No: 4/86 Ref: EW/C945/01

Aircraft type

and registration: Aerospatiale SA 365C Dauphin G-BFVV (light twin engined

helicopter)

Year of Manufacture:

1979

Date and time (GMT):

12 January 1986 at 1952 hrs

Location:

Gas Platform AV1, Morecambe Bay

Type of flight:

Non scheduled off-shore shuttle

Persons on board:

Crew — 1

Passengers — 1

Injuries:

Crew - None

Passengers — None

Nature of damage:

Damaged main rotor blade sleeve attachment beam

Commander's Licence:

Airline Transport Pilot's Licence (Helicopters)

Commander's Age:

38 years

Commander's Total

Flying Experience:

4042 hours (of which 1289 were on type)

Information Source:

Aircraft Accident Report Form submitted by operator, and examination of failed component by AIB/Royal Aircraft

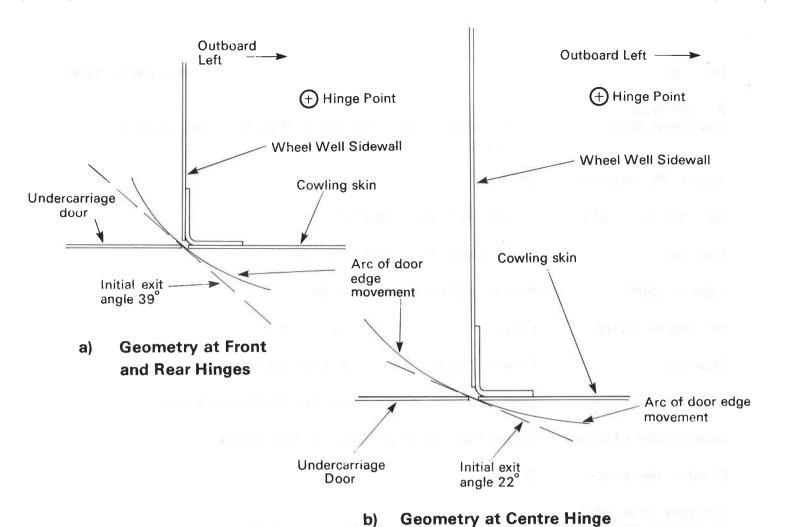
Establishment Materials Department.

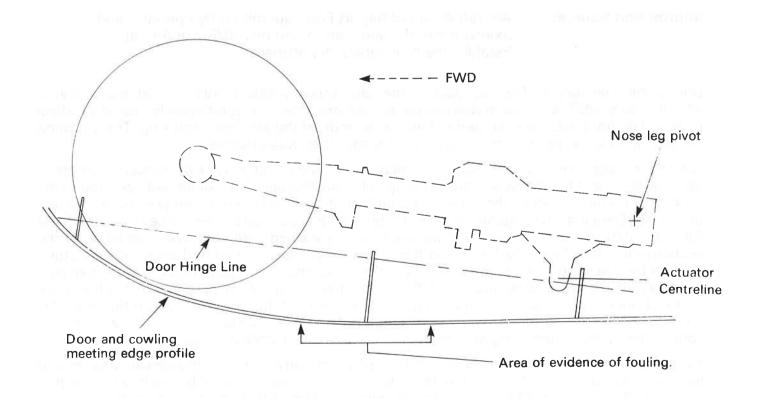
During the final stages of an approach to the gas support platform AV1, a sudden and severe vibration was felt. The vibration was one per revolution of the main rotor in the lateral and vertical planes. The helicopter was landed within 20 seconds of the incident occurring. The vibration continued on deck and a 20 to 30 cm split in blade track was observed.

After the helicopter was shut down, an inspection revealed a failure in one of the main rotor blade upper attachment beams, which are of composite construction. The failure had occurred in the glass fibre rovings between the blade rear attachment bush and the outer edge — see appended diagrams. Detailed investigation by the Materials and Structures Department of the Royal Aircraft Establishment revealed that a pre-existing crack had extended over two thirds of the section before final failure had occurred. It was concluded that the crack had its orgins in a fretting process between the steel bush and the bore of the hole. The bush is assembled into the hole with an epoxy resin and it was apparent that disbonding had occurred initially along one of the cusps of the chopped strand glass/epoxy compound that formed the inner 180° arc of the hole. It is considered that the different moduli of this material and the unidirectional rovings would have contributed to the disbonding process as the component distorted under load.

It was later found that incipient cracks and delaminations had occurred in the forward attachment hole, and in both blade attachment holes of the lower blade attachment beam. It was clear that fretting had occurred in all cases. Visual detection of cracks is difficult in this area due to partial obscuration by the bush flanges.

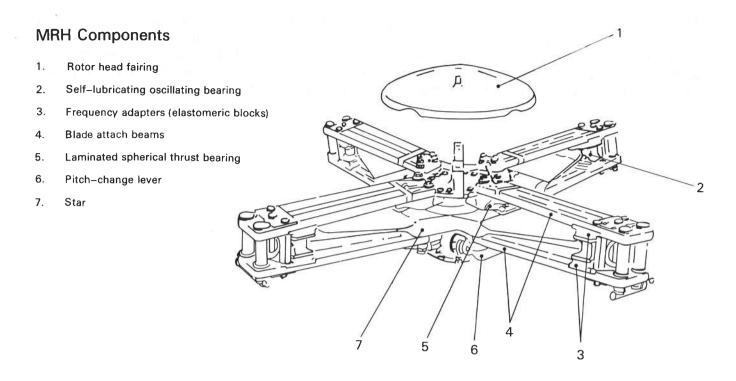
The component had an infinite life and was maintained on an "on condition" basis. The manufacturer has stated that this was the first known failure in 270,000 flying hours on the type.

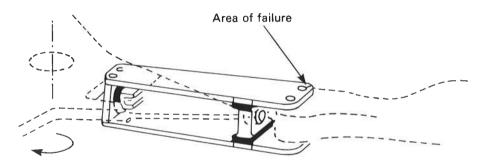


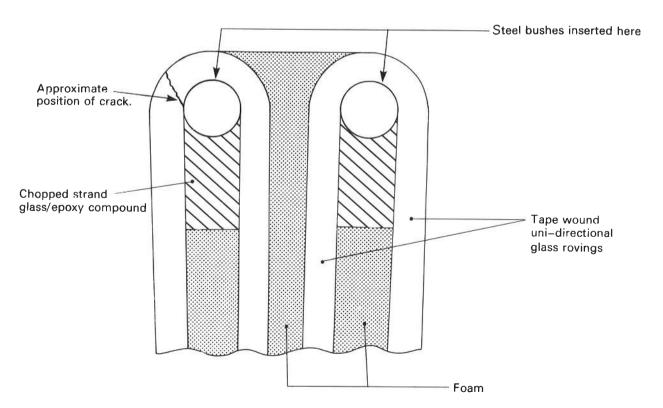


c) Side view of nose undercarriage and door

## **INCIDENT TO G-BFVV**







Main rotor blade attachment beam constructional details

The subject helicopter had achieved more than 7200 hours and been operated on very short sectors, leading to a high number of cycles. Following the discovery of fretting damage on a number of other helicopters, the manufacturers, together with the French Airworthiness Authorities, have imposed a 3000 hour life on the component by means of an Airworthiness Directive. This has been adopted by the United Kingdom Civil Aviation Authority.