



MINISTRY OF DEFENCE

Military Aircraft Accident Summary

Aircraft:	Wessex HC MK2 XR519
Date of accident:	7 December 1990
Parent Airfield:	RAF Shawbury
Place of accident:	RAF Shawbury
Crew:	Two
Casualties:	Two Slight

Circumstances

1. On the morning of Friday 7 December 1990, a unit test pilot at RAF Shawbury was detailed to conduct a rotor-turning ground run on Wessex HC Mk2 XR519 following maintenance on the aircraft which had included changing the main rotor head. The pilot was to be assisted by a Flight Test Observer (FTO) to operate the rotor tuning equipment from the cabin of the aircraft. There were no natural or operating hazards present; the weather was fine and the wind was well within limits.

2. After the port engine had been started uneventfully, the FTO entered the cabin and strapped into a seat on the right hand side. The starboard engine was then started and the main rotor was engaged, whereupon it accelerated and stabilised normally. However, very shortly afterwards, a lateral oscillation began which increased rapidly in magnitude, shaking the pilot violently and frustrating his attempts to shut down the engines. Within approximately seven seconds from the onset of this violent oscillation, the aircraft rolled over onto its left hand side. When the aircraft came to rest, the pilot was able to shut down the engines, activate the fire extinguishers and switch off the battery master switch. Then he and the FTO vacated the aircraft, sustaining only slight injuries. The emergency services were quickly at the

scene, but there was no fire. The aircraft was found to have been damaged beyond economic repair.

3. The investigation revealed that the aircraft had developed ground resonance. Ground resonance is a well known helicopter phenomenon where a lateral oscillation of large amplitude is triggered by a forced or induced vibration associated with an aircraft in contact with the ground. The trigger may be any vibration induced by mechanical failure, technical malfunction or pilot mishandling which causes the aircraft to resonate at its natural frequency.

4. The investigation was able to eliminate the possibility of mechanical failure and pilot mishandling, but, in examining components which might have been the source of a technical malfunction, found corrosion in a main rotor blade drag damper valve. The drag damper valve was corroded to such an extent that, once the main rotor had achieved its normal operating speed, there was inadequate damping of that blade sufficient to unbalance the main rotor and cause ground resonance. The onset of ground resonance was so fast, and the resulting oscillations so large, that the pilot was unable to apply any of the recommended techniques to recover the situation. The main rotor head had been assembled and stored as a complete unit prior to being fitted to XR519, and the investigation concluded that the corrosion had occurred during this storage period.

Cause

5. The accident was caused by corrosion in a main rotor blade drag damper valve, resulting in inadequate damping. This, in turn, led to the onset of ground resonance so rapidly that the pilot was prevented from taking effective recovery action.

Subsequent Actions

6. Measures are in hand to prevent long term corrosion of all critical hydraulic components during storage. Moreover, other measures are in hand to prove the serviceability of rotor head assemblies and associated components after storage and prior to installation.