AAIB Bulletin No: 10/94 **Ref: EW/C94/8/2** **Category: 1.3**

Aircraft Type and Registration:	Cessna 152, G-BMSZ
No & Type of Engines:	1 Lycoming O-235-L2C piston engine
Year of Manufacture:	1979
Date & Time (UTC):	3 August 1994 at 1220 hrs
Location:	Blackbushe Airport, Hampshire
Type of Flight:	Private (Training)
Persons on Board:	Crew - 2 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Nose landing gear collapsed, damage to fuselage, engine, propeller, cowling and left wing
Commander's Licence:	Commercial Pilot's Licence with IMC, Night and Assistant Flying Instructor Ratings
Commander's Age:	35 years
Commander's Flying Experience:	1,074 hours (of which 700 were on type) Last 90 days - 230 hours Last 28 days - 71 hours
Information Source:	AAIB Field Investigation

History of the flight

The aircraft had recently been fitted with a newly overhauled engine. It was undertaking the 13th flight since the fitting of that engine, and was on its third flight of the day. Prior to this flight, it was refuelled to full tanks with 57 litres of Avgas 100LL from the Blackbushe facility. While the aircraft was being positioned for refuelling, two of the airport operator's personnel noted that the engine sounded to be running rougher than was usual for that type of aircraft. The instructor reported that normal pre-flight engine checks were carried out with no irregularities being observed.

The flight was being undertaken as a refresher circuit flying exercise in order to revalidate a lapsed Private Pilot's Licence. The first circuit was flown with a touch-and-go performed on Runway 08. The instructor reported that there was no sign of any carburettor icing during this time. After the first touchdown, the flaps were retracted and the carburettor heat control reset to the cold position. Full

power was then applied, and the aircraft lifted off normally. However, at about 100 feet agl there was a substantial power loss. The instructor took control and exercised the throttle, but was unable to regain sufficient power to continue the climb. He therefore looked for a suitable place for a forced landing, the only viable option being an area of common land in the overshoot area of the runway.

He made a very quick call to ATC, noting that there was an engine failure, but omitting to prefix the call with a 'MAYDAY'. The appropriate emergency drills were then carried out. Initially, the AFISO was uncertain as to whether the failure was a practice exercise, but soon assessed the reality of the situation and alerted the emergency services which responded quickly.

In order to slow the aircraft within the distance available before crossing a public road, the instructor elected to swerve the aircraft towards some gorse bushes. The nose leg collapsed at this stage and the aircraft came to a halt upright but nose down. Both occupants had been wearing lap and diagonal shoulder harnesses and were uninjured. There was no fire, and they quickly vacated the aircraft by the normal means. The instructor was unable to assess why the power loss had occurred. The pilot under instruction noted that the engine had been rough running during the initial part of the pre-takeoff power check, but had then run normally, with no problem apparent during the first circuit.

The weather at the time was good, with a surface wind of 150°/6 kt, temperature +27°C, QNH 1018 mb. The airfield elevation is 329 feet amsl.

Engineering Examination

Examination of the aircraft at the accident site showed that the propeller was not rotating under power when the landing gear nose leg collapsed and that there was no mechanical damage around the engine other than that caused by this collapse. With the engine still in place, the connections of the throttle, fuel mixture and carburettor heat controls were checked and found satisfactory. The fuel system was tested, showing that there was an ample fuel supply to the carburettor. The spark plugs were found to be in good condition, with no evidence of fouling, the fuel filter was clear and there was correct electrical continuity at the magneto switches. A sample of fuel was taken and tested at DRA Woolwich, where it was found to comply fully with the specification for Avgas 100LL.

The engine was removed from the airframe and taken to an engine overhaul facility, where it was mounted on an engine test bed with the original carburettor, magnetos and other accessories still installed. Before the engine was run, the carburettor was examined in detail; it was found to be correctly assembled and the only anomaly was a small fleck of what appeared to be paint at the base of

the mixture valve insert. The carburettor was reassembled and installed on the engine. The engine was then subjected to approximately two hours of running; this included magneto checks, a number of accelerations and decelerations and running at a number of different power settings, both with the aircraft exhaust system installed and removed. The effect of disconnecting the fuel primer line was also examined. The engine performed flawlessly throughout the testing, with performance very close to that of a newly-overhauled engine.

Following the engine runs, the carburettor was examined again. The small fleck of material was found in the same area of the carburettor as before but not in the same position. The size of the fleck was such that it could have passed through neither the fuel filter nor the finger-type fuel screen within the carburettor but it did appear feasible that it might, at some stage, have constricted the fuel flow through the carburettor jet. The engine log book and the flying club's technical log sheets showed that the engine and carburettor had been operated for some seven hours since they had been overhauled to 'Zero hours' specification.