

No: 10/90	Ref: EW/G90/05/21	Category: 1c
Aircraft Type and Registration:	Piper PA-38-112, G-BRNJ	
No & Type of Engines:	1 Lycoming O-235-L2C piston engine	
Year of Manufacture:	1979	
Date and Time (UTC):	7 May 1990 at 1000 hrs	
Location:	6 nm east-south-east of Malvern, Worcestershire	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 1
Injuries:	Crew - None	Passengers - None
Nature of Damage:	Damage to nose landing gear	
Commander's Licence:	Private Pilot's Licence with IMC and Night ratings	
Commander's Age:	27 years	
Commander's Total Flying Experience:	104 hours (of which 13 were on type)	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Whilst on a local flight from Staverton, severe engine vibration was experienced. Recovery to Staverton was initiated immediately, but the vibration got worse and was accompanied by a loss of power. Checks were carried out for carburettor icing, fuel mixture and magnetos without effect. Eventually the vibration increased to a level where the artificial horizon toppled and the pilot considered it unsafe to continue the flight. A Pan call was made and a suitable field selected. However a downwind inspection revealed a number of obstructions in the field, necessitating an alternative field to be selected. At that point, all engine power ceased. The aircraft landed heavily from the resulting glide approach, and the nose landing gear collapsed immediately. The aircraft came to a halt in a nose down attitude and the occupants evacuated the aircraft without injury.

Subsequent investigation of the engine revealed that No. 1 cylinder had three cylinder hold-down nuts missing, the studs apparently having sheared. In addition, 2 nuts on the adjacent (No 3) cylinder were found to be finger tight. In the opinion of the maintenance organisation, the remaining cylinder nuts on the engine had been over torqued. The vibration had been due to the physical movement of the No. 1 cylinder such that a 1/8 inch gap existed between the cylinder flange and the crankcase.

The engine had been overhauled in the United States. No oil weeps from the cylinders, which would have indicated low torque settings on the nuts, had been found during successive 50 hour inspections; the actual torque settings are not normally checked.