ACCIDENT

Aircraft Type and Registration:	Vans RV-8, G-XSEA
No & Type of Engines:	1 Superior XP-IO-360-B1AA2 piston engine
Year of Manufacture:	2005
Date & Time (UTC):	7 November 2009 at 1605 hrs
Location:	High Easter Airfield, Essex
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - 1 (Minor) Passengers - N/A
Nature of Damage:	Damage to left landing gear, left wing, propeller, engine cowling and fuselage
Commander's Licence:	Private Pilot's Licence
Commander's Age:	48 years
Commander's Flying Experience:	1,044 hours (of which 110 were on type) Last 90 days - 15 hours Last 28 days - 3 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot and subsequent AAIB inquiries

Synopsis

Whilst performing an aerobatic manoeuvre, the shuttle valve in the engine oil system became stuck in the inverted position causing a reduction in the engine oil pressure. During the subsequent precautionary landing, the left landing gear ran off the grass strip and sunk into a cultivated field, resulting in the left wingtip and propeller striking the ground.

History of the flight

The pilot was carrying out an aerobatic manoeuvre when the engine oil pressure warning light illuminated, the oil pressure dropped to between 4 and 7 psi, and shortly after the engine started to run roughly. At

this point, the aircraft was approximately 3 nm from its home strip and at a height of between 1,200 and 1,500 ft. The pilot decided it would be safer to return to his strip rather than land in a field and positioned the aircraft for a downwind glide approach, to land uphill with a tailwind of approximately 2 kt. The aircraft crossed the hedge at the threshold of the runway approximately 15 kt above the normal approach speed and did not touch down until approximately 180 m into the 450 m long strip. Aware that he would not be able to stop on the runway, and not wishing to risk a go-around, the pilot manoeuvred the aircraft in an attempt to avoid colliding with a hedge and ditch at

the end of the runway. In doing so, the left landing gear ran off the grass strip, sunk into a cultivated field and broke away from the aircraft. The left wingtip and propeller dug into the ground and the aircraft came to a halt. The pilot, who was wearing a five-point harness and safety helmet, sustained minor bruising.

Engine oil system

The engine was equipped with an oil system designed to permit unlimited inverted flight. The principal element of the system is a gravity-operated shuttle valve which controls the location from which oil is drawn into the high-pressure engine-driven oil pump. During normal flight, oil is drawn from the sump through the shuttle valve to the oil pump. However, during inverted flight the oil is drawn from the top of the crankcase, which is now lowermost, through the breather port and shuttle valve to the oil pump.

Engineering examination

The owner's maintenance organisation reviewed the data stored in the electronic flight and engine instrument system and established that during the first part of the flight the engine oil pressure was between 62 and 66 psi. The oil pressure then reduced to between 19 and 12 psi for approximately 12 seconds and then fluctuated between 3 and 7 psi for the remainder of the flight. When the oil pressure dropped to 19 psi the airspeed was 26 kt and the ground track changed from 016° to 302°.

An examination of the engine revealed that all the engine oil was in the sump and there was no evidence of any oil having leaked out of the engine. The crankcase breather vent was clean and free from oil and emulsion.

Comment

The drop in oil pressure occurred whilst the aircraft was undertaking an aerobatic manoeuvre and it is likely that the shuttle valve in the engine oil system became stuck in the inverted position for the remainder of the flight. It is also probable that the drop in oil pressure would have caused the hydraulic valve lifters to deflate, which would have affected the dynamic range of movement of the inlet and exhaust valves and caused the engine to run roughly.