ACCIDENT

Aircraft Type and Registration:	Boeing 737-804, G-GDFJ
No & Type of Engines:	2 CFM56-7B26 turbofan engines
Year of Manufacture:	2000 (Serial no: 28229)
Date & Time (UTC):	19 October 2012 at 0638 hrs
Location:	Glasgow Airport
Type of Flight:	Commercial Air Transport (Passenger)
Persons on Board:	Crew - 6 Passengers - 187
Injuries:	Crew - None Passengers - 1 (Serious) 15 (Minor)
Nature of Damage:	None
Commander's Licence:	Airline Transport Pilot's Licence
Commander's Age:	36
Commander's Flying Experience:	7,600 hours (of which 2,200 were on type) Last 90 days - 227 hours Last 28 days - 69 hours
Information Source:	AAIB Field Investigation

Synopsis

As the aircraft commenced its takeoff roll, both pilots commented on a strange smell. A few seconds later, due to what appeared to be smoke in the cabin, the Cabin Service Director (CSD) alerted the flight crew to an emergency situation. The takeoff was abandoned and the aircraft stopped on the runway. Visual inspection by the commander confirmed the appearance of a significant amount of smoke in the cabin. He ordered an immediate evacuation, during which one passenger suffered a serious injury. No source for the smoke was identified but excessive moisture in the air conditioning system was identified as a possible factor. The operator subsequently amended its maintenance procedures.

History of the flight

The flight crew reported for duty at 0515 hrs, for a scheduled departure to Alicante, Spain at 0615 hrs. The pilots had flown together the previous day and it was decided that the commander would be the Pilot Flying (PF) for this outbound sector, with the co-pilot as the Pilot Monitoring (PM).

The aircraft was parked on Stand 25 and, while the commander prepared the flight deck, the co-pilot carried out the pre-flight inspection. The Auxiliary Power Unit (APU) was in operation providing the lighting and heating for the cabin environment. There were no unserviceable items in the technical log and the Daily Inspection (DI) had been carried out. However, there

was a 10 minute delay for a passenger. In accordance with their Standard Operating Procedures (SOPs), the crew carried out the takeoff and departure brief, which included the Rejected Takeoff (RTO) procedure.

Once the passengers had boarded and final preparations had been completed, all the doors were closed and clearance to 'push and start' was obtained. Those passengers seated in the rows next to the over-wing emergency exits were given a short briefing on their role in the event of an emergency and asked to study the information in the safety briefing card. The pushback was commenced and both engines were started. The 'Before Taxi' checklist was completed, including turning the engine anti-icing ON. The cabin crew carried out the Safety Briefing and demonstration whilst the aircraft was taxied to Holding Point G1, for a departure from Runway 05. Figures 1 and 2 show Stand 25 and the Holding Point G1, respectively.

The meteorological conditions, as broadcast on the 0556 hrs ATIS, were: Runway 05, wet, wet, wet; surface wind 080°/08 kt; visibility 10 km or more; scattered cloud at 1,200 ft and broken cloud at 1,500 ft; temperature +8°C and dew point +7°C; QNH 1006 hPa.

There was slight drizzle while the aircraft was taxiing and some areas of standing water were present on the surface. Having received the 'cabin secure' notification from the cabin crew, the flight crew carried out the 'Takeoff' checklist and received clearance to takeoff from ATC. The cabin crew dimmed the main cabin lights and some passengers selected their reading lights ON. The commander lined the aircraft up on Runway 05 and set 40% N_1. When both engines were matched and stable, he engaged the Take Off and Go Around (TOGA) mode of the autothrottle (A/T). Both engines accelerated and the pilots became aware of a "strange" smell. The aircraft accelerated normally but, at about 80 kt, the smell intensified and both pilots sensed a slight misting on the flight deck.

