



## MINISTRY OF DEFENCE

### Military Aircraft Accident Summary of a Royal Air Force Board of Inquiry

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Aircraft:	Jaguar GR1B XX733
Date of accident:	23 January 1996
Place of accident:	RAF Coltishall, Norfolk
Casualties:	1, fatal

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#### Synopsis

1. Shortly after becoming airborne from runway 04 at RAF Coltishall, the Jaguar clipped the top of the net barrier at the departure end of the runway, crashed into a field and caught fire. The aircraft was destroyed and the pilot killed. The Inquiry concluded that the most likely cause of the accident was that the pilot omitted to select engine reheat at the start of the take-off sequence and did not subsequently check his instruments for signs of correct reheat performance; it was possible that he had been distracted during the moments leading up to the beginning of the take-off run.

#### Background

2. At many RAF airfields, a retractable net barrier is fitted at both ends of the runway to provide an emergency means for stopping aircraft in the event of brake failure. At Jaguar bases, the normal position is for the departure end barrier to be raised. In order to effect a safe take-off, Jaguar aircraft are required to use reheat, a means of increasing the effective engine thrust by igniting extra fuel at the rear of the engines. This produces an orange glow, clearly visible to those on the ground.

## **Circumstances**

3. On the morning in question, and in good weather conditions, XX733 taxied out to the runway with two other Jaguars. An engine technician became concerned about an unusual rumbling noise from XX733 and informed Air Traffic Control; however, after running up engine power several times, the pilot indicated that he was happy to proceed. As the first two aircraft commenced their take-off run, the pilot of XX733 reported that he had an indication that one of the engines was running hot, but was advised by the pilot of one of the two departing Jaguars that he could continue if the temperature dropped back to normal within ten seconds. Some 30 seconds later, XX733 commenced its take-off run, observers noting that the acceleration appeared slower than normal and that neither reheat was lit. The aircraft rotated further along the runway than the two previous aircraft and, although attempts were made to lower the net barrier, it was struck by XX733's undercarriage. The Jaguar continued over the airfield boundary fence, trailing most of the barrier behind it, before crashing in a shallow dive some 150m from the end of the runway. The impact ruptured the aircraft's fuel tanks, causing an intense fire to engulf the front of the aircraft. The pilot's attempt to eject was not successful and he was killed.

## **Rescue operation**

4. RAF crash rescue services quickly arrived at the scene and brought the fire under control.

## **Aircraft damage**

5. A combination of the impact and the fire destroyed the aircraft, although the wreckage was subsequently recovered for inspection by the Department of Transport's Air Accidents Investigation Branch (AAIB).

## Investigation

6. The Inquiry was able to draw on eyewitness statements and evidence from the AAIB's technical investigation; the Jaguar is not fitted with an Accident Data Recorder (ADR). From eyewitness accounts, it was apparent that the aircraft crashed because it struck the net barrier, and that it struck the barrier as a result of its relatively poor take-off performance. The Inquiry focused therefore on establishing the reason for the poor take-off performance and was able to ascertain that both engines were functioning normally up to the point of impact. There was also no evidence to suggest that birdstrike had been a factor. The Inquiry was satisfied that the unusual engine noises reported whilst the aircraft was taxiing were caused by the known problem of carbon build-up in the combustion chamber, which does not affect engine performance. The Inquiry concluded therefore that it was unlikely that the accident had been caused by either a natural operating hazard or a technical fault, although the remote possibility of a double failure of the reheat control mechanism could not be discounted completely.

7. The Inquiry turned its attention to human factors and possible reasons for the pilot not selecting reheat or monitoring his in-cockpit reheat indications during the take-off run. The most plausible was that he forgot to select reheat, having been distracted at a critical moment by the reported noises from the aircraft's engines and the engine temperature indications. The Inquiry reasoned that the combination of favourable atmospheric conditions and the fact that XX733 was acknowledged to have relatively high performance levels when compared to other Jaguars in the fleet would probably have satisfied the pilot that acceleration was normal. The Inquiry concluded that, as a result, the pilot did not check his cockpit instruments once the take-off run began.

8. Investigation of the wreckage confirmed that the ejection seat handle had been pulled and that the canopy had jettisoned and the seat fired. Unfortunately, the aircraft hit the ground at the same time as the seat fired, subjecting the bolts securing the firing mechanism to the seat to forces in excess of their design limits. As a result, they sheared, and the seat only partially extracted from the cockpit.

### **Safety recommendations**

9. Installation of a reheat warning system into the Jaguar fleet is being considered as part of a forthcoming avionics upgrade. The installation of a simple Accident Data Recorder is also under consideration and a programme of trials is due to begin shortly. In addition, the optimum position of the net barrier during take-offs is to be reviewed.