MINISTRY OF DEFENCE

Military Aircraft Accident Summary

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MILITARY AIRCRAFT ACCIDENT SUMMARY

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AIRCRAFT ACCIDENT TO ROYAL AIR FORCE

HARRIER GR5 ZD350

Date:	7 August 1992
Parent Airfield:	RAF Wittering
Place of Accident:	RAF Wittering
Crew:	One Pilot
Casualties:	One Minor

CIRCUMSTANCES

1. ZD350 was the lead aircraft of a formation of two Harrier aircraft which lined up for take-off at RAF Wittering. All system checks, up to and including the pre take-off engine checks, gave normal indications. The pair began its take-off roll for a standard short take-off. All ZD350's engine indications remained normal, as was the feel of the routine engine "slam" to full power. Some 15 seconds later, at lift-off speed, the leader gave the signal for nozzle movement and moved his nozzle lever to the correct position. After take-off, the pilot had just begun to reduce the nozzle angle to achieve conventional flight when he heard, over the radio, "GR5 leader you've got sparks coming out of your hot nozzles". The transmission was made by another Harrier pilot hovering to the north of the runway, who saw a stream of sparks coming from the rear nozzle area. The pilot of ZD350 had just realized that the call was referring to his own aircraft when he heard a loud rumbling and felt severe airframe vibration, accompanied by a marked loss of thrust. The pilot diagnosed mechanical failure, assessed that it was not possible to land safely and ejected successfully from a height of only 24 feet. The aircraft crashed on the upwind end of the runway and was destroyed.

CAUSE

2. The post-crash specialist investigation of the Pegasus engine, showed conclusively that the accident was caused by

engine mechanical failure. Following the application of full power for take-off, a second-stage stator vane in the low pressure compressor had failed. The free section had twisted through 180 degrees and remained in that position for a short time before passing through the engine. The disintegration and passage of the vane caused extensive damage, loss of thrust and a major surge in the high pressure compressor. The stator vane failed as a result of vibration which had caused a fatigue crack. The vibration had, in turn, developed because the stator vane trunnion bushes had completely worn out and subsequently allowed wear in the trunnions and stator vane roots.

SUBSEQUENT ACTIONS

3. Immediate action was taken to inspect the stator vanes and replace trunnion bushes on Pegasus engines which had completed more than 500 hours running. After the failure mechanism is fully understood, the engine manufacturers, Rolls-Royce plc, will undertake a design review of the inner fixing of the 2nd stage stators to devise a method of improving the integrity of the assembly.