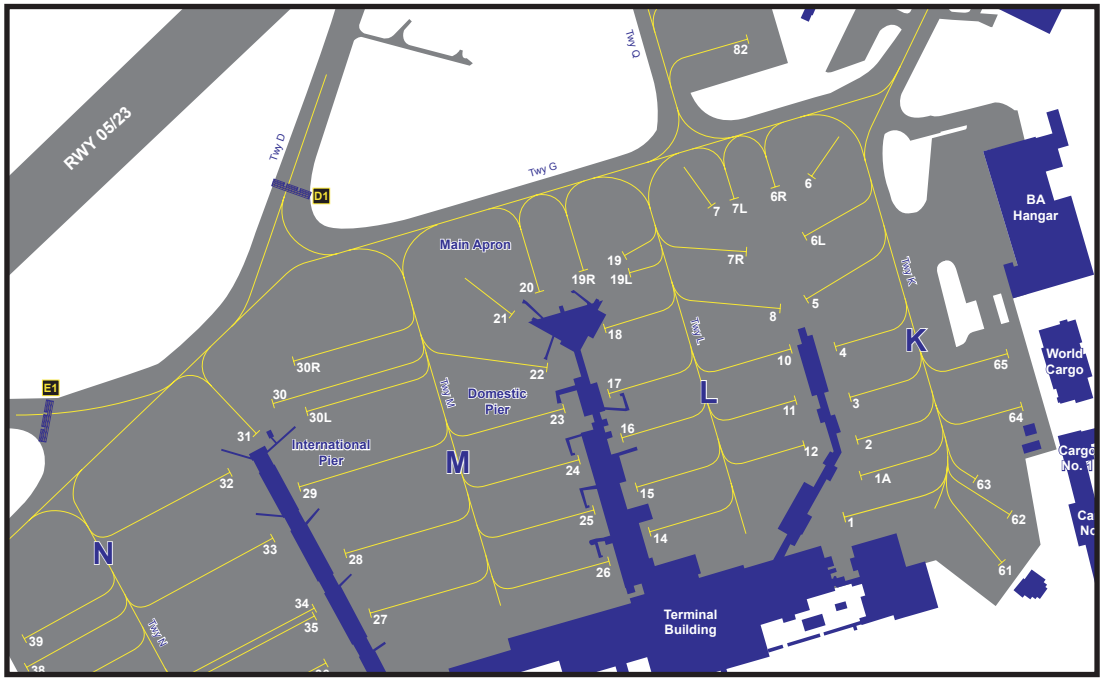


Figure 1

Glasgow Airport parking stands

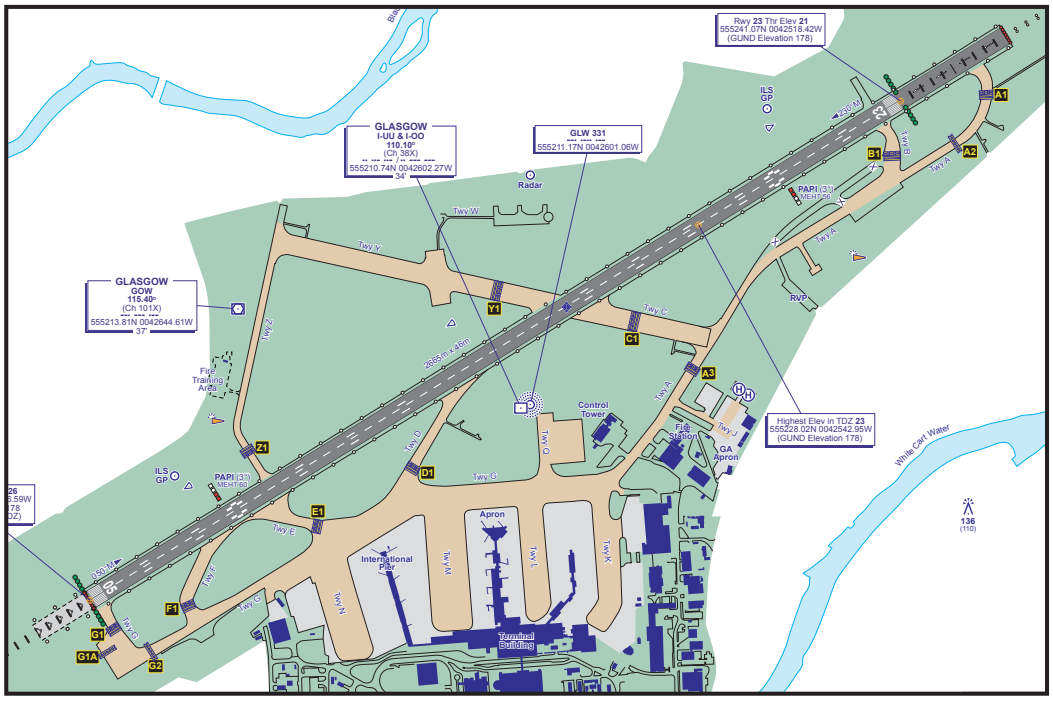


Figure 2

Glasgow Airport map showing Holding Point G1 and the threshold of Runway 05

The cabin crew and passengers were also aware of an unusual smell, which was variously described by the passengers as the smell of hot oil, burning electrics or burning rubber. What appeared to be smoke was coming from the area of the overhead lockers and was seen to be increasing in the beams of the illuminated overhead reading lights. With the deteriorating situation in the passenger cabin, the Cabin Service Director (CSD) repeatedly pressed the flight deck call button on the interphone handset to notify the flight crew that they had an 'urgent' situation in the passenger cabin.

The commander announced the RTO procedure and closed the thrust levers, disconnected the A/T, applied maximum braking, selected the speedbrake fully open and applied reverse thrust. The co-pilot acknowledged the RTO and confirmed that the speedbrake was fully open, that the thrust reversers were unlocked and that braking had been initiated. As the aircraft decelerated through 60 kt, he advised the commander of the speed and moved the flaps from the takeoff position to the 40° (maximum) position, in case of evacuation, and informed ATC that they were stopping on the runway. The aircraft came to a halt and, having applied the parking brake, the commander called the CSD to the flight deck. The CSD briefed the commander on the smell and the smoke in the passenger cabin, which was clearly visible through the open flight deck door. The commander immediately decided to carry out an emergency evacuation on the runway and the flight crew completed the evacuation checklist. The commander then ordered the evacuation and the co-pilot notified ATC.

The cabin crew opened the aircraft doors, the escape slides inflated and passengers opened the over-wing exits. Once all the passengers had evacuated from the aircraft, the cabin crew and, finally, the pilots departed the aircraft; the commander was the last to leave.

The airport Rescue and Fire Fighting Service (RFFS) were alerted by ATC and deployed to the aircraft immediately. They monitored the aircraft in case of fire and, once all those onboard were clear, a team wearing breathing apparatus deflated the forward right emergency evacuation slide and entered the aircraft using a ladder. They found no signs of fire but detected a faint smell of smoke.

Coaches were sent to collect the passengers and crew, to return them to the terminal. Those who were injured were initially treated at the scene, before being transported to hospital.

