persons	3
1.3 Damage to Aircraft.....	4
1.3.1 Fuselage Airframe Status.....	4
1.3.2 Main Door / Emergency Doors	5
1.3.3 Seats and Seatbelts.....	8
1.13 Medical and Pathological Information	9
1.13.1 Medical Treatment of Injured.....	9
1.13.2 Toxicology information of Flight crews.....	9
1.13.3 Forensic inspection and autopsy	9
1.13.3.1 Victim Inspection	10
1.13.3.2 Injury patterns.....	10
1.14 Fire	10
1.15 Survival Aspects.....	10
1.15.1 Emergency Evacuation	10
1.15.2 Rescue.....	11
IV. Appendices.....	12
V. Attachment List.....	12

I. Team Organization

Chairman:
Peida Lin Aviation Safety Council (ASC), Taiwan ROC
Members:
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2. Chih-Hsin Pan Institute of Forensic Medicine, Ministry of Justice, Taiwan ROC
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II. History of Activities

Date	Activities
02/04 ~ 02/12	<ol style="list-style-type: none">1. Survival Factors Group convened and invited the forensic pathologists from Institute of Forensic Medicine (IFM), Ministry of Justice to join and launch to scene.2. Coordinated :<ol style="list-style-type: none">A. Coordinated with the prosecutors, the policemen from Criminal Investigation Bureau (CIB), the forensic pathologists from Institute of Forensic Medicine before performing the forensic examination process to make sure whether ASC need.B. Collected survivors interview notes from prosecutors.3. Completed all forensic inspections and autopsies in mortuary.4. Collected :<ol style="list-style-type: none">A. Passenger names and seat numbers of flight 235.B. Inspection and autopsy records.C. Information of injured survivors status from two local hospitals.
02/05 ~ 03/03	<ol style="list-style-type: none">1. Completed 9 survivors' interview.2. Completed rescuers' interview in Fire Bureau of Taipei City and New Taipei City
02/16 ~ 02/24	<ol style="list-style-type: none">1. Completed cabin wreckage and seat status report

III. Factual Description

1.2 Injuries to persons

There were a total of 58 persons on board including three pilots, two cabin crew, and 53 passengers. Four crew members and 39 passengers sustained fatal injuries. Thirteen passengers and one cabin crew sustained serious injuries and one passenger sustained minor injuries.

This aircraft hit a taxi which was driving on an elevated expressway. The taxi driver sustained serious injuries and one passenger sustained minor injuries.

Table 1.2-1 Injury table

Injuries	Flight Crew	Flight Attendants	Passengers	Other	Total
Fatal	3	1	39	0	43
Serious	0	1	13	1	15
Minor	0	0	1	1	2
None	0	0	0	Not applicable	0
Total	3	2	53	2	60

The TransAsia's ATR72-600 was configured with 72 economy class passenger seats. There were two pilot seats and one observer seat in the cockpit and two cabin crew seats in the cabin.

Figure 1.2-1 shows the cabin configuration with passenger injury and fatality distribution. The passenger seating positions were based on the airline seating plan and interviews with the surviving passengers.

