Aviation Safety Investigation Report 199500857

de Havilland Aircraft Heron

26 March 1995

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Aviation Safety Investigation Report

199500857

The Bureau did not conduct an on scene investigation of this occurrence. The information presented below was obtained from information supplied to the Bureau.

Occurrence Number: 199500857 **Occurrence Type:** Accident
Location: Sydney
State: NSW **Inv Category:** 3
Date: Sunday 26 March 1995
Time: 1118 hours **Time Zone** EST
Highest Injury Level: None

Aircraft Manufacturer: de Havilland Aircraft
Aircraft Model: DH-114 SEAHERONCMK1
Aircraft Registration: VH-NJP **Serial Number:** 14072
Type of Operation: Miscellaneous Ferry
Damage to Aircraft: Substantial
Departure Point: Sydney NSW
Departure Time: 1118 EST
Destination: Bankstown NSW

Crew Details:

Role	Class of Licence	Hours on Type	Hours Total
Pilot-In-Command	ATPL	500.0	16300

Approved for Release: Wednesday, September 4, 1996

Just after lift off, the pilot noticed a vibration throughout the aircraft then heard a bang and number one engine oversped. The engine was immediately shut down and the pilot then saw that the number one propeller was missing. He made a MAYDAY call and landed immediately on the crossing runway. Inspection of the failed propeller revealed the barrel assembly, which retains the blades, had failed due to cracking, liberating both blades.

During the investigation, the remaining propellers were removed and inspected but no abnormalities were observed. After repairs were completed, the aircraft was released for service. However, after 17 hours of operation, the number three propeller was removed due to an oil leak. Inspection of the removed propeller revealed cracking in the barrel in the same area as that found on the original failure. The remaining propellers were removed and fretting was observed on all propeller cone surfaces indicating the propellers had been operating in a loose condition.

Analysis:

The manufacturers maintenance data for the propeller requires that, after installation, the propeller nut torque should be checked again after the first flight and then at 150 hourly intervals. Additionaly, the barrel should be inspected for cracking every 25 hours.

Review of the aircraft history revealed that the propellers had originally been fitted in the United Kingdom and the nuts were retorqued after the first test flight. The aircraft was subsequently flown to Australia where it operated for 176 hours prior to the failure. There is no evidence in the aircraft maintenance records that propeller nut retorque was performed at 150 hours subsequent to its installation, or that the barrel was inspected for cracking at 25 hourly intervals.

The manufacturers installation data for the propeller requires that the propeller nut be torqued to 600 lbs/ft and, whilst maintaining that torque, the wrench is given two taps with a soft mallet in the direction of nut rotation to ensure the cones are seated. Maintenance personnel involved with the propeller installation advised they had not used this method but simply torqued the nut to the required value with a torque wrench.

Experiments were carried out on applying torque to a propeller nut. It was found that when the required torque was obtained and the wrench was tapped twice with a soft mallet, the nut rotated a further 1/4 to 1/2 turn. This indicated that the nut was not sufficiently tight to seat the cones when only the initial torque was applied.

The propeller manufacturers Technical News Sheet number 26, dated January 1963, states that investigations of bracket type propellers which have sufferred failure of major components have directly attributed the failures to operation of the propeller in a loose condition due to:

1. Incorrect installation.

2. Failure to check tighten or to effectively check tighten due to incorrect procedures.

Findings:

1. The initial failure of the number one propeller was consistent with operation of the propeller in a loose condition because propeller nut retorque was not carried at the recommended time periods.

2. The failure may have been averted had inspections of the barrel at the recommended intervals detected cracking.

3. The cracking of the number three propeller barrel and fretting of the other propeller cones was consistant with operation of the propeller in a loose condition as a result of incorrect nut torquing procedure.

Sgnificant Factors:

1. Maintenance personnel involved in the maintenance of the propellers failed to observe the requirements of the manufacturers maintenance data.

Safety Action:

The safety deficiencies identified during this investigation were corrected as they were identified. Cosequently, no safety recommendations have been raised.