Evacuation

An AAIB Passenger Questionnaire was sent to each of the 187 passengers onboard the aircraft and 105 completed questionnaires were returned. From the information provided, a detailed picture of the sequence of events was constructed.

After the aircraft was pushed back and the main engines were started, some passengers became aware of an unusual smell but were not concerned enough to mention it to the cabin crew. As the aircraft lined up on the runway and takeoff thrust was set, a large number of passengers became aware of a smell of burning and saw smoke or vapour swirling around in the reading light beams.

Later, as the aircraft decelerated under heavy braking, some passengers described smelling burning rubber. A number of passengers adjacent to the windows reported seeing smoke, sparks or flames on the wings or from the area of the engines. The aircraft came to an abrupt halt and, shortly after, the instruction to evacuate was given. The cabin crew opened the emergency doors and passengers opened the over-wing emergency exits without difficulty. Passengers stood up and started moving towards the exits. Some tried to recover personal items from the overhead lockers, which created restrictions in the flow towards the exits. Passengers climbed onto both wings, which were slippery due to the rain, but were able to see the markings indicating the direction of movement. It was difficult to see the ground in the dark and some passengers were not aware that they should slide down the flap surfaces. Others expected to find an escape slide. On the left wing, some passengers slid down onto the ground and assisted others. On the right wing, fewer people slid down to the ground, while others re-entered the cabin and exited it using door escape slides when it was apparent that there were no visible signs of danger.

Passengers evacuating through the doors jumped onto the slides, as instructed, and, given the wet surface, slid rapidly to the bottom. Some people had difficulty clearing the slides before the next passenger arrived. This caused a number of injuries, as people collided or were knocked over onto the ground.

When all the passengers had cleared the cabin, the cabin crew left the aircraft and tried to gather the passengers together. The aircraft commander walked the length of the cabin and, having ensured all passengers had evacuated, the co-pilot, followed by the commander, exited the aircraft. Figure 3 shows the exits used by those passengers who returned questionnaires.

The airport RFFS arrived during the evacuation and assisted the passengers, as well as recovering a dog from the aircraft cargo hold. Buses were provided by the airport and the passengers boarded them for shelter, before being transported to the terminal building. Injured passengers received treatment at the scene and those requiring hospital treatment were transported there by ambulance. One passenger, aged 77, fractured bones in her neck and chest when she landed badly on

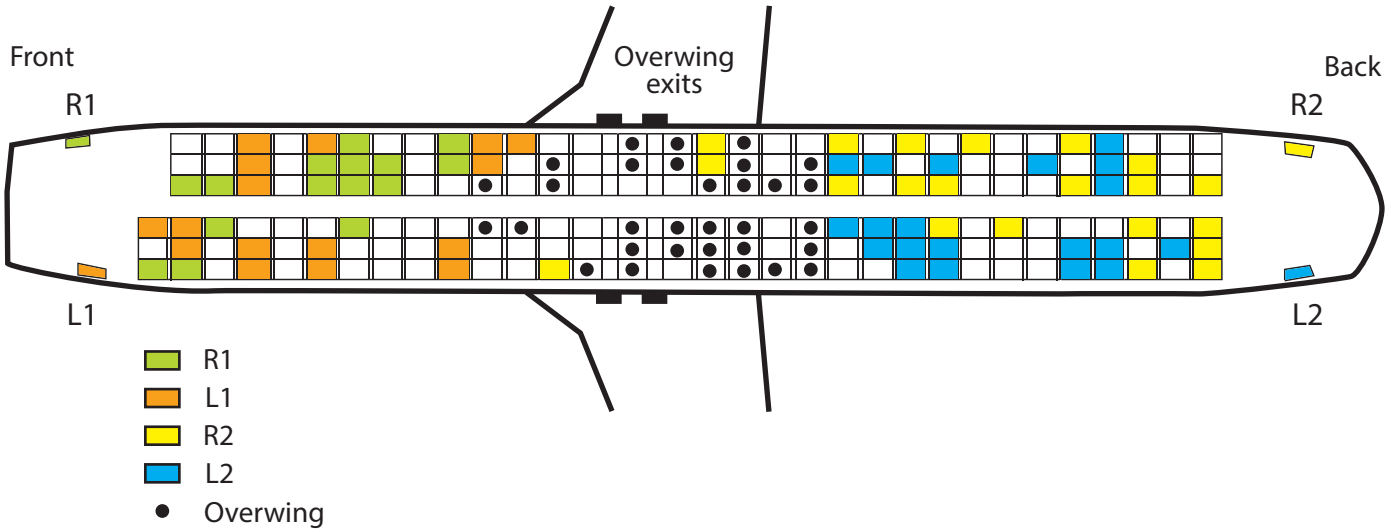


Figure 3

Cabin diagram showing the exits used by passengers

the runway, after descending down a slide. There were 15 minor injuries as a result of passengers sliding into one another at the bottom of slides and being knocked over as they slid off the end.

