ACCIDENT

Aircraft Type and Registration:	Corben Junior Ace Model E, G-BSDI
No & Type of Engines:	1 Continental Motors Corp A75-8F piston engine
Year of Manufacture:	1981
Date & Time (UTC):	25 February 2012 at 1200 hrs
Location:	White Ox Mead Airstrip, near Bath
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Main landing gear cross-member broken
Commander's Licence:	National Private Pilot's Licence
Commander's Age:	64 years
Commander's Flying Experience:	320 hours (of which 60 were on type) Last 90 days - 12 hours Last 28 days - 6 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

Synopsis

The aircraft suffered a significant reduction in engine power during takeoff, following which the pilot landed the aircraft in a field close to the departure runway, damaging the landing gear. The engine continued to run following the field landing and shortly afterwards it was able to produce full power again. Despite the application of carburettor heat prior to takeoff, it is probable that the power reduction was caused by carburettor icing.

History of the flight

After starting the engine, the pilot taxied the aircraft along the grass Runway 24 at the private airstrip, a distance of approximately 510 m, to the Runway 06 threshold. The pilot reported that the grass was damp following overnight rain and that he applied carburettor heat fully on two occasions during taxiing, observing a 100 rpm drop on each application. During his pre-takeoff checks at the Runway 06 threshold the pilot set the carburettor heat to HOT for 30 seconds, before re-selecting it to COLD for takeoff. The aircraft took off but, after climbing to 50 feet aal, the engine lost power although it continued to run at reduced rpm. The pilot closed the throttle and, having determined that the remaining runway length was insufficient, landed the aircraft in a stubble field adjacent to the right of the runway, damaging the main landing gear cross-member. Following the landing the engine continued to run roughly, although with sufficient power to allow the pilot to taxi the aircraft across the field and onto the

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airstrip. On reaching the airstrip the pilot felt the engine run smoothly again and, holding the aircraft with the wheel brakes, he applied full power for three minutes without further difficulty.

The pilot examined the carburettor and performed a fuel flow check following the accident, neither of which revealed any defects. He considered that the loss of power on takeoff was due to carburettor icing and that the application of carburettor heat for 30 seconds prior to takeoff was insufficient to remove any residual carburettor ice that had built up during taxiing to the Runway 06 threshold.

Meteorology

No weather observations were recorded at the airstrip. Bristol Airport, however, located 12.5 nm east-north-east of the airstrip, recorded a surface temperature of +9ºC and a surface dewpoint of +5ºC shortly before the accident, indicating that the risk of carburettor icing in the area was serious at any power setting (Figure 1).

