MINISTRY OF DEFENCE

Military Aircraft Accident Summary

MILITARY AIRCRAFT ACCIDENT SUMMARY

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AIR ACCIDENT INVOLVING ROYAL AIR FORCE

TORNADO F Mk 3 ZE809

Date:	7 June 1994
Parent Airfield:	RAF Leeming
Place of Accident:	North Sea, 45 miles NE of Scarborough
Crew:	1 pilot and 1 navigator
Injuries:	2 Slight

CIRCUMSTANCES

1. While flying at high speed at 1300ft over the sea, the crew heard a loud bang, and the aircraft began to decelerate rapidly. The engine warning captions illuminated and the rear of the aircraft became engulfed in flames. The pilot was unable to extinguish the fire, and soon after, control of the aircraft was lost. The crew ejected and the aircraft crashed into the sea.

CAUSE

2. Examination of the engine showed that the labyrinth seal around the High Pressure (HP) shaft, which connects the HP compressor to the HP turbine, had failed; this in turn, led to local overheat and failure of the HP shaft itself. The HP turbine then accelerated to an overspeed condition and failed. The mechanism of the labyrinth seal failure was not positively determined.

3. When the failure occurred, components of the right engine HP turbine were explosively forced through the engine casing at the rear of the aircraft, damaging both hydraulic systems and

the Command Stability Augmentation System, responsible for monitoring pilot inputs. The reheat fuel pipe was fractured, allowing fuel to be released into the open combustion chamber and causing the rear fuselage fire. Furthermore, a hole was punched through the firewall into the left engine bay, allowing hot gases to pass through, and the 115v AC electrical supply was cut off.

4. The Board concluded that the accident was caused by a catastrophic uncontained failure of the right engine, leading to double hydraulic failure and rear fuselage fire. The aircraft was irrecoverable from the moment the right engine failed, because the failure of both hydraulic systems led directly to the loss of control of the aircraft. The Board also considered that the combination of high speed, high air density and high ambient temperature had a direct influence on the engine failure.

SUBSEQUENT ACTIONS

5. A temporary speed restriction has been placed on all Tornado aircraft; a design and engineering review of the circumstances surrounding this RB199 engine failure is in progress, with a view to providing a permanent solution.

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