

No. 26

Paraense Transport Aéreos S/A, Curtiss C-46A, PP-BTH, accident at Buracão - Barra do Bugres Municipality, Mato Grosso State, Brazil, on 12 August 1965. Report dated 29 November 1967, released by the Aircraft Accident Investigation and Prevention Branch, Inspectorate General, Ministry of Aeronautics, Brazil

1. - Investigation1.1 History of the flight

The aircraft departed Cuiabá/Marechal Rondon aerodrome, Mato Grosso, at 1021 GMT, for Pôrto Velho with an IFR flight plan. At the outskirts of Barra do Bugres about 30 minutes after take-off, the aircraft turned back towards Cuiabá with its left engine on fire. While over Buracão, its left wing and engine broke away from the fuselage and it crashed to the ground out of control. The accident occurred at 1100 hours.

1.2 Injuries to persons

Injuries	Crew	Passengers	Others
Fatal	4	9	-
Non-fatal	-	-	
None	-	-	

1.3 Damage to aircraft

The aircraft was destroyed.

1.4 Other damage

None.

1.5 Crew information

The pilot-in-command held a valid licence with IFR rating. He had flown a total of 7 857 hours, including 2 357 hours as pilot-in-command or instructor. He had flown 1 357 hours as pilot-in-command on the subject aircraft type, of which 72 hours were flown during the 30 days preceding the accident.

The co-pilot also held a valid licence. He had flown a total of 2 816 hours, including 1 516 hours as co-pilot on the subject aircraft type, of which 9 hours were flown during the 30 days preceding the accident.

1.6 Aircraft information

The airframe had a total of 27 761 hours. It had been overhauled at 24 650 hours on 2 April 1964 and had undergone a 500-hour inspection on 31 July 1965. The engines were also inspected on 31 July 1965 although they had not yet reached 500 hours. Neither propeller underwent repair subsequent to overhaul.

On 31 July, twelve days before the accident, No. 8 cylinder of the left engine was replaced because of faulty compression. In the week preceding the accident this same engine was overheating and vibrating, and oil pressure was low. During maintenance the oil filter was inspected and, as everything appeared normal, the aircraft was released for flying.

The gross weight and centre of gravity were not mentioned in the report.

The fuel and lubricants used were of the recommended type and grade and had no bearing on the accident.

1.7 Meteorological information

The weather had no bearing on the accident.

1.8 Aids to navigation

Not mentioned in the report.

1.9 Communications

Not pertinent to the accident.

1.10 Aerodrome and ground facilities

Not pertinent to the accident.

1.11 Flight recorders

Not mentioned in the report.

1.12 Wreckage

The aircraft crashed in a flat, densely wooded area. The left engine was found some distance away from the main wreckage with No. 8 cylinder torn from its mountings.

1.13 Fire

There was a fire in the left engine.

1.14 Survival aspects

There were no survivors.

1.15 Tests and research

No information was contained in the report.

2. - Analysis and Conclusions

2.1 Analysis

Evidence revealed that No. 8 cylinder had been torn loose from the left engine in flight.

Of the fifteen bolts attaching this cylinder, eleven had snapped flush with the surface of attachment, and four were stretched almost to breaking point. It was concluded that the eleven bolts failed by fatigue and that the four remaining bolts failed by tension. The methods used for changing the cylinder and inspecting the bolts before reinstalling them as well as the tension used in tightening these screws were not investigated.

The major oil leak which resulted from the failure of the cylinder started a fire by igniting on contact with hot surfaces of the engine.

Following several C-46 accidents, the U.S. Federal Aviation Agency made recommendations for certain modifications of the fire detection and fire extinguishing systems. Three accidents having occurred in Brazil, the Brazilian DGCA decided that these modifications would be mandatory for obtaining authorization to operate C-46 aircraft in Brazil.

The aircraft was equipped with a fire detection system that ought to have been modified; however, the accident occurred before the deadline date set by the DGCA for carrying out the modifications. The warning signal in the control cabin consisted of red lights that lit up whenever heat activated the system. It was already very difficult in normal daylight conditions to tell if these lights lit and nearly impossible when the sun was shining on them. Owing to the position of the sun it is highly probable that the pilots were unable to notice that the warning light was on, indicating fire in the engine. Furthermore, the circuit had never been adequately insulated so that the wiring soon fused. The fusing of the wires caused the light to go out, even though the fire had not been brought under control.

The fire extinguishing system in the aircraft was also of a type that should have been modified since the heat sensitive points and flow of extinguishing agent were considered inadequate.

The fire weakened the aircraft's structure up to the point where the left wing separated in flight.

2.2 Conclusions

Findings

The crew were properly certificated and experienced.

The aircraft's certificate of airworthiness was not mentioned in the report.

Weather had no bearing on the accident.