ACCIDENT

Aircraft Type and Registration:	Jabiru J400, G-CDLS
No & Type of Engines:	1 Jabiru Aircraft PTY 3300A piston engine
Year of Manufacture:	2006
Date & Time (UTC):	19 May 2010 at 0944 hrs
Location:	Hinderwell, Yorkshire
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - 1
Injuries:	Crew - None Passengers - None
Nature of Damage:	Propeller destroyed, lower fuselage, cowlings, engine attachment and landing gear damaged
Commander's Licence:	National Private Pilot's Licence
Commander's Age:	69 years
Commander's Flying Experience:	776 hours (of which 88 were on type) Last 90 days - 4 hours Last 28 days - 4 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

Synopsis

The aircraft was damaged during a forced landing following an engine malfunction. Carburettor icing may have been a factor.

History of the flight

The aircraft took off from Fishburn Airfield at around 0725 hrs with the pilot and one passenger aboard and approximately 60 litres of Avgas for a flight to Scarborough and back. On the return leg, flying at a height of approximately 1,000 ft north-west of Whitby, the engine began "misfiring severely". At 0812 hrs the pilot transmitted a MAYDAY and selected a field to the east of the aircraft in which to make a forced landing. Whilst flying downwind he judged that the aircraft was too low to continue the approach as intended and turned the aircraft sharply left into wind. Before completing the turn the aircraft impacted the ground, coming to rest on the front left portion of its fuselage following the failure of its nose and left landing gear legs. During the short ground travel the engine "started to rev up", so the pilot switched it off before vacating the aircraft with the passenger using the door on the right of the cabin. There was no fire and the uninjured occupants were able to signal to a Coast Guard helicopter that attended shortly afterwards. Police and the Ambulance service attended later.

Aircraft information

The aircraft was constructed by the pilot from a kit. The kit manufacturer states in information available online that the engine type fitted to this aircraft has a fuel consumption of approximately 26 litres per hour at 75% cruise power, noting that the actual figure will *'vary depending on installation, propeller and power settings'*. The engine is equipped with a means of heating the carburettor to reduce ice accretion.

The aircraft was recovered two days after the accident by an engineer who was familiar with the type. While dismantling it he drained approximately 27 litres of fuel from its wing tanks. During an informal examination he also determined that the engine could be turned freely and exhibited compression in each of its cylinders.

Meteorological information

A meteorological report valid at 0820 hrs for Durham Tees Valley Airport, 24 nm west of the accident site, indicated a surface wind from 200° at 5 kt, visibility in excess of 10 km with no cloud reported below 4,000 ft, a temperature of 14°C and dew point 8°C.

Discussion

Engine malfunction

Given the quantity of fuel recovered from the aircraft after the accident it is unlikely that the loss of power in flight was due to lack of fuel onboard. The findings of the informal engine inspection, and the pilot's report that the engine "started to rev up" on the ground, indicate that the engine had not suffered a serious mechanical failure prior to impact.

In his report of the accident the pilot observed that the loss of power in flight may have been caused by carburettor icing. Safety Sense Leaflet 14 – *'Piston Engine Icing'*, published by the CAA, discusses the phenomenon and suggests procedures for minimising its effects. It includes the figure reproduced below.

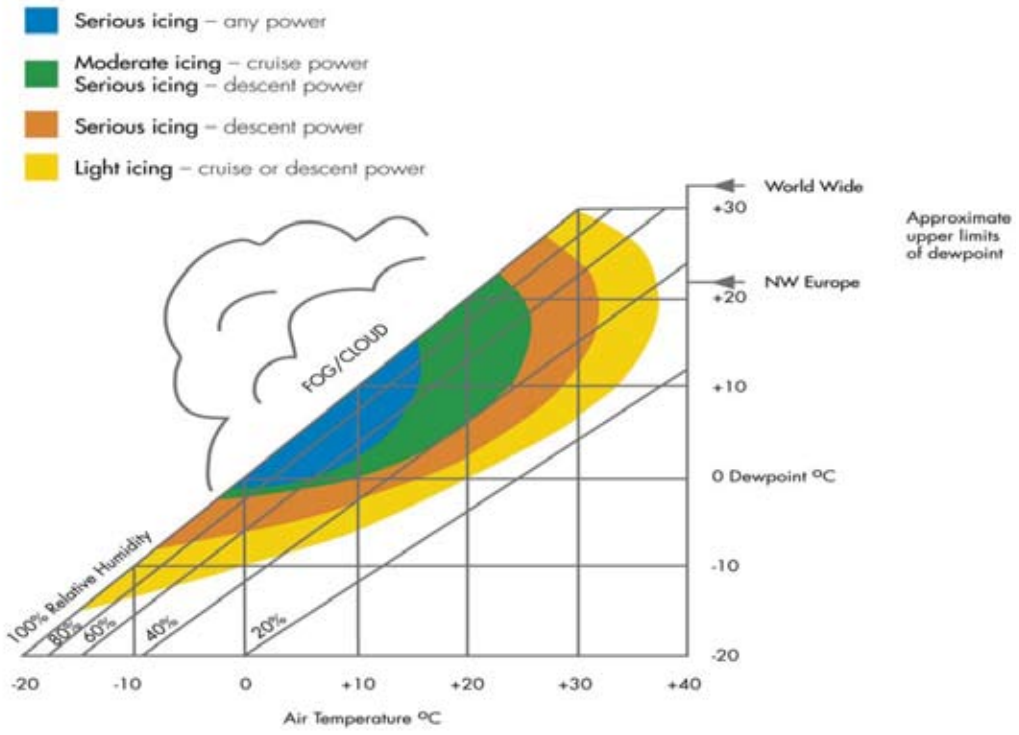

Figure 1

Carburettor icing as a function of temperature and dew point

The combination of temperature and dew point reported at Durham Tees Valley is conducive to moderate carburettor icing at cruise power and is close to combinations that might give rise to severe icing at any power.

A more comprehensive exploration of the issue of induction system icing is included in the report on the accident to G-AVNP on 28 April 2001, published by the AAIB in its January 2004 bulletin. The report on the accident to G-BAOS on 30 May 2006, published in the September 2006 bulletin, includes the following statement from the Civil Aviation Authority Safety Regulation Group Safety Plan 2006:

> *'Since 1976 Carburettor Icing has been a contributory factor in 14 fatal accidents and in over 250 other occurrences in the UK with numerous AAIB recommendations to SRG. Progress has repeatedly been hampered by the lack of data on where ice forms, how quickly and how much heat is effective in removing it. There has also been some doubt that the level of carburettor heat required by the Airworthiness Requirements (e.g. EASA CS-23) is adequate to mitigate the risk. CAA has conducted research using a specially designed carburettor test rig in conjunction with Loughborough University and an industry partner for systematic data collection. The CAA will publish a report on carburettor icing, including potential mitigation.'*

The target date for reporting on this work, stated elsewhere in the Plan, was February 2007. In the Safety Plan Update 2007 and 2008 this was successively revised to April 2009. The Safety Plan 2009/11 listed the work as "on hold", to be reviewed when resources become available.

Forced landing

Safetey Sense Leaflet 07 – *'Aeroplane Performance'* includes a consideration of issues associate with forced landing, noting in particular that:

> *'Since an engine failure or power loss (even on some twin-engined aircraft) may result in a forced landing, this must be borne in mind during all stages of the flight.'*

And

> *'A forced landing under control is infinitely preferable to the loss of directional control.'*