Evacuation certification requirements

The Boeing 737-800 was required to meet the requirements of Federal Aviation Requirements (FAR) Part 25.803 and demonstrate an emergency evacuation in accordance with the following:

> *'For airplanes having a seating capacity of more than 44 passengers, it must be shown that the maximum seating capacity, including the number of crew members required by the operating rules for which certification is requested, can be evacuated from the airplane to the ground under simulated emergency conditions within 90 seconds. Compliance with this requirement must be shown by actual demonstration using the test criteria outlined in appendix J of this part unless the Administrator finds that a combination of analysis and testing will provide data equivalent to that which would be obtained by actual demonstration.'*

FAR 25.803 required, amongst other things, that the demonstration must be conducted under the following conditions:

> *'1) It must be conducted during the dark of night or during the daylight with the dark of night simulated, utilising only the emergency lighting system.*
>
> *5) A representative passenger load of persons in normal health must be used as follows:*
>
> *(i) At least 30% must be female*
> *(ii) Approximately 5% must be over 60 years of age with a proportionate number of females.*
> *(iii) At least 5% but no more than 10% must be children under 12 years of age, prorated through that age group.'*

This demonstration was satisfactorily carried out.

The age group requirements for the demonstration, by percentage, are shown in Figure 4. They are compared with the actual age distribution in the accident, obtained from the 105 questionnaires returned.

Evacuation guidance for pilots and cabin crew

The operator provides advice to its pilots in the Boeing Flight Crew Training Manual. Section 8.4, states:

> *'For persistent smoke or fire which cannot be confirmed to be completely extinguished, the safest course of action typically requires the earliest possible descent, landing and evacuation.'*

An Operational Staff Instruction (OSI) 11/222 for the Boeing 737-300/800 fleet, for the takeoff phase of a flight, also advised:

> *'If the decision is made to reject the take-off the Captain is to call 'STOP' and carry out the manoeuvre as prescribed in the QRH. It is to be the 737 Fleet policy that a Passenger Evacuation is to be ordered for every RTO that has involved a fire, even if that fire has been extinguished.'*

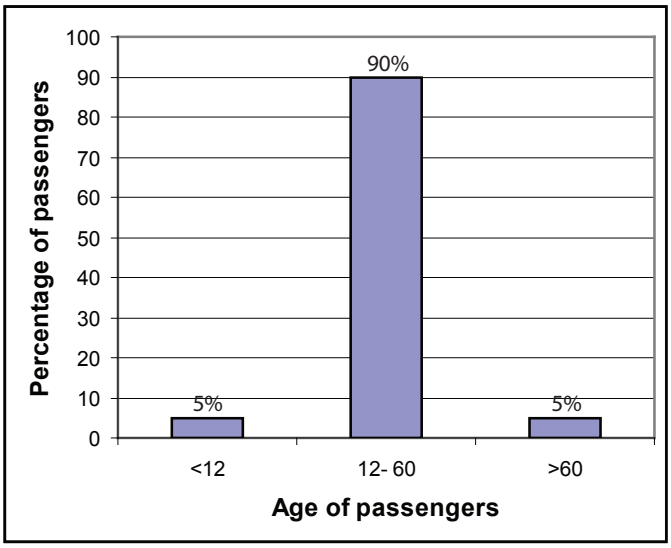
Cabin Crew alert to the Captain

The Cabin Safety Manual contains instructions for Cabin Crew on how to alert the Captain of an emergency in the cabin. These are:

> *'4.1.1 'Alerting Captain to an Emergency in the Cabin*
>
> *Should the Cabin Crew be aware of an emergency situation in the cabin, e.g. fire, and need the immediate attention of the Captain. They should use the interphone system and press the Captain button 5 or more times.'*

Escape slide requirements

Aircraft doors which are used for emergency evacuation are required to be fitted with escape slides which must meet set criteria. In the case of over-wing exits, no slide is required providing the escape route utilises the flap surface and the height to the ground from the trailing edge of the flap is less than six feet. The height from the trailing edge of the flap to the ground during the certification of the Boeing 737-800 was measured to be 70 inches. The



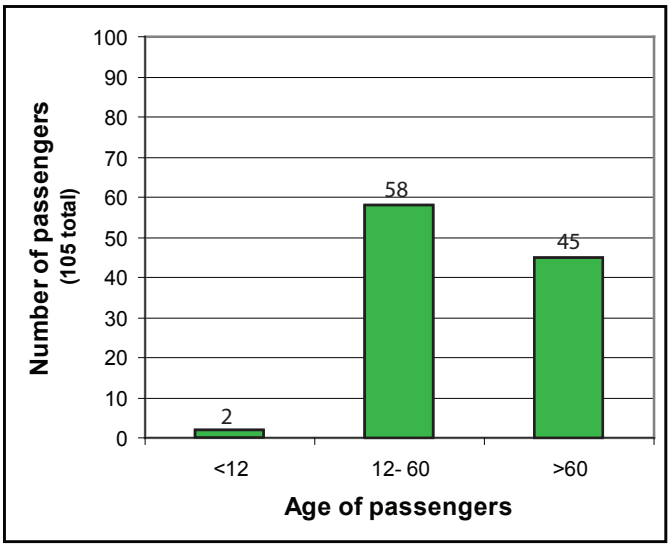


Figure 4

Certification and accident age distribution

Figure 5

Showing the flaps in the fully lowered position.

height of the lowest part of the flap trailing edge with the flap fully lowered (see Figure 5) is 42 inches.

Recorded data

The aircraft was fitted with a CVR and an FDR which were downloaded. The aircraft was also fitted with a Quick Access Recorder (QAR) but this did not record any additional parameters. Some parameters and recordings from the rejected takeoff are shown in Figure 6.

ATC, RTF and Surface Movement Radar (SMR) recordings were made available to the investigation. The RTF recordings covered communications on the Tower, Ground and Fire frequencies and the OMNICRASH communications system. The SMR provided a timeline for vehicles attending the aircraft.

