

No: 12/91

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Category: 1a

Aircraft Type and Registration: Embraer EMB-110 P1, G-SWAG

No & Type of Engines: 2 Pratt and Whitney PT6A-34 turboprop engines

Year of Manufacture: 1980

Date & Time (UTC): 26 August 1991 at about 1115 hrs

Location: Tilstock Airfield, Nr Whitchurch, Shropshire

Type of Flight: Aerial Work

Persons on Board: Crew - 1 Passengers - 1
Parachutists - 17

Injuries: Crew - None Passengers - None
Parachutists - 1 (fatal)

Nature of Damage: Minor damage to the leading edge of the left horizontal stabiliser

Commander's Licence: Commercial Pilot's Licence

Commander's Age: 32 years

Commander's Flying Experience: 1,609 hours (of which 83 were on type)

Information Source: AAIB Field Investigation

A parachuting and social event was held at Tilstock Airfield on the 24, 25 and 26 August 1991. It was planned to use a Shorts 330 aircraft for the parachute drops but the appropriate clearances could not be obtained in time. The Club Chief Instructor (CCI) hired a Shorts Skyvan as the primary aircraft and was offered the use of an Embraer Bandeirante which was normally based at Southend Airport. As far as the CCI was concerned this was an appealing idea as, to his knowledge, this type of aircraft had not been used before, in the United Kingdom, in the parachuting role. He stated that he was assured by a representative of the operating company that the necessary CAA authorisation had been obtained, but he did not personally check the documentation.

The aircraft was positioned at the airfield by one pilot; the pilot of the accident flight arrived later by road. He was authorised, by the British Parachute Association (BPA), as both a Parachute Pilot and a Parachute Pilot Examiner. The authorisation was for Cessna 206, BN2A and PA32 aircraft. Although he had a valid type rating on the Bandeirante, he did not have the necessary Parachute Pilot Authorisation.

The airdrop version of the aircraft is fitted with a removable paratroop door, a jump platform, handrails, anchor lines and a warning system for the jumpmaster. These modifications were originally developed for military use and not sport parachuting. No such modifications had been made to G-SWAG, however, the freight door had been removed to allow parachutist to exit. The Bandeirante was not designed or certified for flight without this door and so no flight tests were carried out in this configuration. The CAA approved Minimum Equipment List does not permit flight with the freight door removed. No approval had been given, by the CAA, for parachute dropping.

The paratroop door, when fitted, is integral to the existing freight door which is on the rear left side of the aircraft. The rear edge of the paratroop door is about 45 inches aft of the front edge of the freight door. About 35 inches aft of the front edge of the freight door on G-SWAG, there was a one inch wide red line painted on the cabin floor from door sill to right cabin wall. Its purpose was to mark the rear extremity of cargo compartment five. This was used as a guide to the rearmost position for an exiting jumper's feet. The pilot based his drop configuration on that suggested in the Embraer Flight Manual Supplement on parachute dropping. This was "landing gear retracted, flaps at 100%, 100 KIAS". In practice he used an IAS of 90 kt, about 600 lb torque and a level pitch attitude; this gave a rate of descent of about 500 ft/min. Over the 3 day period, more than 600 successful descents were made from the aircraft.

Shortly after 1100 hrs on Monday 26 August, 16 jumpers plus a camera-man, who had been briefed by the load organiser for Canopy Relative Work, boarded the Bandeirante. The plan was to leave the aircraft at 13,500 feet, deploy the parachute after a five second delay and attempt to form a canopy stack prior to breaking off and landing back at Tilstock Airfield. The load organiser took up his position at the front of the cabin, just behind the pilot, who he briefed on the planned jump. The remaining jumpers sat on the floor, in two rows, facing aft. The jumpmaster was by the rear door. The aircraft took off, at about 1107 hrs, on runway 33.

An aftercast for the period was obtained from the Meteorological Office at Bracknell. An anticyclone, centred over the Irish Sea, maintained a light northerly airflow over the area. There was scattered cumulus cloud, base 2,600 feet which merged with broken strato-cumulus, base 4,000 feet and tops 5,500 feet. The following winds were quoted;

14,000 feet	270°/15 kt
10,000 feet	290°/10 kt
5,000 feet	290°/10 kt
2,000 feet	360°/10 kt
1,000 feet	010°/07 kt
Surface	020°/05 kt

