FINAL REPORT

AAIU Synoptic Report No: 2005-010
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In accordance with the provisions of SI 205 of 1997, the Chief Inspector of Accidents, on 17 February 2005 appointed Frank Russell as the Investigator-in-Charge to carry out an Investigation into this occurrence and prepare a Synoptic Report.

Aircraft Type and Registration:	Cessna 150 K, EI-CIN
No. and Type of Engines:	1 x TCM 0-200- A
Aircraft Serial Number:	15071728
Year of Manufacture:	1970
Date and Time (UTC):	15 February 2005 @ 12.30 hrs
Location:	Derrinturn, near Edenderry, Co Offaly
Type of Flight:	Aerial Work
Persons on Board:	Crew - One Passengers - One
Injuries:	Crew - Nil Passengers - Nil
Nature of Damage:	Nil
Commander's Licence:	Commercial Pilot's Licence
Commander's Details:	Male, aged 44 years
Commander's Flying Experience:	1,100 hrs (of which 375 were on type)
Information Source:	Operator reported incident. AAIU Incident Report Form submitted by pilot.

1. History of the flight

The pilot, a qualified Flying Instructor, was practicing stalling exercises with a student in a clear area east of Edenderry, Co. Offaly. The weather was suitable, with very light winds, good visibility and few clouds. The student had already recovered from two stalls in the clean configuration, two stalls with 20º flap selected and a stall on right turn from base to finals with 20º flap selected. On recovering from a similar stall in a left hand turn the engine failed to develop power and stopped.

At this point the Instructor took control, set the aircraft up in a glide configuration and selected a suitable landing area. In the descent, which started above 3000', he tried three times unsuccessfully to restart the engine.

He then made a MAYDAY call on 129.17 Mhz and concentrated on his approach and landing to the selected field. He carried out a successful landing from which no injuries to those on board or damage to the aircraft or property ensued.

In his assessment of the possible cause of the engine failure the pilot stated that the temperature at 3500' was approximately -3ºC. Due to the nature of the exercise, he recalled, the engine was at idle for periods of time, with the carburettor heat on. In retrospect, he thought that the engine was getting progressively cooler and was not heating the air passing through the heat exchanger sufficiently to prevent carb ice forming. On that point, he noted, the engine started on the ground after the incident. Finally, as the selected landing field was deemed too short by the Operator to attempt a safe take-off, the aircraft was de-winged and recovered to Weston by road the next day. The Operator said that the Instructor had carried out a "*text book forced landing*".

2. Engine Icing

Carburettor icing is prevented by heating the intake air in an exhaust heat exchanger. Carburettor icing can occur on relatively warm days particularly if conditions are sufficiently humid. This type of icing is more likely at a low power setting such as that used during descent on the approach to a landing. This is because there is a greater temperature drop at the carburettor venturi and the nearly closed butterfly valve can be more easily restricted by the ice build up.

The "HOT" position should be selected in time to prevent the formation of ice, because if the selection is delayed the use of hot air might be too late to melt the ice before the engine stops. A slight drop in RPM would be the first sign of carburettor icing and this may not be associated with any rough running of the engine. Partial heating can induce carburettor icing as it may melt ice particles, which would otherwise pass into the engine without causing trouble, but not prevent the resultant mixture from freezing as it passes through the induction system. Alternatively, partial heat may raise the temperature of the air into the critical range.

The chart at **Appendix A** shows the wide range of ambient conditions conducive to the formation of induction system icing for a typical light aircraft piston engine. This chart is reproduced from the General Aviation Safety Sense Leaflet 14A, which is a UK CAA publication. It is also issued in similar form in Aeronautical Information Circular NR 11/97, published by the IAA. Both are based on research carried out by the National Research Council of Canada (NRCC). Flight tests have produced serious icing at descent power with the ambient temperature above 30° C even with a relative humidity as low as 30%.

3. Comment

Analysis, by the Aviation Division of Met Eireann, of the tephigrams around the time of the incident suggests that the temperature and dew point were approximately -1ºC and -5ºC respectively at 3,000 ft. These figures, applied to the Appendix A Chart, show that the engine, operating in conditions of reduced power, was likely to lead to serious carburettor icing.

