

**INCIDENT**

**Aircraft Type and Registration:** Dart Herald 209, G-CEXP

**No & Type of Engines:** 2 Rolls-Royce Dart 532-9 turboprop engines

**Year of Manufacture:** 1968

**Date & Time (UTC):** 31 July 1994 at 1823 hrs

**Location:** Runway 26L, London Gatwick Airport

**Type of Flight:** Public Transport

**Persons on Board:** Crew - 3                      Passengers - 1

**Injuries:** Crew - None                      Passengers - None

**Nature of Damage:** Both engines destroyed

**Commander's Licence:** Airline Transport Pilot's Licence

**Commander's Age:** 60 years

**Commander's Flying Experience:** 15,300 hours (of which 1,723 were on type)  
Last 90 days - 87 hours  
Last 28 days - 37 hours

**Information Source:** AAIB Field Investigation

**History of the flight**

The crew, accompanied by an aircraft maintenance engineer, flew the aircraft on the first sector, lasting some 50 minutes, from Guernsey to Gatwick, arriving at 1605 hrs. The aircraft was scheduled to remain on the ground at Gatwick for just over two hours to allow for the loading of cargo and mail before the crew's second sector to East Midlands. A Post Office worker was to accompany the mail during this flight. At 1816 hrs the aircraft taxied from the cargo area via Taxiways 4 and 6 to holding point 'BRAVO' to await take-off clearance from Runway 26L.

At 1821 hrs the Gatwick aerodrome controller transmitted to the crew "ARE YOU READY IMMEDIATE TAKEOFF". The crew replied in the affirmative and were instructed "BEHIND THE DEPARTING ATR-42 LINE-UP 26L BE READY TO GO". At this time the ATR-42 had just commenced its take-off roll, using the full length of Runway 26L, and another aircraft was on short finals. The Herald commander released the brakes, checked the approach area to confirm the position of the landing traffic and applied power to taxi into position. After a momentary burst of power to get the aircraft moving the throttles

were retarded to the idle position. As the aircraft turned onto the runway the commander reported that he released the control locks and checked the flying controls in all three axes. Whilst still moving the aircraft was cleared for takeoff. The commander, noting that the ATR-42 was already airborne and clear of the runway, switched on the pitot heaters and landing lights and called for full power. As the first officer opened the throttles the commander checked both engine Turbine Gas Temperatures (TGTs) and noticed that they were against their maximum stops in excess of 1,000°C. Realising that there was a problem the commander closed the throttles, rejected the takeoff and asked the first officer to inform ATC and to ask for clearance to vacate the runway.

ATC instructed the aircraft to vacate the runway to the left onto the maintenance taxiway. Once clear, the commander applied the parking brake and noticed that the left engine was running down. He therefore decided to shut down both engines and, as he was doing so, the left engine fire warning light illuminated. The commander called for the fire drill and carried out the initial memory items as the first officer radioed for the fire services. The commander then turned to the engineer, who was sitting just behind the flight deck next to the door, and asked him to go outside the aircraft and to report on the condition of the left engine fire. The engineer quickly returned to the flight deck and informed the commander that there was still some sign of fire, whereupon, the commander activated the second fire extinguisher bottle. The engineer by this time had now left the aircraft again taking the passenger with him. Moments later the commander left his seat to check on the passenger's welfare and vacated the aircraft himself. Seconds later the first officer, who had been completing the subsequent actions of the fire drill, left the aircraft and joined the commander, passenger and engineer in one of the rescue vehicles which had arrived on the scene three minutes after the initial call.

### **Standard operating procedures**

The aircraft is normally taxied with the elevator control lock removed and the remaining flying control locks engaged. A reminder for crews to do this was included in the aircraft 'AFTER START' checklist and is carried out for two reasons. Firstly it allows the control column to move forward away from the pilot so that the nosewheel steering handle, located on the centre boss of the control column, is easier to operate. Secondly it ensures that not only are the ailerons and rudder locked against wind gusts but also that the propeller STOP WITHDRAWAL LEVER, which is activated by a certain amount of throttle movement, is locked in the rearmost 'GROUND' position.

