MINISTRY OF DEFENCE

MILITARY AIRCRAFT ACCIDENT SUMMARY

AIRCRAFT ACCIDENT TO ROYAL AIR FORCE TORNADO F3 ZG751

AIRCRAFT:	RAF Tornado F3 ZG751
DATE:	25 August 2003
LOCATION:	CFB Goose Bay, Canada
PARENT UNIT:	25(F) Squadron, RAF Leeming
CREW:	Two – Pilot and Navigator
INJURIES:	One major, one minor

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

June 2005

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SYNOPSIS

1. At 1541 hours local time, on 25 August 2003, Tornado F3 ZG751 landed as the second aircraft of a pair, on Runway 08 at Canadian Air Force Base (CFB) Goose Bay. Shortly after landing, and whilst using the aircraft engines' reverse thrust to decelerate, the aircraft yawed rapidly to the left. The pilot attempted to regain control of the aircraft, but with the aircraft approximately 60° off runway heading and approaching the left side of the runway, he initiated command ejection some 11 seconds after touchdown. The aircraft came to rest in soft ground to the left side of the runway. On landing after ejection, the pilot received major injuries and the navigator minor injuries. The Inquiry concluded that the accident was caused by a loss of directional control, due to a lateral control column input whilst operating reverse thrust at a high power setting, on a runway with poor friction conditions.

BACKGROUND

2. ZG751 was being flown on an initial training sortie designed to familiarise the crew with operations from CFB Goose Bay. They had deployed with their squadron, from RAF Leeming in North Yorkshire, via Lajes in the Azores, on 23 and 24 August 2003. On the morning of the accident the squadron were given arrival briefs by the Goose Bay staff, to aid their familiarisation. They then planned and thoroughly briefed their familiarisation sortie, which consisted of 3 pairs of Tornado F3s, with each pair separated by 3 minute intervals.

CIRCUMSTANCES

3. Tornado F3 ZG751 took off as No2 of a pair of aircraft and flew an uneventful sortie. The pair returned to CFB Goose Bay for an instrument landing approach to runway 08 in close formation. The weather at Goose Bay was reported as wind 360° / 7 knots, visibility 12 miles in light rain, with two-eighths cloud cover at 1500 ft and overcast at 4000 ft, which was unremarkable. The approach was flown accurately and uneventfully. Upon touchdown at 1541 hours, minimum reverse thrust was selected and after approximately 2 seconds, the pilot selected maximum reverse thrust. During the initial stage of the landing roll there was a reduction of spacing between the 2 Tornados, particularly in nose to tail separation. However, approximately 6 seconds after touchdown, the nose to tail separation between them began to increase, but ZG571 began to yaw and track to the left. The pilot reselected minimum reverse thrust. ZG751 crossed behind the lead aircraft with a large and rapidly increasing deviation from runway heading. Assessing that control of the aircraft had been lost, the pilot called for, and initiated, command ejection. ZG751 continued to yaw and track to the left until it departed the side of the runway approximately 2800 ft from the touchdown point.

RESCUE/SALVAGE OPERATION

4. The ejection sequence was normal and both crew members landed firmly on the runway. Once on scene, paramedics attended to the crew before transporting them to the local hospital. Both crew members had sustained injuries caused by the parachute landing.

AIRCRAFT DAMAGE

5. The aircraft suffered Category 3 damage (repairable on site).

INVESTIGATION

6. The investigation concluded that ZG751 was fully serviceable and that no technical defect had contributed to the accident. The Board noted that the timescale for the squadron deployment was shorter than normal due to the limited availability of RAF air transport and air refuelling assets. However, although noting that the crew might have had more time to digest the arrival briefing had the squadron arrived in theatre earlier, the Board found the deployment to be well planned and organised. The Board discovered that the deployed Tornado F3 squadron was not aware that the runway at CFB Goose Bay is prone to suffer from 'standing water' after even light rain showers, which can significantly affect aircraft landing performance. The Tornado relies principally on the use of reverse thrust to slow down when landing. Full reverse thrust has the effect of reducing aerodynamic directional stability and requires good grip from the tyres, combined with the nose wheel steering system to keep the aircraft straight. On a runway with poor friction, a left roll control input made inadvertently by the pilot of ZG751 approximately 6 seconds after landing, increased the left yawing forces experienced by the aircraft. This sideways motion may have been exacerbated by the crosswind from the left due to an effect known as "weathercocking", where the tailfin acts as a weathervane. The injuries sustained by the crew after ejection were caused by the parachute descent and the subsequent impact with the runway. The aircraft was fitted with GQ 1000 parachutes. The GQ 5000 parachute is being brought into service and

has a reduced descent velocity. It would be expected that the use of the GQ 5000 would have reduced the injuries suffered by the crew.

SAFETY RECOMMENDATIONS

7. The Board recommended that:

a. There should be a flight safety risk analysis carried out before overseas exercises, during which the flight safety organisation should be actively engaged in the research of potential operating hazards including, relevant differences in national procedures.

b. There should be further investigation into the effect of lateral stick inputs when the Tornado is rolling down the runway after landing.

c. The Defence Aviation Safety Centre reviews the policies for the dissemination of information obtained from accident and incident investigations, including investigations by foreign operators.

d. Consideration be given to the minimum times required between deployment to unfamiliar operating environments and the commencement of flying operations.

e. Consideration be given to consolidating the advice in both F3 and GR4 Aircrew Manuals with regard to the handling of Reverse Thrust.

f. A review be made of both F3 and GR4 Release to Service limitations regarding runways and crosswinds.

g. Consideration should be given to introducing the procedure of filming the head-up display on take-off and landing, for all capable aircraft types, to aid accident and incident investigation.

h. The fitting of the new ejection seat headbox and replacement of the GQ 1000 parachute with the GQ 5000 parachute should be expedited.