ACCIDENT

Aircraft Type and Registration:	Scheibe SF25B, G-AXEO
No & Type of Engines:	1 MS 1500/2V piston engine
Year of Manufacture:	1969
Date & Time (UTC):	9 July 2005 at 1122 hrs
Location:	Milfield Airfield, Northumberland
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Extensive damage to both wings, fuselage and propeller
Commander's Licence:	National Private Pilot's Licence
Commander's Age:	62 years
Commander's Flying Experience:	135 hours (of which 5 were on type) Last 90 days - 5 hours Last 28 days - 1 hour
Information Source:	Aircraft Accident Report Form submitted by the pilot and further enquiries by the AAIB

History of flight

The pilot planned to fly the aircraft once it returned from a cross-country flight of approximately one hour. The pilot on that flight reported that the aircraft was running "very nicely". He also advised against refuelling since the surface temperature was +25°C, and the increased mass would have an adverse effect on performance during the subsequent takeoff. There was approximately 15 ltr of fuel remaining which was more than sufficient for the one hour flight that the pilot had planned: the aircraft was not refuelled.

After starting the engine the pilot taxied to a point short of the take-off position where he completed his power checks and pre-take off checks. Runway 36 was in use and its grass surface was dry. The pilot reported that he observed 2,400 rpm during the power checks prior to takeoff, this being the minimum criteria for power output for takeoff on this aircraft type. He also noted that there was no significant drop in engine rpm on application of carburettor heat. The Chief Flying Instructor of the gliding club reported that this was not unusual on this aircraft type due to the poor performance of the carburettor heating on this engine.

The pilot then continued to the take-off point once a glider that was in the circuit had landed. A wait of some five minutes then passed whilst the glider was retrieved. During this period the engine speed was maintained at

1,100 rpm, which is the usual power setting to apply whilst stationary on the ground. Once the glider had been retrieved the pilot commenced the takeoff.

The aircraft was seen by witnesses to become airborne approximately two thirds of the way along the runway and climb initially to a height of 20 to 30 ft agl. At this point the pilot reported that there was a progressive reduction in engine power. By this time, being at about 80 ft, he realised that he was too high to land in what remained of the airfield ahead. The engine then stopped completely and the aircraft started to descend.

The aircraft's propeller struck the top of a fence which marks the boundary of the airfield with the adjacent field. The left wing made contact with a small tree in this boundary fencing, causing the aircraft to yaw to the left as it struck the ground on the other side of the fence. The aircraft then came to rest on a concrete area in the adjacent field; part of a disused airfield. The pilot vacated the aircraft unassisted and without injury.

Meteorological information

The Meteorological Office provided an aftercast for the area at the time of the accident. It indicated a ridge of high pressure extending across the British Isles from the south west with an area of slack pressure gradient lying over the Scottish Borders.

The visibility was generally 20 km, with no low cloud, with perhaps a few cumulus clouds at 3,000. The surface wind was assessed as variable (mainly east to south easterly) 2 to 5 kt, with a temperature of +24ºC, a dew point of +13ºC and a relative humidity of 51%.

The pilot reported a visibility in excess of 25 km with no significant cloud. The surface wind was variable (mainly north, north easterly) less than 5 kt, temperature +25ºC, dew point +13ºC.

Aircraft and engine examination

The damage to the aircraft was extensive; the left wing spar was broken, the right wing was cracked, the rear fuselage twisted and the propeller was damaged. The aircraft was assessed as damaged beyond economic repair.

The engine was inspected by the resident maintenance organisation. The engine showed no signs of any internal damage and subsequently started without difficulty.

Carburettor icing

The temperature and dew point derived from the aftercast were plotted on the Carb Icing Chart in Safety Sense 14, found in LASORS and AIC 145/1997. They fall into an area where serious icing can occur at descent power and where moderate icing can occur at cruise power.

An extract of LASORS Safety Sense 14, *Piston Engine Icing* is shown below:

> *Carb icing is not restricted to cold weather, and will occur on warm days if the humidity is high, especially at low power settings. Flight tests have produced serious icing at descent power with the ambient (not surface) temperature over 25°C, even with relative humidity as low as 30%. At cruise power, icing occurred at 20°C when the humidity was 60% or more. (Cold, clear winter days are less of a hazard than humid summer days because cold air holds less moisture than warm air.) In the United Kingdom and Europe where high humidity is common, pilots must be constantly on the alert for the possibility of carb icing and take corrective action before an irretrievable situation arises.*

The Chief Flying Instructor believed that the poor performance of the carburettor heat system may have led to carburettor icing. He believed that the length of the hot air ducting to the carburettor would allow the heat to dissipate from the ducting material. In addition, the routing of the normal air supply to the carburettor is from the front of the engine through the cylinder cooling apertures at the front of the close-fitting engine cowlings. This air would therefore be warmed as it passed over the cylinder cooling fins and this effect would be amplified when the aircraft was on the ground at low engine rpm and with no ram-air effect. Thus, the temperature differential between the normal air supply to the carburettor and the heated air would be reduced.

A search of the CAA's Mandatory Occurrence Report database of carburettor icing incidents to SF25b aircraft fitted with these engines revealed no previous occurrences.

Manufacturer's comments

In discussion with the manufacturer a number of possibilities were considered that might have caused the engine to stop. However, given the high outside air temperature, the warm engine from the previous flight and the protracted time awaiting the takeoff, they believed that a vapour lock in the fuel system might have been the cause.

Conclusion

Neither carburettor icing nor a vapour lock in the fuel system would leave any subsequent evidence.

Prior to the takeoff the aircraft was stationary on a dry grass surface for approximately five minutes with the engine set to 1,100 rpm. The ambient temperature was +25ºC, the dew point was +13ºC and the relative humidity was 51%. The engine was already warm from its previous flight and the normal air supply to the carburettor would have provided very warm air as a consequence of its low flow rate through the engine compartment in the absence of any ram effect. It is therefore considered unlikely that carburettor icing would have occurred in these conditions. Conversely, these conditions were ideal for the formation of a vapour lock in the fuel line.