AAIU Report No.2002-001
AAIU File No. 19990047
Published: 18/01/02

Name of Operator	Garda Aviation Club Limited
Manufacturer	Reims Cessna
Aircraft Model	Reims Cessna FA 150K
Nationality	Irish
Registration	EI-AUC
Location:	Laraghcon, Lucan, Co. Dublin
Date and Time (UTC)	15 July 1999, 17.30 hours

Notification

ATC Watch Manager, Dublin Airport, notified the Air Accident Investigation Unit (AAIU) of the location and time of this accident. Two members of the AAIU arrived at the scene shortly afterwards and commenced the investigation.

Synopsis

The aircraft, which was on a checkout flight, took off from Weston Aerodrome at 1700 hours on 15 July 1999. It was the intention of the instructor to complete a half hour flight and then return to the field. Whilst the aircraft was being configured for the final approach by the co-pilot to Runway 25 the engine failed and could not be restarted. The instructor immediately took control of the aircraft and elected to carry out an emergency landing in a cornfield 1 NM north east of the runway threshold. On landing, the nose strut collapsed and the aircraft inverted. There was no fire.

1 Factual Information

1.1 History of the Incident

The aircraft had completed two other flights during the afternoon of the day of the accident. The first flight lasted 50 minutes and the second flight 1 hour. It was intended to refuel the aircraft prior to a third flight. This flight was planned in order that the instructor could conduct a currency checkout on the co-pilot who already held a private pilots licence. However, due to the fact that the refuelling service at the airfield had closed for the day, fuel was not available. The crew then decided to plan a shorter flight.

The instructor stated that prior to the flight he confirmed the fuel contents by dip sticking the tanks. Each tank indicated 4 gals (Imp). At 1700 hours the crew took off for what was to be a 30-minute training flight (circuits). Having completed approx 5 or 6 left hand circuits, the aircraft, under the control of the co-pilot, continued down wind at 800 feet QNH at a speed of 95 MPH and at 2300 RPM engine speed. The carburettor heat was cycled during the downwind phase. The aircraft then proceeded on to the base leg, reducing speed to 70/80 MPH at engine speed of 1900 RPM with carburettor heat on. The instructor stated that the flaps were set at 10 degrees. The aircraft experienced a strong 250º/18 kts wind. The engine was throttled back to 1700 RPM for further descent. Instead of remaining at this setting however, the RPM continued to decrease and then decayed completely. At this stage the instructor took control of the aircraft and tried unsuccessfully to restore engine power. No engine backfires were heard and the propeller continued to windmill. The instructor immediately initiated engine failure procedures, which included a mayday transmission on the emergency frequency of 121.5Mhz. It was decided to make an emergency landing and the pilot picked out a field approx. 1NM northeast of the intended airfield. For the approach, the instructor set the flaps at 40º and maintained an approach speed of 60 MPH. The aircraft landed in a field of mature corn, and after a short ground roll, the nose wheel undercarriage leg collapsed causing the aircraft to nose over and fall on to its back. The occupants were unhurt and exited the aircraft unassisted. They returned to Weston where the instructor alerted ATC, Gardai and directed the Emergency Services to the scene. Two units of the local fire brigade arrived and discharged dry power on to the engine. There was no fire however. Initially there was concern for the safety of the occupants as they could not be located by the Fire Brigade. They were unaware, however, that the occupants had returned to Weston.

1.2 Injuries to persons

There were no injuries to persons.

1.3 Damage to aircraft

The nose undercarriage strut was torn from the engine mount, when both strut and wheel were pushed rearwards. One of the propeller blades was damaged at its tip. The front windscreen was also damaged. The port wing was damaged at the tip leading edge. The outer skin surface of the port aileron suffered ripple damage. The engine air filter housing was damaged, as was the engine manifold system.

1.4. Other Damage

There was damage to the crop in the area where the aircraft landed.

1.5 Personnel Information

Commanders Licence:

Private Pilots Licence	Instructor Class 2
Flight Instructor Rating	31 Dec. 1997

Medical Certificate	17 June 1999 Class 2
Commanders Age:	48 Years

Commanders Flying Experience:

Total, all types	1241 hours
Total, all types P1	1185 hours
Total on type	350 hours
Total on type P1	340 hours
Last 90 days	22 hours
Last 28 days	19 hours
Last 24 hours	50 minutes

Pilot Under Training

Medical Certificate	1 June 1999	Class3
Flying Experience	Total, all types	48 hours
Total,	all types P1	13 hours

Both flying crew were members of a local flying club, which was the registered owner of this aircraft.

1.6 Aircraft Information

1.6.1 Aircraft Details

Aircraft Serial Number:	0040
Year of Manufacture:	1970
No. and Type of Engines:	One - Teledyne Continental Motors Model O200A57 Piston Engine

1.6.2 History

The engine installed on this aircraft had been rebuilt by Teledyne Continental Motors on 15/3/1990 and was then installed on another aircraft and flown for 355.50 hours. It was preserved for long-term storage from 20/9/1991. The engine appears to have been installed on EI-AUC on or about 15/3/1997.