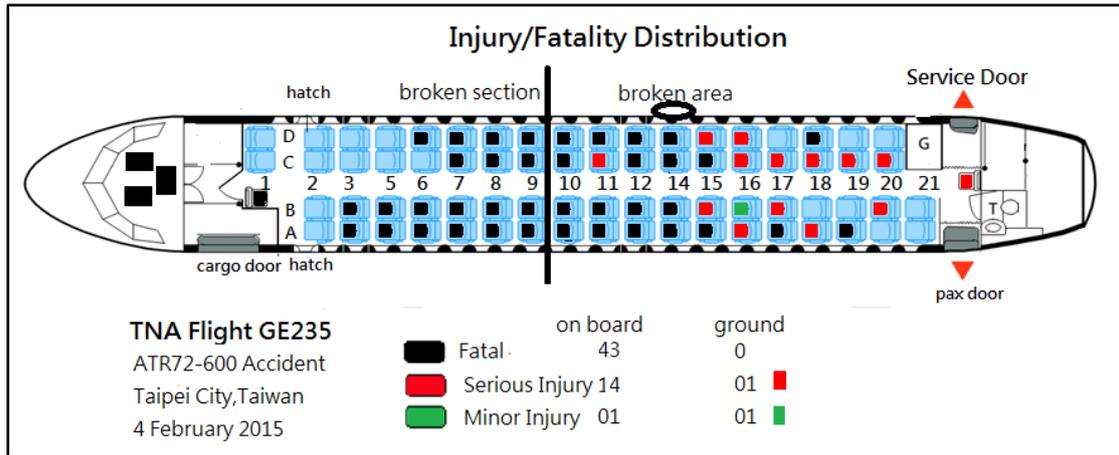


Figure 1.2-1 Injury and fatality distribution

1.3 Damage to Aircraft

As a result of the impact, the main wreckage sustained severe damage and sequentially described as follows and details were recorded in Attachment 7-1 wreckage site survey report and Attachment 7-2 seat status report.

1.3.1 Fuselage Airframe Status

Forward fuselage area including cockpit suffered severe compression and damages due to the impact, as shown in Figure 1.3-1.



Figure 1.3-1 Wreckage on Cockpit

Forward and middle-aft fuselage was separated from frame 24-25 (around seat row 9-10), as shown in Figure 1.3-2. There was also a break/hole on the right hand side fuselage located at frame 28-28A area

(around seat row 14-15). This break was then sawed to a larger hole for rescue purpose. The fuselage from frame 24 to tail cone was almost kept in its original shape, as shown in Figure 1.3-3.



Figure 1.3-2 The FWD and Mid-Aft fuselage separation from frame 24-25



Figure 1.3-3 A broken area on the right hand side fuselage located at frame 28-28A area

1.3.2 Main Door / Emergency Doors

The frame that contains cockpit hatch door was severely damaged with the door missing, as shown in Figure 1.3-4. The actuator of cargo door was retracted. The cargo door was not opened before the impact; however afterward only door fitting remained connected to the actuator, as shown in Figure 1.3-5. Right hand side emergency door was dislocated from the door frame. The emergency door, with mounting hinges broken,

was considered being pushed into cabin during the impact, as shown in Figure 1.3-6. Left hand side emergency door broke into halves due to the impact. The fuselage side door frame could not be located due to severity of damages to the FWD airframe. According to broken hinge location, this door was pushed into cabin during the impact, as shown in Figure 1.3-7. Left hand side passenger door was closed and intact at the time of the accident. Both internal handle and external flap handle were pulled down to un-lock position, as shown in Figure 1.3-8. Right hand side service door was still functioning, and was opened during rescue operation, as shown in Figure 1.3-9.