Recordings from three CCTV cameras were provided to the AAIB. The CCTV cameras were not initially directed at the aircraft but panned to the aircraft at various times after the evacuation had started. There was no view of the left side of the aircraft and recording quality was poor, due to low light conditions, limited resolution and very low frame rates. However, they yielded useful information.

The various sources of the recordings used slightly different time stamps. For the purposes of this report, the times were adjusted to align with the ATC recordings. Table 1 is a time line of the pertinent times, events and communications.

Detailed observations

The CVR recording captured the end of the previous flight. Wipers were used during that approach and, after landing, the crew commented on the amount of standing water on the ground. The CVR also recorded that the aircraft's departure before the RTO was delayed for one passenger, waiting for wheelchair assistance.

The recordings show that the pilots identified a "STRANGE SMELL" approximately five seconds after the engines reached their takeoff power. The flight crew did not make reference to any visual signs in the cockpit. Eleven seconds after the flight crew first commented on the smell, the cabin crew alerted the flight crew to a problem in the cabin. This was identified as smoke. There was no reference to heat or breathing problems.

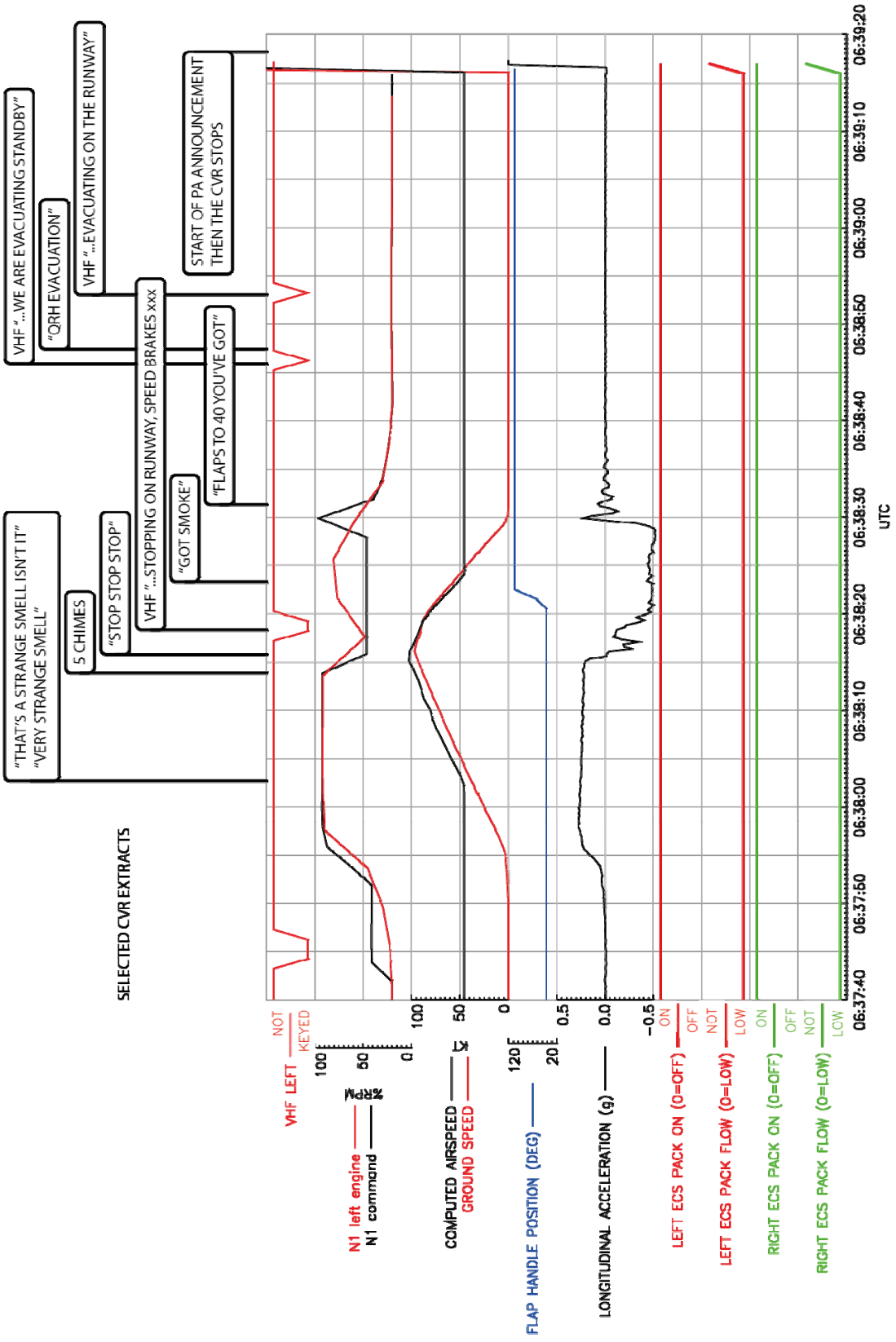


Figure 6

Pertinent FDR parameters and CVR extracts

UTC	Recording source	Observation
06:26:50	CVR	First engine start.
06:31:15	FDR	The ECS packs were switched ON with LOW flow.
06:37:40	RTF / CVR	ATC provided takeoff clearance.
06:37:58	FDR	The engines reached takeoff power.
06:38:03	CVR	"THAT'S A STRANGE SMELL ISN'T IT" reply "VERY STRANGE SMELL".
06:38:10	CVR	"EIGHTY KNOTS".
06:38:14	CVR	Five chimes.
06:38:16	CVR	"STOP STOP STOP".
06:38:19	RTF / CVR	Radio "...STOPPING ON RUNWAY, SPEED BRAKES", CVR had additional un-transmitted "UP" at the end of the sentence.
06:38:23	CVR	"GOT SMOKE".
06:38:30	SMR	Aircraft appears stationary.
06:38:31	CVR	"FLAPS TO 40 YOU'VE GOT".
06:38:37	CVR	"CABIN CREW AT STATIONS, SENIOR TO THE FLIGHT DECK".
06:38:46	RTF / CVR	Aircraft to tower: "…WE ARE EVACUATING STANDBY".
06:38:48	CVR	"QRH EVACUATION".
06:38:53	RTF / CVR	Aircraft to tower "...EVACUATING ON THE RUNWAY".
06:39:08	OMNICRASH	Passed a message regarding a ground incident specifiying aircraft type and location.
06:39:18	CVR	PA "THIS IS THE CAPTAIN…" then the recording stopped.
06:39:26	OMNICRASH	Passed information regarding an evacuating onto the runway and a speed brake problem.
06:39:52	RTF	Tower asked for confirmation of a speedbrake problem.
06:39:55	RTF	Aircraft to tower: "...FIRE IN THE CABIN…"
06:40:01	SMR	First sign of vehicles emerging from the fire building.
06:40:01	RTF	Aircraft to tower: "SMOKE IN THE CABIN SIR".
06:41:19	CAM9	The camera panned to the aircraft and showed that the slides were deployed and people were on both sides of the runway.
06:41:28	SMR	First vehicle stopped in front of the aircraft, shortly followed by two others.
06:41:45	CAM9	The last time a person came down the right rear slide (note 1).
06:42:56	CAM9	The last time a person came down the right front slide (note 1).

Note 1 - the CAM9 (CCTV) recording was only at one frame per second and with poor image quality in the low light, so it is possible that more people came down the slides but it was not apparent in the recording. There were no recordings available that viewed the left side of the aircraft.