Early in 1995 the aircraft suffered storm damage. The aircraft was dismantled and both wings repaired. The engine was later completely dismantled for inspection after a start-up fire. Following the rectification of the airframe and engine, the aircraft was returned to service on 18/03/1997.

On 14/8/1998 the aircraft was re-registered to its present operator. In May 1999 further work was carried out on this aircraft in preparation for the aircraft's annual inspection, which was signed off on 6/5/1999. On 25/6/1999 the engine was over primed on start-up resulting in another engine fire. The engine was inspected, the air intake filter cleaned, the filter bracket replaced, the fuel lines checked, the engine ground run and the aircraft test flown satisfactorily.

The aircraft continued to fly for a total of 22 hrs 50 mins up to the time of this accident. At that time the airframe had a total of 5546 hours flying time recorded and the engine a total of 718 hrs recorded since the overhaul in 1990.

1.6.3 Site Investigation

The fuel removed from the fuel tanks at the accident site was as follows:

RH Tank	8 litres	(2.11 US gals)
LH Tank	13 litres	(3.43 US gals)
Total	21 litres	(5.54 US gals)

There was no evidence of significant fuel spillage. It was reported by the instructor that the dipstick and other items were returned to Weston. Subsequently, a statement was made that the dipstick had been located and would be delivered to the Investigation. However, this item failed to arrive. On 6th Oct.'99 the instructor informed the Investigation that the dipstick could not be located.

Following the forced landing, both wings were removed and the aircraft transported to an AAIU facility at Gormanston, Co.Meath. Following reinstallation of the wings, an immediate inspection revealed that the fuel gauges were incorrectly juxtaposed, the gauge marked "L"(left) being on the right-hand side of the instrument panel, and the gauge marked "R"(right) positioned to its left. Also, the flap motor continued to run after the flap switch had been released, the switch knob failing to return to the centre position.

1.6.4 Fuel System

Fuel is supplied to the engine from two tanks, one in each wing. From these tanks, fuel flows by gravity through a simple ON/OFF fuel shut off valve and fuel filter to the carburettor. There are no pumps in the fuel system, apart from the priming pump.

The tank outlet is taken from the side of each tank such that when the flow of fuel under gravity ceases, there is always a quantity of fuel remaining in each tank, which is unusable. The Owners Manual states that of a total fuel quantity of 26 US gals, 3.5 US gals (i.e. 1.75 US gals per side) remains unusable. This figure for unusable fuel covers all conditions likely to be encountered in flight.

1.6.5 Wing Flap System

The aircraft's Owners Manual for this aircraft supplied by the owner states:

"The wing flaps are electrically operated by a flap motor located in the right wing. A switch, labelled "WING FLAPS" on the lower centre of the instrument panel, controls flap position. A pointer housed in the left front doorpost mechanically indicates flap position.

To extend the wing flaps, the wing flap switch must be depressed and held in the "DOWN" position until the desired degree of extension is reached by pilot reference to the flap position indicator. After the desired flap extension is obtained, releasing the switch allows it to return to the centre off position. When flap retraction is necessary, place the switch in the "UP" position. The switch will remain in the "UP" position without manual assistance due to an over centre design within the switch.

After the flaps reach maximum extension or retraction, limit switches will automatically shut off the flap motor. However, when the flaps have reached the fully retracted position, the wing flap switch should be manually returned to the centre off position."

1.7 Meteorological Information
Forecast Conditions (Pilots Report)

The instructor obtained the following meteorological forecast conditions prior to flight;

Wind 250º/14 kts
Visibility 10 km
Significant weather showers - rain
Cloud SCT018, BKN 025
Temp/Dew point; Dublin Airport 16°/10°, Casement Aerodrome 14°/12°

MET Eireann

An aftercast from Met Eireann gave the following estimated weather conditions in the Lucan area at 1800 hours local on 15 July 1999.

Wind260º 18 to 20 kt gusting 28-30kt
Visibility greater than 10 km

Cloud 2 octa Cu/Cb 2500 ft
3 octa Sc 3500 ft

Temperature 18º C
Dewpoint 10ºC

1.8 Aids to Navigation

Not Applicable

1.9 Communications

Not Applicable

1.10 Aerodrome Information

Aerodrome 8 NM West of Dublin City
Runway 07/25 with Tarmac Surface

1.11 Flight Recorders

The aircraft was not fitted with recorders and none were required to be installed.

1.12 Accident Site

The accident site was located in a cornfield approx. 1 NM north east of the airfield. All aircraft parts were contained within the impact site. The aircraft inverted on landing.

1.13 Medical

Not Applicable

1.14 Fire

There was no evidence of fire at the site although a fire extinguisher was expended over the engine by the fire services as a precautionary measure.

