



MINISTRY OF DEFENCE
MILITARY AIRCRAFT ACCIDENT SUMMARY

**AIRCRAFT ACCIDENT TO ROYAL AIR FORCE HARRIER GR7
ZG856**

AIRCRAFT: RAF HARRIER GR7 ZG856

DATE: 29 January 1999

LOCATION: Exercise RED FLAG, Nevada,
USA

PARENT UNIT: No 3(F) Sqn, RAF Laarbruch

CREW: One - Pilot

CASUALTIES: One Major

Issued by: Directorate of Air Staff, Ministry of Defence, Whitehall, London SW1A 2HB

JUNE 2001



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SYNOPSIS

1. On the afternoon of 29 January 1999, Harrier GR7, ZG856 was part of a six-aircraft Harrier formation taking part in Exercise RED FLAG, in Nevada. To avoid attack from an opposing aircraft, the pilot of ZG856 flew up and over a small hill. As ZG856 crossed the crest of the hill to return to low level the pilot rolled the aircraft left and increased the g force which reached a peak of 5.8g. During this manoeuvre the pilot became aware of his close proximity to the ground, and attempted to roll the aircraft upright. However, he quickly

concluded that recovery was impossible, and immediately ejected from the aircraft, sustaining major injuries. The aircraft impacted the ground 2.5 seconds later, and was destroyed.

BACKGROUND

2. The aircraft had undergone minor pre-flight engineering work on the evening before the accident which involved selecting the Q-Feel system to "off". The Q-Feel system increases the force required to move the aircraft's control column under certain conditions. If the Q-Feel was "off", the control column forces required to manoeuvre the aircraft at higher speeds would be lighter than normal. Normally, Q-feel remains selected to "on".

3. Although the RAF Board of Inquiry postulated that the cause of the accident was that the pilot ejected from the aircraft when its attitude and proximity to the ground led him to believe that recovery was impossible, the lack of evidence meant that this could not be positively determined.

CIRCUMSTANCES

4. The aircraft had completed a target run and live weapons delivery and was leaving the simulated hostile airspace at the end of the attack mission. Whilst in a tactical formation with three other Harriers, an opposing aircraft's radar targeted ZG856, and the pilot manoeuvred the aircraft towards the nearby hill. To regain his position within the formation and still avoid the opposing aircraft's weapons, the pilot crossed the crest of the hill, rolled the aircraft left and increased the 'g' force to manoeuvre the aircraft back down to low level. He became aware of the ground, attempted to roll the aircraft upright, but perceived no reaction to his roll control inputs. The pilot ejected, sustaining internal and flail injuries

INVESTIGATION

5. In its attempt to determine the cause of the accident, the Board of Inquiry's investigation was severely hampered by the lack of evidence. The Accident Data Recorder (ADR) was totally destroyed by the impact and as a result of the extreme fragmentation of the wreckage, the Board could not fully confirm the serviceability of the flying control system. Moreover, the pilot had no clear recollection of events other than the reluctance of ZG856 to respond to a roll control input.

6. The only firm evidence available to the Board was the aircraft's Head-up Display video recording which survived the impact. However, despite the HUD video being able to rule out some factors, it provided no firm evidence of the cause of the accident.

7. The Board investigated the reason for the excessive level of g force recorded during the final manoeuvre. They were unable to ascertain the exact position of the Q-Feel switch but considered it was likely to have been in the "off" position. This may have influenced the pilot's final manoeuvre and contributed to the accident.

8. The Board also considered that the severity of the pilot's injuries could have been reduced had the ejector seat been fitted with arm restraints.

SAFETY RECOMMENDATIONS

9. The Board's recommendations included that:

- consideration be given to the fitting of arm restraints to all RAF Fast Jet ejection seats;
- a review of the ADR security container be carried out to ensure survivability in future accidents;
- maintenance manuals are amended to ensure tighter control of Q-Feel system and testing, and in particular that it is selected "on" after maintenance, and;
- fast jet aircraft maintenance manuals be reviewed to ensure switch selections post-maintenance are aligned with those detailed in aircrew and groundcrew pre-checks.