Table 1.

A timeline of selected extracts from the CVR, FDR, ATC RTF recordings, CCTV cameras and the SMR

Previous flights

The FDR data covered eight flights; a limited sample. Compared to the previous flights, this flight included the second shortest period between the Environmental Control System (ECS) packs being selected ON, in accordance with the standard operating procedures, and takeoff power being applied, which came after the longest period with the engines running and the ECS packs OFF. This followed an earlier short engine ground run, approximately an hour and a half before the engines were started.

Cabin air supply

During normal operation, bleed air is taken from the engine compressors and passed through an air conditioning system to provide a supply of temperature controlled fresh air to the cabin and cockpit. The air supply can also be provided by the APU or a ground source via an external connection, if required.

Each engine supplies a separate air conditioning pack and the output of conditioned air from both of these packs is fed into a single mix manifold, where it is mixed with recirculated cabin air before being distributed to the two cabin zones, forward and aft. The cockpit air supply is taken from an outlet between the left pack and the mix manifold. The air temperature for each zone is independently controlled by mixing hot unconditioned air with the conditioned air supply to that zone. This unconditioned air supply is a combined single supply of hot air which is taken from points just downstream of the flow control valves.

During taxi, the engines mostly operate at ground idle and the bleed air from the engine compressors is at relatively low pressure. The pneumatic system uses pressure regulation to extract air for use by the air conditioning packs. Therefore, when engine pressures are low, less air is extracted. This low airflow means that during ground operations it takes longer for the air conditioning system to adjust the cabin air temperature to the desired value. Safeguards that limit the coldest air temperature from a pack are built into the system to prevent the pack from freezing. Conditioned air is mixed with recirculated cabin air in the mix manifold and typically air is delivered to the cabin at around 15°C.

During takeoff, the pressures in the engine compressors rise and more air is available to the air conditioning packs. The packs can now supply more conditioned air at colder temperatures, down to the safeguard limit. Therefore, during takeoff, the air conditioning system provides larger volumes of air to the cabin and could, if demanded, provide air to the cabin at temperatures down to 1.7°C.

Examination of the aircraft

During the previous night a borescope inspection had been carried out on the No 2 engine as part of maintenance actions following an earlier birdstike. No damage or bird remains were found and a short engine run was carried at ground idle to confirm there were no leaks following the inspection.

After the evacuation, the aircraft was inspected by the operator's maintenance personnel under the supervision of the AAIB. The aircraft had not had any hydraulic fluid uplifts immediately prior to the flight and it had not been de-iced. Both engine oil levels had been replenished before the flight but they were found to be within the normal operating range. An initial visual inspection of the aircraft was carried out and no anomalies were noted.