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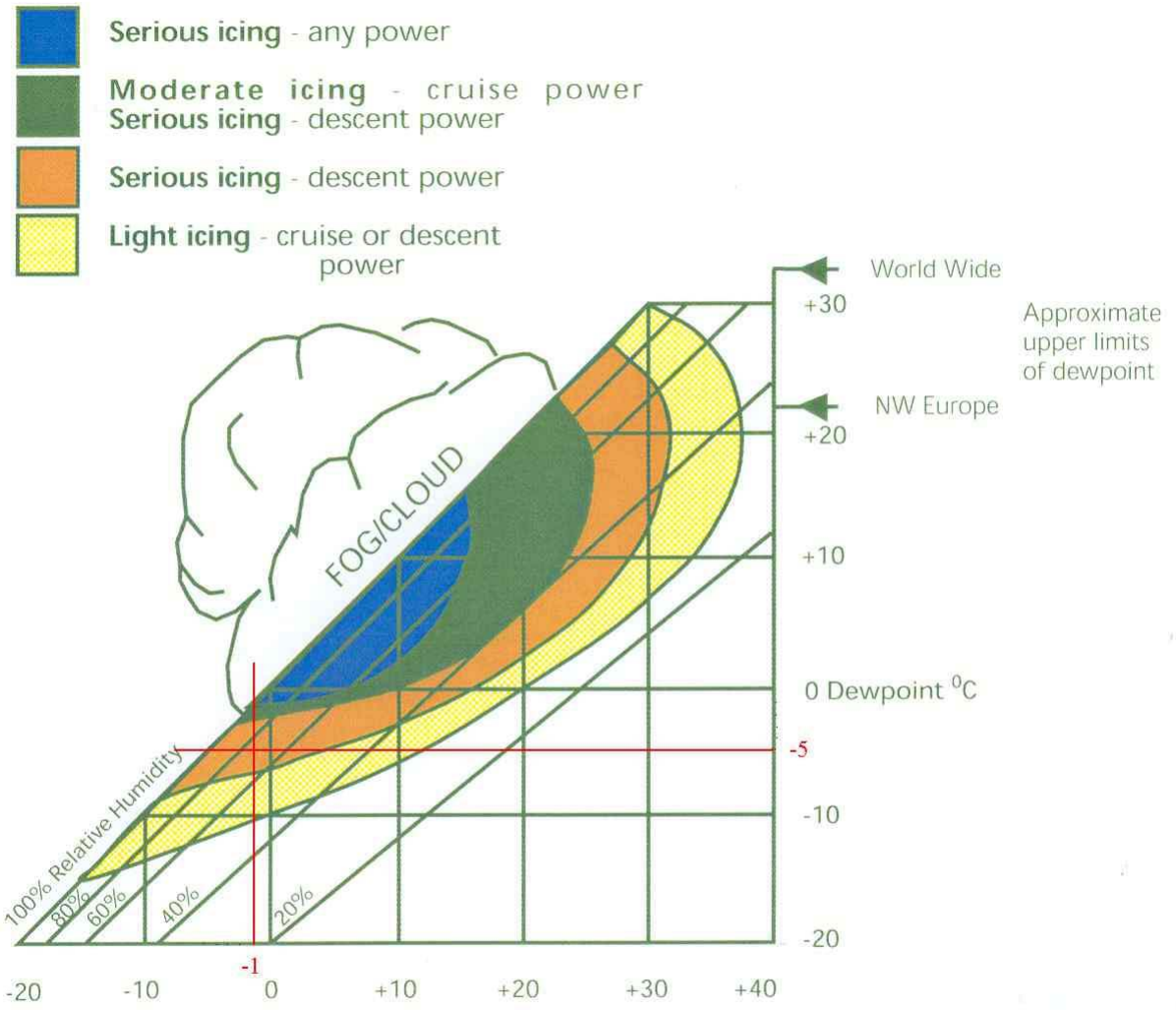
APPENDIX A



CARB ICING CHART