

SUMMARIES OF AIRCRAFT ACCIDENT REPORTS PREPARED BY STATES
AND PUBLISHED AS RECEIVED

No. 1

Ansett-A.N.A. DC-3 VH-ANJ, accident at Warrnambool, Victoria, Australia,
on 1 April 1965. Report undated, released by the
Department of Civil Aviation, Australia

1. - Investigation

1.1 History of the flight

Flight No. 1 was a scheduled domestic flight from Hamilton to Melbourne via Warrnambool, Victoria, and the aircraft landed at Warrnambool at 2159 hours GMT after an uneventful flight. After a stay on the ground of 17 minutes, during which time there were load changes, the aircraft taxied for take-off on runway 31. The pre-take-off checks did not indicate any abnormality and the aircraft proceeded to take off. After becoming airborne, but prior to undercarriage retraction, a loss of engine power occurred and the pilot-in-command deduced that the port engine had failed. He feathered the port engine and then became aware that the starboard engine was delivering only partial power, which was insufficient to sustain the aircraft in flight. A suitable area was selected immediately and a landing with wheels and flaps retracted was made in grassy paddocks on level terrain, but the aircraft passed through three fences before coming to rest.

The location of the accident was at latitude 38°17' S, longitude 142°24' E, and the accident occurred at 2217 hours GMT in daylight.

1.2 Injuries to persons

Injuries	Crew	Passengers	Others
Fatal			
Non-fatal			
None	3	20	

1.3 Damage to aircraft

The aircraft suffered substantial damage.

1.4 Other damage

The only damage caused to property was to three wooden post and wire fences through which the aircraft passed.

1.5 Crew information

The pilot-in-command, aged 35, held a valid first-class airline transport pilot licence endorsed for DC-3 aircraft and with a valid first-class instrument rating. His flying experience amounted to 6 181 hours which included 1 738 hours as co-pilot, 213 hours under instruction or supervision and 174 hours in command on DC-3 type aircraft. On the day before the accident, he had been on duty for approximately 3:30 hours and then was off duty for approximately 12 hours.

The co-pilot, aged 29, was the holder of a second-class airline transport licence endorsed for DC-3 aircraft and with a second class instrument rating. He had a total flying experience of 1 770 hours, of which 1 561 hours had been gained as a co-pilot on DC-3 aircraft.

1.6 Aircraft information

The aircraft was operating under current certificates of registration and airworthiness and was maintained in accordance with the requirements of the approved maintenance system. There was no known defect in the aircraft at the time it commenced to take off and the maintenance release was valid.

The gross weight of the aircraft was less than the maximum permitted and the position of the centre of gravity was within the prescribed safe limits.

The fuel used in the aircraft was 100/130 octane rating aviation gasoline.

1.7 Meteorological information

The weather conditions were fine with a light westerly breeze and there was broken cloud with a base of not less than 1 000 ft. The weather conditions encountered were consistent with those forecast.

The accident occurred in daylight.

1.8 Aids to navigation

Not pertinent to the accident.

1.9 Communications

Not pertinent to the accident.

1.10 Aerodrome and ground facilities

Not pertinent to the accident.

1.11 Flight recorders

The aircraft was not equipped nor was it required to be equipped with a flight data recorder or a cockpit voice recorder.

1.12 Wreckage

The aircraft came to rest intact one mile from the boundary of the aerodrome and in a level area which is clear, apart from fences and windbreaks of trees.

1.13 Fire

There was no fire.

1.14 Survival aspects

The post-impact drill of emergency procedures was completed by the crew, and the twenty passengers, under the supervision of the hostess, evacuated the aircraft through the cabin door.

1.15 Tests and research

The port engine and associated systems were subjected to intensive ground testing, but no defects or evidence of malfunctioning were found.

2. - Analysis and Conclusions

2.1 Analysis

The investigation established that a loss of engine power occurred just after the aircraft became airborne on take-off and the pilot-in-command then feathered the port propeller. There is no evidence to support the deduction made by the pilot-in-command that the port engine had failed but there was evidence available to the crew that the starboard engine suffered a partial loss of power at some time shortly after attaining V2. Examination of the starboard engine reveals that No. 7 cylinder had separated from the cylinder assembly due to failure of the inlet valve stem.

In the procedures which the operator has prescribed in the event of engine failure, the prime method of identification is by analysis of foot pressures and employs the axiom "dead foot dead engine". Verification by the co-pilot is required before feathering procedures are initiated and the closing of the throttle as the first time of the feathering procedure acts as a further check on identification. The procedure of identification by rudder pressure is suited to the case of complete engine failure in which substantial yaw results immediately, but in the circumstances of a partial power failure the amount of yaw would be correspondingly less and a careful analysis of engine instruments would be necessary to identify the defective engine. It was a low manifold pressure reading which the crew finally noticed and thus became aware that a partial failure of the starboard engine had occurred.

When the pilot sensed a power loss, he associated it with the port engine and his action then to immediately retard the port throttle produced a yaw situation which tended to disguise the power asymmetry, arising from the defect in the starboard engine. The pilot, because he found that he was applying right rudder, deduced that the port engine had failed. Although it could be said that the co-pilot failed to properly identify the failed engine, the action of the pilot-in-command in retarding the port throttle before identification was completed presented the co-pilot with a confused and difficult situation which frustrated the proper performance of his duties in this regard.

There is no reason why the pilot-in-command should not have properly carried out the procedures prescribed by the operator and in which the pilot had been trained. An investigation into the DC-3 conversion training history of the pilot indicated that initially there had been a weakness in his handling of engine failure sequences and this, together with his inexperience as a pilot-in-command, are factors which, taken together, serve as a background to the strong evidence that he adopted incorrect procedures when the aircraft suffered a loss of engine power and that he shut down the port engine and feathered the port propeller in the erroneous belief that it was the port engine that had failed.

2.2 Conclusions

(a) Findings

The pilot-in-command and the co-pilot were duly certificated and qualified for the flight.

The aircraft had a valid certificate of airworthiness and had been properly maintained. Its gross weight and centre of gravity at the time of the accident were within permissible limits.

The weather conditions were fine with a light westerly breeze and there was broken cloud with a cloud base of not less than 1 000 ft.

The aircraft commenced a take-off and became airborne but, prior to under-carriage retraction, a loss of engine power occurred and the pilot-in-command deduced that the port engine had failed. He feathered the port engine and then became aware that the starboard engine was delivering only partial power which was insufficient to sustain the aircraft in flight. A suitable area was selected immediately, and a landing with wheels and flaps retracted was made in grassy paddocks on level terrain but the aircraft passed through three fences before coming to rest.

When the pilot became aware of the engine power loss, he immediately retarded the port throttle before he and the co-pilot could verify which engine was defective. This action was not in accordance with the procedures prescribed by the operator, and it is apparent that the pilot shut down the port engine and feathered the propeller in the erroneous belief that it was that engine that was defective.

There was no evidence of any pre-impact defects or malfunctioning in the aircraft structure or its associated systems or in the port engine. In the starboard engine a section of the cylinder head of No. 7 cylinder had separated from the cylinder valve stem across the collet groove due to fatigue cracking, which originated in an area of severe fretting on the valve stem at the retaining collet position. It is considered that the fretting accumulated in service over an extensive period.

(b) Cause or Probable cause(s)

The cause of the accident was that the pilot-in-command, on becoming aware of a loss of engine power, took action to feather the propeller after adopting procedures which failed to ensure correct identification of the defective engine.