Inspections were then carried out in accordance with the manufacturer's Fault Isolation Manual (FIM),

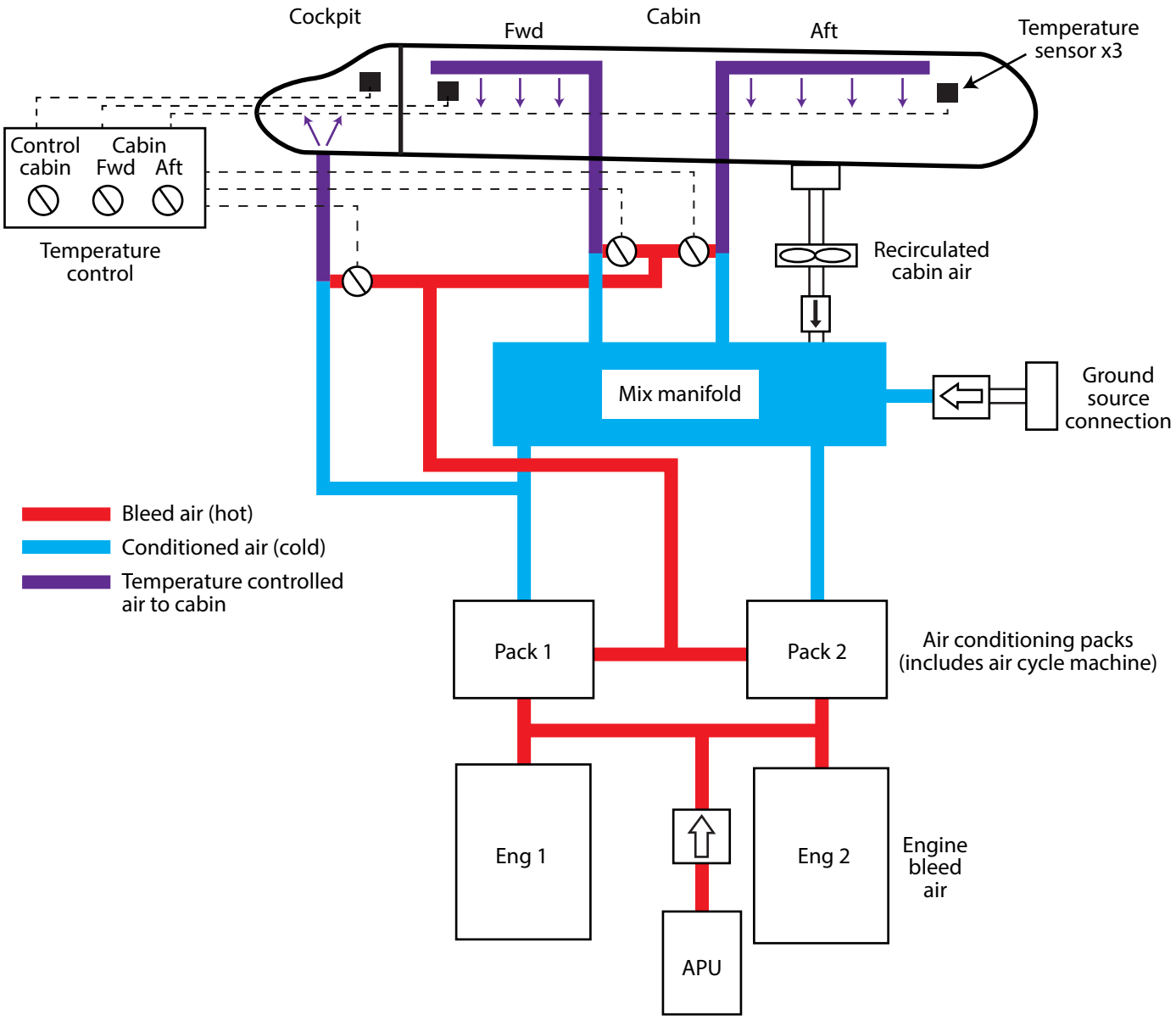


Figure 7

Simplified Schematic of Air Conditioning System

Task 21-00-806 Smoke or Fumes in the Cabin, Source Unknown and Task 71-05-807 Smoke or Fumes in Cabin, Pneumatic Power Supplied by Engine. These tasks included a borescope inspection of both engine's compressors and a thorough inspection of the aircraft bleed air and air conditioning systems, including the inside of ducting. No anomalies or evidence of contamination were found.

An extensive ground run test was then carried out using the APU and the engines as the pneumatic source. The bleed air and air conditioning system were configured in various combinations and temperature selections to try and reproduce the fault. These systems operated normally and nothing unusual was observed. No signs of any smoke or fumes were noted by any of the people onboard during these tests.

Subsequent to this testing the right air cycle machine and its pack valve were replaced due to an intermittent reluctance to operate. The air cycle machine was taken to the manufacturer's workshop where it was dismantled and inspected under supervision of the AAIB. The unit had been manufactured in 1999 and remained fitted to the aircraft ever since. The inspection found the unit to be in a condition commensurate with its age and no defects were identified that could have led to smoke or fumes being present in the cabin.

In order to identify the nature of the fumes seen in the cabin, the two cabin temperature sensor filters were removed for testing. These filters are located, one forward and one aft, in the underside of the hat racks and they filter cabin air before it is drawn across the temperature senor. Another set of filters were removed from a similar aircraft to use as a comparison. The filters were sent to a specialist laboratory for testing, using Gas Chromatography with a Mass Selective Detector. The laboratory summarised its findings as:

> *'The materials trapped by the all the filters are consistent with general dirt and dust.*
>
> *The amounts of materials trapped by the filters from both aircraft are comparable.*
>
> *The natures of the organic materials in the incident and control aircraft are the same.*
>
> *The organic materials which could not be characterised are not present in Mobil Jet II or Skydrol.'*

The laboratory concluded,

> *'the analyses carried out have not identified any significant differences between the contents of the filters from the incident aircraft when compared with those of the control aircraft. There are no identified materials in the filters from the control aircraft that could be linked to the reported fumes/smoke.'*

The aircraft was operated to another base without passengers onboard, to confirm satisfactory operation before being returned to service. The positioning flight and subsequent commercial flights were normal and there was no recurrence of the smoke / fumes in the either the cockpit or cabin.

