Aviation Safety Investigation Report 199502007

de Havilland Aircraft Dove

03 July 1995

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NOTE: All air safety occurrences reported to the ATSB are categorised and recorded. For a detailed explanation on Category definitions please refer to the ATSB website at www.atsb.gov.au.

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

<b>Occurrence Number:</b>	199502007	Occurrence Type	e: Accident
Location:	Carnarvon Airport		
State:	WA	Inv Category:	4
Date:	Monday 03 July 199	5	
Time:	1755 hours	Time Zone	WST
<b>Highest Injury Level:</b>	None		
Aircraft Manufacture	r: de Havilland Airci	raft	
Aircraft Model:	DH-104 SERIES 5	5	
Aircraft Registration:	VH-DVE	Serial Nu	mber: 04420
Type of Operation:	Non-commercial	Business	
Damage to Aircraft:	Substantial		
<b>Departure Point:</b>	Jandakot WA		
<b>Departure Time:</b>	1505 WST		

Exmouth WA

**Crew Details:** 

**Destination:** 

	Hours on		
Role	<b>Class of Licence</b>	Туре Но	urs Total
Pilot-In-Command	Private	26.0	4570

Approved for Release: Tuesday, October 10, 1995

## Circumstances

The aircraft was approximately 80 NM south of Carnarvon when the right engine began to run roughly. Approximately 20 NM later the right engine was shut down and the propeller feathered due to a continued deterioration in the engines performance. The flight was continued with the lowest safe power selected on the left engine. The pilot decided to carry out a precautionary landing at Carnarvon.

During the approach, when the landing gear was selected down, the right main gear down light failed to illuminate. The gear and flaps were retracted and a go-around was initiated. Later, the landing gear was selected down again but the right gear light still failed to illuminate. A subsequent attempt was made to extend the right landing gear, using the emergency extension system, without success.

As the left engine's temperature had entered the 'red' instrument band and it had started to misfire the pilot decided to land the aircraft without further delay.

During the landing the pilot used the ailerons to hold the right wing up for as long as possible whilst applying heavy left braking in an attempt to keep the aircraft on the runway. The aircraft eventually came to a standstill in gravel to the right side of the runway with the right wing in contact with the ground.

## Engine and Landing Gear Failure

(The Dove aircraft uses a pneumatic system incorporating compressors on both engines to provide power for the operation of landing gear, flaps and brakes).

Examination of the right engine disclosed the induction manifold was severely holed by flame from the region of the No. 3 cylinder exhaust flange which was due to the failure of the exhaust manifold gasket. The subsequent lean fuel-air mixture delivered to Nos. 1, 2 and 3 cylinders resulted in burning and damage to the skirts of their respective pistons allowing the engine crankcase to be pressurised. Pressurisation of the crankcase forced engine oil past the pneumatic air system compressor mounting pad seal and into the compressor and the pneumatic system lines, particularly those leading to the right landing gear. The increased load caused the compressor drive shaft to shear. The quantity of oil that had entered the landing gear down lines was enough to prevent the correct functioning of the normal or emergency pneumatic systems.

The exhaust gasket that failed was of fibre and aluminium construction similar to those found in the automotive industry. These gaskets were fitted to all exhaust flanges on both the right and left engines. The engineer who fitted the gaskets indicated that he had engineering approval to use them. A copy of this approval was not available.

The exhaust system is composed of a series of pipes bolted directly to the cylinder outlet ports and connected together further downstream. Anecdotal evidence indicates that the nuts holding these pipes to the cylinders may work loose in service. The exhaust system was fitted with a spark arrester that was bolted directly to the airframe. It is probable that this fixture prevented the exhaust system from matching any movement of the engine and this, in turn, led to the premature loosening of the bolts. The aircraft log book did not contain any entries indicating that the nuts had been re-tightened at the periodic service which occurred 34 hours prior to the accident although there was a requirement to inspect the exhaust system during that service. The owner reported that the exhaust bolts had been re-tightened at the periodic servicing and also prior to departure from Jandakot on the accident flight. The nuts on cylinder No. 3 were found to be loose however, whether this occurred prior to the gasket failure could not be established.

The Dove aircraft is certified for single engine performance at maximum all up weight. The aircraft was operating well below its maximum weight and should have been capable of operating on one engine without overheating that engine. There was evidence that some of the exhaust gaskets on the operating engine had also failed and although the inlet manifold had not been breeched there were signs of scorching. At least two of the cylinders showed some evidence of abnormally high inlet temperatures. It is possible that the temperature of the fuel-air mixture passing through the hot inlet manifold reached a point where power output and engine temperature were significantly affected.