Figure 1.3-4 Cockpit and hatch door

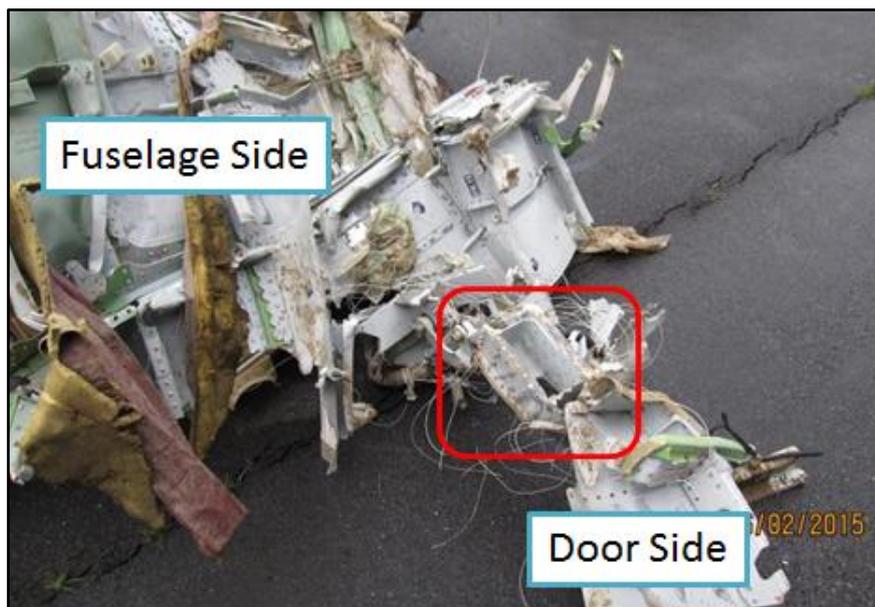


Figure 1.3-5 Cargo door



Figure 1.3-6 RHS Emergency escape door



Figure 1.3-7 LHS Emergency escape door



Figure 1.3-8 LHS Passenger door



Figure 1.3-9 RHS Service door

1.3.3 Seats and Seatbelts

There were 8 sets (2 seats for 1 set) of passenger seats kept intact on seat tracks located in the aft fuselage, as shown in Figure 1.3-10. 28 sets of passenger seats were dislocated from their positions due to the impact (about 5 sets) or rescue effort (about 23 sets), as shown in Figure 1.3-11. Their original positions could not be identified.

Two cabin crew seats (FWD and AFT) have been located. Flight crew and observer seats were badly damaged. Most of seat structures were damaged badly as twisted, deformed, and cracked. Most of seat shackles and belts were still in workable condition. Some of the life vests were recovered.



Figure 1.3-10 Passenger seats intact on seat track



Figure 1.3-11 Passenger seats dislocated from its position

1.13 Medical and Pathological Information

1.13.1 Medical Treatment of Injured

In this occurrence, there were 14 out of 15 survivors onboard who suffered mostly front impact and serious injuries including skull, sternum and lumbar bone fractures, abrasion, contusion and lacerations. The medical records of the injuries can be referred to Attachment 7-3.

The injuries were initially transported to 6 local hospitals around Taipei City and New Taipei City.

1.13.2 Toxicology information of Flight crews

The Institute of Forensic Medicine, Ministry of Justice conducted toxicology examinations on the 3 flight crew. The test items included alcohol content, poisons, sedatives, hypnotics, carbon monoxide hemoglobin and the basic drugs screen (about one thousand items).

Toxicology report of Captain A shows no evidence of drugs or toxin.

Toxicology report of Captain B shows doxycycline in blood and urine, no other drug or toxin was found.

Toxicology report of the first officer shows amlodipine in blood and urine, no other drug or toxin was found.

The toxicology examination report of flight crew can be referred to Attachment 7-4.

1.13.3 Forensic inspection and autopsy

Shi-Lin District Prosecutors, Institute of Forensic Medicine and Aviation Safety Council had a coordination meeting to make sure the agencies jointly collected all required information before performing

victim forensic inspection. The forensic pathologists from IFM performed the autopsy of three flight crew. Locations where victims were retrieved were not recorded before they were arranged and centralized by firefighters or rescuers.

1.13.3.1 Victim Inspection

Based on the abstract of inspection report by IFM, which can be referred to Attachment 7-5, most causes of the death were multiple traumatic injuries and drowning. The direction of the fatal impact force was predominately from front to back.

The main findings of the external examination on the victims were multiple fractures of skull and extremities. Some victims showed not only multiple traumatic injuries, but also possible drowning.

The forensic autopsy report showed the three flight crew had the same cause of death that was ring fracture of skull base, and severe comminuted skull fracture with severe brain crush and separation, referred to Attachment 7-6.

1.13.3.2 Injury patterns

The injury patterns included skull bone fracture, extremities bone fracture, multiple traumatic injuries, and drowning. Their descriptions related to cabin distribution was drawn by using "Injury Database and 3-D Analysis Software¹ ", as shown in Attachment 7-7.

