No. 3

Iranian Airways Company, DC-3, EP-ABB accident during take-off run at Kabul Airport, Afghanistan, 2 January 1962. Report released by The Director General of Civil Aviation, Afghanistan.

1. Historical

1.1 Circumstances

Flight IR-123 was a scheduled international cargo flight from Kabul, Afghanistan to Tehran, Iran. Aboard were two pilots. The co-pilot was in the left-hand seat and operating the flight controls at the commencement of the take-off run. The aircraft was cleared for take-off on runway 29 at 0843 hours GMT. When accelerating for take-off the pilot-in-command noticed that the propeller of No. 1 engine was overspeeding and surging as high as 3 300 rpm. As the aircraft approached an indicated airspeed of about 80 kt the captain took command. He noticed that the aircraft was headed to the left away from the runway centreline towards three runway lights in a concrete footing at the left edge of the runway. To avoid a possible collision with these lights the captain applied elevator control and lifted the aircraft off the runway. The overspeeding propeller condition did not subside although he followed the procedure prescribed in the company operations manual for corrective action. The flight path was about 30 to 45° to the left of the runway and in the general direction of the Kabul Airport terminal building so the captain attempted to turn the aircraft further to the left to avoid collision with the building. About 325 ft from the south edge of runway 29 the left wing contacted the ground and the aircraft crashed at 0846 hours GMT (1316 hours local time).

1.2 Damage to the aircraft

There was major damage to the aircraft.

1.3 Injuries to persons

The two crew members sustained minor injuries.

2. Facts ascertained by the Inquiry

2.1 Aircraft information

The aircraft had a certificate of airworthiness valid until 21 March 1962. Its maintenance release was valid for the flight to Tehran. The gross take-off weight of EP-ABB was 12 128 kg, i.e. close to the maximum permissible of 12 200 kg for cargo operations as shown in the Company's Operations Manual. No provision is made for reduction of take-off weight for airport elevation or temperature. The centre of gravity of the aircraft, computed as 25.3%, was within the approved limits.

2.2 Crew information

The pilot-in-command, age 36 years, held an Iranian airline transport pilot licence with ratings for DC-3 and DC-4 aircraft. He had flown a total of 8 800 hours

of which approximately 3 500 hours were on the DC-3. He had flown 105 of these hours during the 30 days preceding the accident. During his training for the airline transport pilot flight test of the Federal Aviation Agency (U.S.A.), which was successfully completed, engine failures before and after V_1 were emphasized.

The co-pilot, age 29 years, had an Iranian commercial pilot's licence with ratings for DC-3, DC-4 and Viscount aircraft. His total flying experience amounted to 3 500 hours of which about 2 000 hours were on the DC-3 and 45 hours had been flown during the 30 days preceding the accident.

2.3 Weather information

At the time of the accident the wind was from 180° True at a velocity of 2 kt. The temperature was between 5.6° and 7.6° centigrade, the latter being that recorded for the 0900 hours GMT observation.

2.4 Navigational Aids

Not involved in the accident.

2.5 Communications

They were not a factor in the accident.

2.6 Aerodrome Installations

Runway 29 is constructed of concrete. It is 9 100 ft long and is at an elevation of 5 795 ft. The runway gradient has not been determined. At the time of the accident it was dry, and there were no obstructions on it.

2.7 Fire

Fire broke out following impact. The fire was originally confined to the broken fuel, oil, and hydraulic fluid lines at the engine nacelle and at the exposed ends of this broken plumbing on each engine. The fire in the area of the No. 2 engine nacelle was also fed by fuel flowing from the right main fuel tank.

Fire fighting equipment of the Afghan Air Authority Department of Civil Aviation and the Royal Afghan Air Force was used to fight the fire. The principal fire extinguishing agent used was foam. Approximately 1 500 gallons per minute of expanded foam were discharged in the crash area; prompt action by the fire fighting crew effectively extinguished the fire in approximately three minutes.

2.8 Wreckage

The wreckage was examined extensively for malfunctions of operating components and systems and for structural failures. The investigation did not result in the finding of evidence to show that there were technical defects in the airframe, engines or accessories.

At the time of impact the aircraft was intact and in the take-off configuration with the landing gear extended and the wing flaps up.

The impact forces on the propellers were such as to result in the separation of the entire propeller assemblies and reduction gearing from the power section of their respective engines. The propeller blades had been bent rearward showing that at impact the engines were not developing a substantial amount of power. The engines were subsequently found to be structurally capable of normal operation. Each of the three blades of the left-hand propeller was 040° from the low pitch stop. Each of the three blades of the right-hand propeller was approximately 009° from the low pitch stop. Although the captain stated that the No. 1 propeller was overspeeding to a serious degree, there was no evidence to show the cause of the overspeeding. The distributor valves in each propeller dome were in normal operating condition, and both governors appeared to be capable of normal functioning prior to impact.

3. Comments, findings and recommendations

3.1 Discussion of the evidence and conclusions

The emergency occurred at a very critical moment, at a time when the flight controls were changing hands and at the approximate time when a decision was necessary for discontinuing or continuing the take-off.

The runway was more than adequate for bringing the aircraft to a stop if the captain had selected this alternative. However, the aircraft was already headed in a direction that would take it off the runway at the approximate time when a decision was necessary. Although the captain stated that the better course of action would have been to discontinue the take-off, a procedure prescribed in the operating manual, he did not choose to do so because he believed that the aircraft would remain airborne.

The loss of aircraft performance, which resulted because of the necessity for the reduction of power on the No. 1 engine, was further compounded by the drag created by the overspeeding propeller of the No. 1 engine. The co-pilot testified that attempts to feather the propeller of the engine proved unsuccessful due to the failure of the feathering button to engage. The captain stated that although he had experienced demonstrations in training flights of the rudder force required to control the aircraft at V_{mc}, (minimum control speed), the force required in this instance was greater than he had ever experienced before. He was unable to state conclusively whether or not he had the right rudder at the limit of its travel, but he did believe that his seat was properly positioned to permit him to reach full rudder travel if he had the strength to do so.

For the conditions existing at the time of this take-off a distance of 2 200 ft was required with full rated take-off power. The maximum power available from each engine at the elevation of this airport as stated by the captain is approximately 200 bhp less that the rated take-off power of 1 200 bhp. In this instance the aircraft was lifted off the runway after accelerating a distance of approximately 1 837 ft or 363 ft less than the minimum prescribed by the manufacturer with full rated take-off power.

When observed by the control tower operators at Kabul the aircraft was believed to be about 20 ft in the air during the time it was airborne. It was, therefore, apparent that one of the sustaining elements for this short period of flight was the phenomenon of ground effect.

3.2 Probable cause

The captain failed to discontinue the take-off when he saw that No. 1 propeller was overspeeding and at a time when the aircraft was still on the runway.

3.3 Recommendations

No recommendations are contained in the report.

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