As the aircraft climbed out, on a westerly track, several of the jumpers noted that there was a layer of cloud between about 2,000 feet and 5,000 feet. At about 6,500 feet, the aircraft turned back towards the airfield. When his altimeter read 10,000 feet, the jumpmaster stood up, had his equipment checked and looked out of the door to check the DZ area. He saw the clubhouse through the door opening and noted that the area was clear and that the aircraft was tracking easterly. About ½ mile east of the clubhouse, a left turn was made which he assumed was onto a run-in heading. A plot from the Clee Hill radar computer indicated that this turn was started shortly after 1119 hrs and that the aircraft's groundspeed was approximately 145 kt. The jumpmaster reported that his altimeter read 13,000 feet at this stage and he signalled to the load organiser that he was visual and gave a thumbs up sign to indicate "ready to go". The load organiser reported that he communicated this to the pilot who said "OK"; he then acknowledged the jumpmaster's signal and indicated that he was also visual with the airfield. Shortly afterwards the jumpmaster gave the order to exit the aircraft. The pilot reported that, at this stage, the aircraft was still climbing, at 130 kt IAS, with 1,600 lb torque and about 12° nose up pitch. He recalled feeling a "slight and short vibration" which appeared to come from the underside of the nose of the aircraft. When he realised that the jumpers were exiting, in order to adopt the correct configuration as quickly as possible, he simultaneously reduced power and lowered the nose. As the speed reduced to 110 kt, he selected 100% flap, which would have taken about 12 seconds to deploy; the radar plot indicated a reduction in groundspeed at just after 1120 hrs, when the aircraft was on a north-easterly track. He turned to see the last four or five parachutists exiting and immediately informed the DZ controller that they had left the aircraft of their own accord. The radar plot showed nine contacts to the north-east of the airfield at between 1121:22 hrs and 1122:36 hrs; these were thought to be the parachutists.

The majority of the jumpers had not noticed any significant difference in aircraft attitude to previous jumps from the Bandeirante. One jumper did, however, report that, on a previous jump, there was a reduction of noise level from the engines and he had to walk noticeably "uphill" towards the door opening. On this occasion he had not noticed any reduction in noise level and the aircraft floor appeared to be relatively level. About a third of the jumpers noticed that their personal altimeters read around 13,000 feet and others reported that the floor was almost level when they left the aircraft. Several of the jumpers experienced a period of instability following their exit; many recognised this as the consequence of exiting at a higher than normal airspeed.

The jumper who was number 10, excluding the camera-man, in the sequence, reported that he checked the equipment of jumper number seven and found everything in order. He noted that jumpers four, five and six passed close to the tail following their exit. He also noted that, as jumper number seven stood in the doorway, facing inboard, his right foot was about nine inches aft of the red painted line on the floor. He saw him exit and turn to face the direction of travel of the aircraft; shortly afterwards the back of his helmet struck the tail of the aircraft. The observer then jumped out of the aircraft and lost contact.

No running-in call had been made by the pilot and, consequently, the DZ controller had neither cleared the aircraft to drop nor observed the exit through the telemeter, as was standard practice. The first he knew of the incident was when, some minutes later, he was informed over the ground communications system. He sent someone to the site who, on arrival, briefed him by radio. By this time the Skyvan had discharged another load and the Bandeirante had taken off again. He decided to let the latter continue with its drop and then suspended all further operations.

Some people, observing the parachuting from a car, were near the rear entrance to Twemlows Hall, in the north-east corner of the airfield, when one of them saw a dark object fall from the sky. A flock of birds flew up from the area where it landed, which was quite close to their position; they went immediately to the scene. They saw a parachutist lying on the ground; he was wearing a parachute which was unopened and his helmet lay to one side. He appeared to be dead. One person drove to the Sports Parachute Centre to inform them of the accident while the others remained to protect the site until the emergency services arrived. The residents of a nearby bungalow called an ambulance; the emergency call was received at Ambulance HQ, Shrewsbury at 1123 hrs and an ambulance was dispatched from Whitchurch Ambulance Station, which was approximately two miles from the site. This arrived at 1129 hrs, followed at 1131 hrs by a paramedic. The Ambulance Control Room had also alerted the Air Ambulance at RAF Cosford, however, this was not required and was cancelled at 1134 hrs. The first person from the parachute centre was reported to have arrived some time after the ambulance. The ambulance and paramedic left the site at 1157 hrs.

The post mortem report indicated no pre-existing medical condition which would have contributed to the accident. The parachutist was probably rendered unconscious by the impact with the horizontal stabiliser.

The following recommendations were made to the CAA;

- 1) The BPA be required to include, in their Operations Manual, a procedure to ensure that the jumpmaster is positively informed, by the pilot, that the aircraft is in the correct configuration for the drop.
- 2) The BPA be required to include, in their Operations Manual, a requirement that the jumpmaster either be briefed on, or apprise himself of the relevant characteristics of the aircraft type from which the jump is to be made.
- 3) The BPA be required to consider the first aid/medical implications of events such as the one at Tilstock and include the appropriate requirements/guidance in their Operations Manual.