1.14 Fire

No fire

1.15 Survival Aspects

1.15.1 Emergency Evacuation

According to the interview notes of passengers and a cabin crewmember (referred to Attachment 7-8), pilot in command performed briefing with cabin crew before this flight. The content of the briefing included the terminal and en-route weather, turbulence alert signal, hijacking signal and fire procedure review etc. After pushing back, cabin crew played safety video and carried out life vest demonstration. The aircraft then started to take-off rolling when cabin crew completed cabin safety check and announced to flight crew.

The survivors heard the no.1 engine noise became smaller and saw it stop rotating during takeoff/ initial climb phase. The aircraft sank a while,

¹ produced by ASC and Institute of Forensic Medicine in 2009

then was pulled up and then rapidly fell down in a left roll. During falling down, there was no striking noise or feeling in cabin and the aircraft directly into the water. Some of the passengers saw the aircraft was very close to the surrounding buildings.

All of the 15 survivors were seated after row 10. After the aircraft crashed into water, the middle-aft fuselage was separated from the forward fuselage, and was rotated nearly 160 degrees in counterclockwise direction and upside down. The cabin environment became dark and full of fuel odor. Some of passengers were upside down and unconscious immediately after the impact. Then they woke up due to choke from water. Most survivors were still in their seats and unbuckled their seat belts by themselves or assisted by other passengers. Most passengers described that the cabin at that time was very silent without any movement.

There was a break/hole at the aircraft right hand side fuselage around row 14~15 seats. Survivors described they saw sunlight from outside through this hole and they decided to escape from this hole. There were some objects obstructing survivors' escape way including seats, luggage, and other debris. One survivor who escaped from this hole stated her watch showed 11:05am at that time. A total of 10 survivors escaped from this hole and stood on the aircraft wing. The first batch of rescue boats arrived at scene at about 11:35am.

There were five survivors seated closed to aft-cabin escaped from service door. They had late recovery from coma. When the first one of these 5 survivors woke up, he could observe other survivors' condition and location and he described that in addition to these five people, there were no other survivors. He tried to comfort and took care of other survivors when waiting for rescuers and trying to knock the window for help. The rescuers opened the service door and rescued these five passengers around 11:35am through this service door.

1.15.2 Rescue

According to interview notes of local rescuers (referred to Attachment 7-9) and official rescue report (referred to Attachment 7-10), the first 9 rescue vehicles with about 15 fire fighters from Taipei City and New Taipei City rushed to crash site about 11:05~11:15 am after receiving the notice from their firefighting command centers. Three of the fire fighters tried to swim to aircraft main wreckage in the river. Two of them failed to reach due to strong current. Two powered rubber boats successively reached to aircraft main wreckage area and send rescuers to climb on tail fuselage. The other rescuers stayed on boat and began to rescue the 10 survivors who escaped by themselves from cabin and stood close to wing

section about 11:30 am. The rescuers on tail fuselage then opened the service door and went into cabin. They rescued five survivors from cabin through the service door.

According to rescuer interview notes, the cabin was full of gas odor and dark when they went into cabin. Therefore they tried to find out and use appropriate tools to rescue people such as the explosion-proof lights and the hydraulic cutters. TransAsia maintenance staffs and the fire fighter from Taipei Songshan Airport arrived on the initial phase and provided the advisory of aircraft's information regarding exit position and door operation, gas tank position, cutting area, hanging points and so on. For rescue purpose, the rescuer ever cut off several seats and portion of right fuselage skin. Most of victims in cabin were sitting on their seats with seat belt fasten and they were upside down in water.

IV. Appendices

NIL

V. Attachment List

No	Item
7-1	The wreckage site survey report
7-2	The seat status report
7-3	The medical records of the injuries
7-4	The toxicology examination report of flight crew
7-5	The abstract of victim inspection report
7-6	The forensic autopsy report
7-7	The injury pattern
7-8	The interview records of cabin survivors
7-9	The interview records of rescuers
7-10	The rescue and emergency response report from CAA