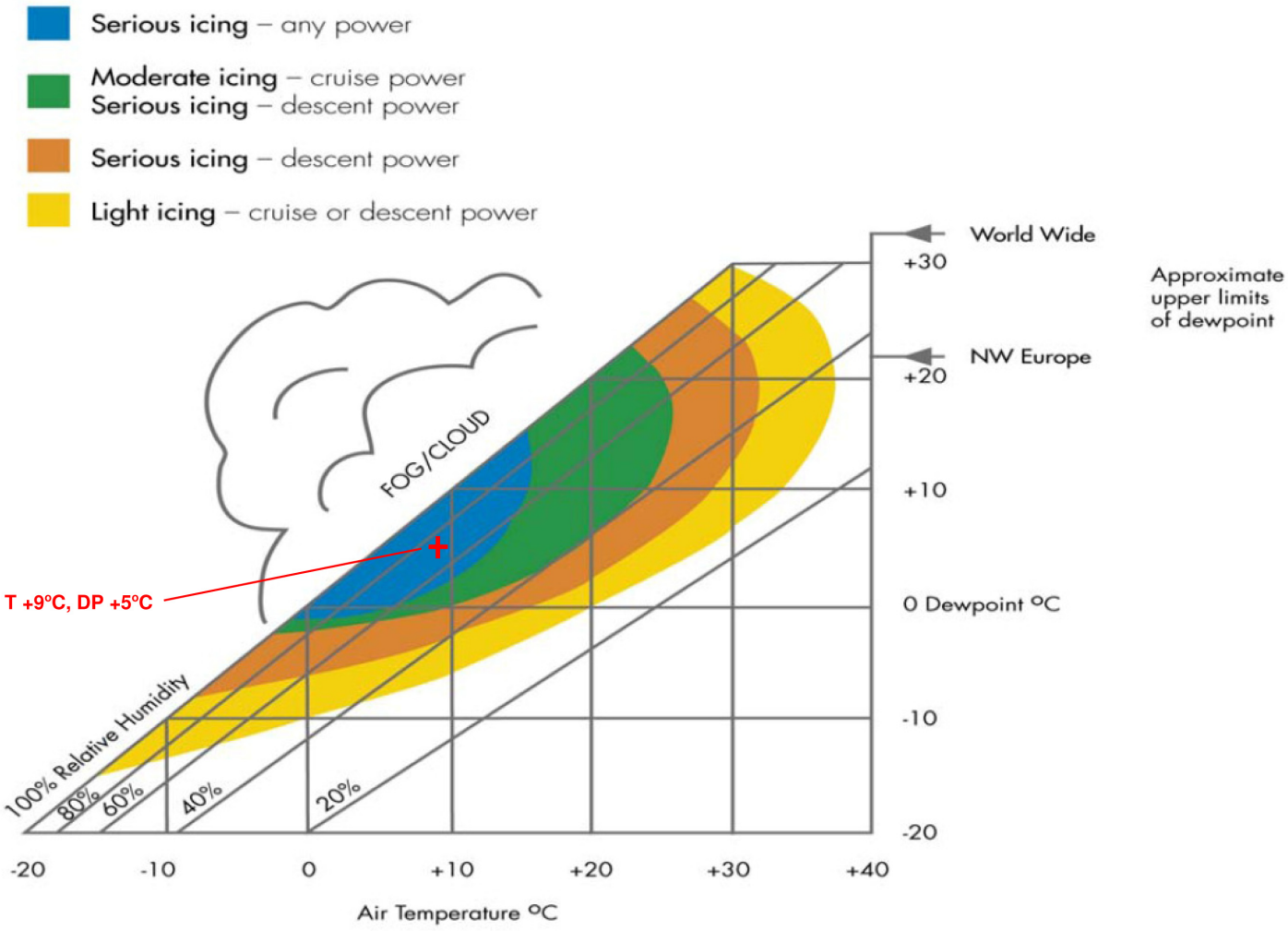

Figure 1

Carburettor icing chart

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Piston engine icing

The CAA's Safety Sense Leaflet 14, *'Piston Engine Icing'* (available from www.caa.co.uk/safetysense) provides useful information to pilots on the hazards of piston engine icing. Section 7 'Pilot Procedures', subsection (e) states:

> *'Immediately Prior to Take-Off: Since icing can occur when taxiing at low power settings, or when the engine is idling, select carb hot air ON for a minimum of 15 seconds and then OFF, immediately before take-off at a high power setting to clear any build-up. If the aircraft is kept waiting at the holding point in conditions of high humidity, it may be necessary to carry out the run-up drill more than once to clear ice which may have formed.'*

Subsection 7(g) of the leaflet also contains the following advice on how to perform the carburettor heat check:

> *'If icing has caused a loss of power, and the hot air disperses it, re-selection of cold air should produce an increase in rpm or manifold pressure over the earlier reading. This is a useful check to see whether ice is forming, but does not prove that all the ice has melted! Carry out further checks until there is* ***no*** *resultant increase, monitor the engine instruments, and increase the frequency of the routine checks, as it may re-occur. Absence of carb icing should produce no increase in rpm or manifold pressure beyond that noted prior to the use of hot air.'*

Discussion

The reduction of engine power after takeoff was likely to have been caused by carburettor icing as the engine ran normally, at full power, shortly after the aircraft landed and no mechanical defects were subsequently discovered with either the carburettor or the aircraft's fuel system. Piston-engine aircraft operating on damp or wet grass surfaces are more susceptible to carburettor icing than those operating from paved surfaces, due to the high moisture content of the air in contact with the grass. It is likely that, during the long taxi manoeuvre to the Runway 06 threshold, ice formed in the carburettor that did not completely melt during the application of carburettor heat during the pre-takeoff checks. As the engine initially produced sufficient power for takeoff, it is likely that additional carburettor ice formed during the takeoff roll, adding to any residual ice remaining from taxiing. Atmospheric conditions at the time of the accident were conducive to severe carburettor icing at all power settings, including takeoff power.

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