

No. 7

British European Airways Corporation, Vickers-Armstrongs Viscount, G-AMOM,  
crashed on take-off from Blackbushe Airport, England, on 20 January 1956.  
Civil Accident Report No. C. 647, released by the Accidents Investigation  
Branch, Ministry of Transport and Civil Aviation (UK).

Circumstances

The aircraft took off from London Airport at 0755 hours Greenwich Mean Time on a training flight, which was part of a routine base check being carried out by a training captain on a line captain. Having completed the first part of the check the aircraft landed at Blackbushe. At approximately 0850 hours Greenwich Mean Time a take-off was commenced from this airport for another exercise. On reaching the take-off safety speed the training captain simulated a starboard outer engine failure. At this point the aircraft was just leaving the ground and as it did so the starboard inner propeller was seen to be stopping and the aircraft began turning to the right with an increasing amount of bank. It rose to about 30 feet and then descended and hit the ground at a point 250 yards from the runway in a steeply banked, nose-down attitude. It cartwheeled, slid along the ground backwards for 200 yards and came to rest just inside the northwest boundary of the aerodrome. The aircraft sustained major impact damage and fire broke out which almost completely destroyed it. The five occupants escaped with only slight injuries.

Investigation and Evidence

Following the landing at Blackbushe after completion of the first part of the check, No. 1 engine was again restarted and the aircraft was lined up on Runway 26. The training captain then told the line captain that he intended to simulate an engine failure during the take-off sequence which was to be purely visual. On take-off the training captain was in the right-hand pilot's seat and the line captain was at the controls in the left-hand seat. Upon reaching the  $V_2$  speed of 106 knots when the aircraft was just becoming airborne, the training captain stated that he carried out manual feathering of No. 4 propeller by the three movements laid down on the BEA drill card namely by -

- 1) moving the high pressure cock lever to the feather position,

- 2) pulling back the throttle lever, and

- 3) pressing the feathering button.

He further stated that he then checked the gauges showing the r.p.m. and torquemeter pressure for No. 4 engine and that both showed zero, signifying to him that feathering was completed. Immediately after this it became apparent to him that the line captain was experiencing difficulty in maintaining directional control, as the aircraft was turning to starboard despite application of rudder and aileron controls. Because the rate of turn was increasing and the right wing was dropping the training captain took over control. As he did so the line captain selected the undercarriage up. He then noticed that the aircraft was not accelerating beyond 106 knots and believing that he could still gain control, he put the nose down slightly in an endeavour to increase the speed, but as a height of about only 30 feet had been reached the aircraft hit the ground.

Three eye witnesses stated that No. 3 propeller stopped rotating. One of these was another captain aboard the aircraft, who was looking out of the front starboard window at the propellers as he expected No. 4 propeller would be feathered during the take-off. Not only did he see No. 3 propeller feather, but he also noticed a sudden cessation of noise from the starboard side of the aircraft.

Inspection at the scene of the accident showed that initial impact with the ground was made by No. 3 propeller and the nosewheel tires followed by the starboard underside of the nose and the starboard wing tip. The outer half of the starboard mainplane broke off almost at once, closely followed by No. 3 propeller. The aircraft cartwheeled, slid along backwards on its belly and came to rest some 200 yards from the point of initial impact. No. 4 engine with its propeller attached broke off at the wing leading edge and was lying clear of the main wreckage. Fire had destroyed most of the aircraft but the nose section was intact and undamaged by fire.

Three of the blades of No. 3 propeller were in the feathering range, whilst three of the No. 4 propeller were in the fine pitch range. Damage to the blades indicated that No. 3 propeller was almost stationary on impact and that No. 4 was rotating.

Examination of the control cabin revealed that No. 3 H.P. cock lever was selected to the feathering position, to attain which the latch must be raised and the lever moved right back through the gate. The other three H.P. cock levers were forward of the gate. The throttles were all nearly fully open but these positions were considered to be unreliable owing to the effects of crash damage.

Nos. 3 and 4 engines and propellers were removed to London Airport for further examination. It was established that No. 3 propeller actuating piston was in the position to be expected if the H.P. cock lever had been moved to the feathering position and the feathering button had not been operated. It was also established that the No. 4 propeller piston was so positioned that the blades would have been in fine pitch and giving approximately 10 000 r.p.m. at the moment of impact. Electrical and mechanical feathering and unfeathering operations were carried out on No. 4 propeller in exactly the condition it was in when recovered, and it was found that the system functioned normally.

A consideration of the evidence in conjunction with the BEA drill for manual feathering made it apparent that the training captain had moved No. 3 H.P. cock lever (which was two inches longer than No. 4) to the feathering position instead of No. 4, and had then throttled back No. 4 engine and pressed No. 4 feathering button. These actions cut off the fuel from No. 3 engine and feathered its propeller and also reduced

No. 4 engine to idling conditions. Pressing No. 4 feathering button had no effect on No. 4 propeller, however, as the H.P. cock lever was not in the feathering position. The aircraft was thus deprived of all power on its starboard side at the moment of becoming airborne and the situation was made worse by No. 4 propeller idling in fine pitch.

The training captain believed he had completed feathering of No. 4 engine and to confirm this glanced rapidly at the gauges showing r.p.m. and torquemeter pressure for No. 4 engine, both of which he read as zero. Because the engine was throttled right back the torquemeter pressure would have been zero but the small pointer of the two-pointer r.p.m. gauge would have been indicating 10 000. In his rapid glance at this gauge he must have misread it.

Movement of the throttle in the feathering drill on this occasion was not necessary as water-methanol injection was not being used. The movement was included in the feathering drill only to cut off water-methanol injection when that system was being used. Following this accident, BEA issued instructions that simulated engine failures on take-off during training flights would only be made when the use of water-methanol was unnecessary. The drill was altered accordingly to exclude movement of the throttle.

#### Probable cause

The accident was due to an error by the training captain who operated No. 3 high pressure cock lever instead of No. 4 when simulating a failure of No. 4 engine during take-off. This resulted in the loss of all power from both starboard engines at a critical point of the take-off.

-----