Information from the aircraft manufacturer

In December 2009, the manufacturer issued Service Letter 737-SL-00-023-B, a Smoke and Burning Odour (SBO) Event Summary. This provided an analysis of SBO events reported to the manufacturer. The predominant causes that had been identified were listed along with potential corrective or preventive actions for each. These were reviewed by the operator and all were ruled out as the potential cause of this event. The Service Letter notes that events where a root cause was not identified were excluded from the analysis.

Other similar events

The CAA was asked to conduct a search of their Mandatory Occurrence Reporting (MOR) database for similar events on this type of aircraft over the last five years. Of the twenty two events recorded, nine relate to smoke from ovens, caused by things such as stray paper or grease; four to technical defects such as hydraulic fluid leaking onto hot brakes and six were due to contamination of the air conditioning system, such

as ingestion of de-icing fluid into air intakes or over servicing of the engine oil system. Three reports related to unidentified mist or fumes inside the aircraft, one was in the cruise and resulted in a diversion and one was during boarding which was temporarily suspended. The third occurred shortly after takeoff and was reported as 'greyish' smoke in the flight deck, with no odour, and misting and a 'rubbery' odour present in the front of the cabin. The misting or smoke cleared and the flight continued. No cause was found during subsequent inspections.

Analysis

No defects were identified on the aircraft that could have led to the smoke or fumes that were seen and smelt. Laboratory analysis of the cabin temperature sensor air filters, exposed to cabin air, showed that there were no unusual substances or residues of oil or hydraulic fluid present.

At the beginning of the flight, the air conditioning packs were selected ON after engine start, in accordance with the standard operating procedures, but later than on the other flights sampled. This, combined with the short taxi time, may have meant that the cabin was slightly warmer than usual by the time the takeoff commenced. The ambient conditions on the day meant the air was humid, with the temperature and dew point only one degree apart. As engine power was increased for takeoff, more air was available for air conditioning and the air conditioning system was able to supply colder air to the cabin to achieve the selected temperature. As the cabin was warm and humid, this sudden influx of cold air, potentially down to 1.7°C, could have caused the formation of mist or fog in the cabin which, in the low lighting conditions, could have given the appearance of smoke or fumes.

No reason for the acrid burning smell could be found and it did not recur at any time during ground tests or subsequent flights. There was no residual smell in the cabin or on people's clothing and none of the aircraft occupants reported any negative effects. It is possible that this smell may have been due to excessive moisture in the pneumatic system, vaporising from the ducting as it heated up to its normal operating temperature.

Some passengers in window seats reported seeing sparks outside the aircraft as it was decelerating on the runway. Nothing outside the aircraft was found that could have caused the apparent sparking. Given the wet runway conditions and low levels of light, these 'sparks' were most likely the aircraft and runway lights reflecting off the spray thrown up from the runway by the use of full reverse thrust on the engines.

Evacuation

When the flight crew set the takeoff thrust, they were aware of a "strange smell". As the takeoff run progressed, passengers and cabin crew both noticed increasing amounts of smoke or vapour in the cabin, visible in the beams of the reading lights. Prompt action by the CSD, in alerting the flight crew, assisted the commander in making a timely decision to abandon the takeoff and stop the aircraft.

When the CSD entered the flight deck, the commander was clearly able to see the smoke or vapour in the cabin. This visual picture, the strong smell of burning and the CSD's assessment were the triggers for an immediate emergency evacuation, which the commander initiated. The crew then followed the procedures for evacuating the passengers. Those passengers at the over-wing exits opened them, as briefed earlier.

The evacuation took an estimated 3 minutes and 38 seconds. Passengers attempting to recover property

from the overhead lockers delayed movement towards the exits, and the age or infirmity of some of the passengers may have extended the evacuation time. Several passenger decided to re-enter the cabin through the over-wing exits, rather than slide down the extended flaps, as they considered it would be safer to use an escape slide. Also, the time taken for the commander to walk the length of the cabin, to ensure all on board had left, further extended the total evacuation time.

The injuries suffered were as a result of the evacuation, due to passengers bumping into each other on the slides or being knocked to the ground. In the case of the over-wing exits, sliding six feet to the ground off a wet flap can be a daunting experience but the aim is to escape from the aircraft and, as such, carries a degree of risk.

The effects of fire and smoke are well documented and the procedures and guidance provided to crews reflect the need to take prompt decisions and action when fire and/or smoke are encountered in an aircraft.

Subsequent action

Excessive moisture in the air conditioning ducting was a possible factor in this event. Consequently, the operator has directed its maintenance personnel, by Quality Notice 118A, to take additional action following all engine ground runs after maintenance. It states:

> *'The following shall be carried out for all engine runs after maintenance. In addition to the minimum idle of 5 minutes without load (as per AMM task 71-00-00), both air conditioning packs shall be run using engine bleed (as per AMM task 21-00-00) with cabin temperature selectors in the mid position for a further 5 minutes prior to engine shut down.'*

In addition, the operator has re-issued the on-board Safety Card to reflect the need for passengers, evacuating via the overwing exits, to slide down the trailing edge of the wing. Also, the verbal briefing given to passengers occupying seats adjacent to the overwing exits has been amended to stress the requirement to turn aft, immediately after evacuating through the exit, and to slide down the trailing edge of the wing.