The flying control locks are only fully removed and a 'full and free' control check carried out, as prompted by the 'RUNWAY CHECKS', just prior to takeoff. This ensures not only that the controls are operating correctly before flight but also that, as throttles are increased from idle to full power, the STOP WITHDRAWAL LEVER will move from the 'GROUND FINE' to the 'FLIGHT FINE' position under the influence of the throttles. The aircraft checklist did not include a specific check regarding STOP WITHDRAWAL LEVER position prior to the commencement of the take-off roll.

## **System description**

The aircraft was equipped with Rotol constant speed fully feathering four bladed propellers. Each propeller has mechanical pitch stops, a fixed ground fine pitch stop (GFPS) and a removable flight fine pitch stop (FFPS). The FFPS is so designed that the blades can pass through it while coarsening but are prevented from so doing while fining off. To permit the blades to enter the ground fine pitch range from the flight range it is necessary to operate the pitch STOP WITHDRAWAL LEVER manually to withdraw the FFPS. When the blades are below the FFPS an indicator lamp illuminates. After engine start and with the gust locks removed the lever will automatically move forward when the throttles are advanced above about 13,000 RPM (engine) thus engaging the FFPS.

The actual engine RPM at which the STOP WITHDRAWAL LEVER will move forward will vary with the fuel trim, blade angle and conditions of the day, eg tailwind conditions. During a test on another aircraft under tailwind conditions the lever moved forward at around 11,600 RPM. The STOP WITHDRAWAL LEVER is mechanically actuated from the throttle levers to operate at the throttle lever position corresponding nominally to 13,000 RPM.

It is essential to ensure that the blades are below the FFPS (ie that the lever is in the 'GROUND FINE' position) when initially applying even moderate power at low speeds, in order to avoid very high TGTs and turbine damage.

## **Cockpit Voice Recorder**

The Cockpit Voice Recorder was removed and replayed using AAIB facilities; it covered the period of the taxi and rejected takeoff. Engine frequencies were derived from the area microphone, and showed the application of power as the aircraft taxied onto the runway, with a maximum of around 12,300 RPM, before reducing to around 10,000 RPM. The engine power was then increased for takeoff, but only reached around 11,500 RPM before the takeoff was aborted.

## **Engine examination**

After the incident both engines were found to be seized and there was metallic debris in both jet pipes. The No 1 propeller was feathered, probably having autofeathered, and the No 2 propeller was on the GFPS. The HP cock levers were both at the 'CLOSED' position, not at 'FEATHER'. On aircraft of this type when one engine is feathered the other is inhibited from autofeathering. The throttles were closed and the pitch STOP WITHDRAWAL LEVER was found in the 'GROUND FINE' position, although a photograph of the flight deck, taken by company personnel two hours after the incident,

showed the pitch STOP WITHDRAWAL LEVER in the 'FFPS' fully forward position. The lever and throttles functioned normally with the gust locks disengaged. The paint of the jet pipe duct for the No 1 engine was burned badly and both engines showed discolouration due to overheating. External examination of the engines showed that the No 1 engine had experienced the highest temperatures, presumably causing it to autofeather first. After re-instatement and replacement of the emergency battery, which had become discharged after the incident, the fire warning system functioned normally. The Technical Log showed that the aircraft had been operating without significant defects for at least the previous 30 hours.

### **Follow-up action**

As a result of this incident the operating company have issued a notice to crews re-emphasising aircraft and engine handling procedures. They have also amended the aircraft checklist introducing a specific check on the STOP WITHDRAWAL LEVER prior to takeoff. Furthermore a caution has been added to the company Operations Manual (Handling) highlighting the significance of STOP WITHDRAWAL LEVER operation.