

Evans VP-1 Volksplane, G-BICT, 4 August 1996

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Aircraft Type and Registration: Evans VP-1 Volksplane, G-BICT

No & Type of Engines: 1 Volkswagen 1600 piston engine

Year of Manufacture: 1982

Date & Time (UTC): 4 August 1996 at 1630 hrs

Location: Near Evesham, Worcestershire

Type of Flight: Private

Persons on Board: Crew -1 - Passengers - None

Injuries: Crew - None - Passengers -N/A

Nature of Damage: Landing gear and both wings damaged

Commander's Licence: Private pilot's licence

Commander's Age: 59 years

Commander's Flying Experience 148 hours (of which 120 were on type)

Last 90 days - 6 hours

Last 28 days - 2 hours

Information Source: AAIB Field Investigation

The pilot had been conducting a local pleasure flight at about 2000 ft agl and had decided to return to his base airfield. He initiated a gentle descent for a 'straight-in' approach by reducing the engine rpm from 3,100 to 2,900. At about 1500 ft, the pilot noticed that the engine RPM had decreased to 2,600. He opened the throttle to bring the RPM back to 2,900 but the engine did not respond. Realising that he would not be able to reach his base airfield, he altered the aircraft's heading towards an airfield that he thought he could reach. However, when approaching some high ground that was on track to the alternate airfield, the engine stopped completely. As there were no suitable landing areas ahead, the pilot turned the aircraft through 180° and headed for some flat market garden fields in the valley. The aircraft landed heavily and struck some irrigation equipment that was laid out within the field of vegetable crop. After vacating the aircraft without injury, the pilot inspected the engine and noted that it was extremely hot, especially in the area of the No 3 cylinder. This surprised him, since he assessed that it had been about 3 minutes from when the engine stopped until his arrival in the field. He therefore thought that the engine might have seized. Subsequent examination of the engine at a later date showed that it was free to rotate. The cockpit carburettor hot air control was found to be in the COLD position, but the air shutter at the carburettor was found in the HOT position. A fault within the cable operating system would not

allow the shutter to return to the cold position when the cockpit control was selected to cold. One of the four cylinder head nuts on No 3 cylinder was loose and subsequent removal of the cylinder and head showed evidence of exhaust gas leakage in one area of the cylinder head/cylinder barrel interface. There was a sufficient quantity of oil within the engine sump and the magneto timings were approximately correctly set. The No's 1 and 3 cylinder head, cylinder barrels, pistons and gudgeon pins were removed for metallurgical examination, and an oil sample taken for analysis. The bore of the cylinders and the external diameter of the piston skirts were measured and compared with information in the engine manufacturer's manual, with the following results:-

Piston Number	Diameter	Size
1	85.363	85.46
3	85.352	85.46

Cylinder Number
Diameter Size and colour code from manual mm 1 85.497 Normal - Blue (diameter 85.492 to 85.508) 3 85.497 Normal - Blue (diameter 85.492 to 85.508)

Examination of the No 1 piston assembly showed that the piston crown was clean except for slight sooting. The piston rings had been correctly assembled, but the lower compression ring was locked in its groove by 'tar' from overheated oil which was generally present above the scraper ring. The piston had just started to seize in the cylinder and the gudgeon pin had been grossly overheated. Examination of the condition of the No 3 piston/cylinder assembly showed that it was similar to the No 1, but it was in a more advanced stage of degeneration. All the piston rings were seized in their grooves and the piston/cylinder scoring was more extensive. The gudgeon pin appeared to have been overheated to a similar degree to that in the No 1 piston. Examination of the cylinder head showed that the sooting on the piston crowns delineated the limits of the cut-outs required to allow the valves to open. Evidence of 'tar' from overheated oil was present in the No 3 position of the cylinder head. A crack was present between the No 3 valve seats and was associated with peening depressions where the seat inserts had been locked into the head. The spark plugs were removed from the cylinder head. Those in the No 1 position were only just tight, but those in the No 3 position had seized and the threads stripped during plug extraction. All plug electrodes and surrounding areas were coated with an unidentified deposit. When tested, all spark plugs were found to work satisfactorily. The oil sample taken from the engine was analysed and found to be consistent with a standard suitable for this engine. There was no evidence of high carbon or metal particle content, or of thermal degrading of the oil consistent with the overheating effects present on the piston gudgeon pins. It was considered that the condition of the parts examined indicated that seizure of the engine was as a result of a breakdown in lubrication. This could have resulted from inadequate engine cooling, an oil pump malfunction or an internal oilway restriction/blockage. It was not considered that the evidence of friction-induced wear between the pistons and cylinders was indicative of sufficient related heat having been generated to have produced the uniform evidence of overheating present on the gudgeon pins, particularly that on the No 1 gudgeon pin.