1.15 Survival

A full four-point harness was fitted and used by both occupants, which prevented injuries.

1.16 Tests and Research

A sample of fuel taken from the aircraft was analysed and found to meet the British and Irish standards for Aviation fuel.

A sample taken from the filter bowl showed some sediment but this was not sufficient to interrupt the fuel flow to the engine.

1.17 Organisational and Management information

Subsequent to the accident, information on flying times was received from the Chairman of the club which revealed that the aircraft actually flew more hours on the 12th, 14th and 15th July 1999 than recorded in the aircraft log books. The technical log sheet for the above dates, certified by the pilots concerned, records that the aircraft had either "Nil" after-flight defects or simply nothing recorded under the DEFECTS column. The instructor did not record any defects following a flight he had made in this aircraft earlier in the day.

1.18 Additional Information

Following the accident the instructor indicated that the aircraft was in the following configuration at the instant when the engine failure occurred:

- Aircraft was on left base leg for runway 25 at Weston.
- Altitude was 650 feet QFE.
- The flaps were set at 10º.
- Airspeed between 70 mph and 80 mph.
- Port side fuel tank gauge indicated full.
- Starboard fuel tank gauge indicated between one eight to one quarter.
- Engine failure occurred co-incident with a power reduction whilst the engine was being throttled back for the base leg descent.
- When engine failure occurred, the engine gauges indicated no abnormality.
- For the final landing 40º flaps was set but the flap motor seemed to continue running after the flap setting was set.
- Final approach speed was 60 mph.

Subsequently the instructor also said that many fuel gauges were notoriously inaccurate and that the port side fuel tank gauge on this aircraft often stuck on "full". As a result, he did not place reliance on fuel gauge indications. He reported that the aircraft instrument panel had the fuel gauges mounted in the transposed position i.e. the port-side fuel tank gauge was mounted on right hand side of the starboard fuel tank gauge. He also stated that the maintenance organisation never clarified which gauge was wired to which tank. The instructor said that he was mindful prior to the flight that there was approximately 1 hours fuel endurance and carefully checked the fuel contents with a dipstick and correlated this against fuel consumed since full.

Having made the correlation he concluded that there was sufficient fuel for a half hour flight with a reserve of a further half hour. The instructor also stated that prior to the accident the aircraft was last refuelled on the 14th July 1999. at Waterford Airport. The fuel uptake at that time was 40.9 litres (10.79 US gals) and the fuel tanks visually indicated full. A flight from Waterford back to Weston then took place with a flight time of 1 hour 5 min. A total of 3 flights were conducted on the day in question (15th July '99) covering a total flight time of 2 hours and 20 minutes. The total hours flown since the aircraft tanks were filled to full capacity to the time of the accident were 3 hours 25 min.

The fuel dipstick used for the accurate measurement of fuel contents could not be found after the accident. The instructor attributed the subsequent collapse of the undercarriage on landing to the drag imposed by the high standing crop (1 metre high) and the softness of the ground.

The engine oil was dipped prior to flight and indicated approx. 1 litre over full and was quite black in colour. He said that the pre-flight inspection also revealed oil leaking from the front portside cylinder pushrod tube seals and that the aircraft had developed a tendency to backfire when the throttle was closed. The Chairman of the club which owned the aircraft indicated that these problems and the above fuel gauge faults were not apparent on the aircraft's' return to service following its C of A check on 6 May 1999.

1.19 Technical Investigation

1.19.1 Engine Run

Following the accident the following work was carried out on the engine:

Magnetos checked
Timing checked
New carburettor mounting plate fitted
Carburettor internal inspection
New propeller fitted

With the original carburettor and plugs fitted, including a new carburettor mounting plate, the wings were reinstalled on the aircraft and the aircraft was refuelled. The engine was then started and ran satisfactorily at high and low RPM settings. The engine stopped only when the fuel supply was cut off.

1.19.2 Fuel Contents

The fuel gauges supplied by the manufacturers for this type of aircraft are specific to the left and right side. The gauge for the left has "L FUEL" inscribed on its face and the gauge for the right has "R FUEL" inscribed on its face.

It was noted that, on this particular aircraft, the fuel gauge marked "L FUEL" was actually installed on the right and connected to the right tank. The gauge marked "R FUEL" was installed on the left and connected to the left tank. The right hand gauge (marked "L FUEL") read "*FULL*" irrespective of the right fuel tank contents. This faulty reading was attributed to a faulty cockpit indicator.

A post accident test was carried out on the right hand fuel tank installed on the aircraft. With the aircraft level, the empty tank was gradually filled with small quantities of fuel. Four litres (1.06 US gals) of fuel were required before fuel appeared at the engine fuel filter inlet. As the nose down angle was increased, the quantity of fuel required to produce a flow at the engine fuel filter inlet also increased. At a nose down angle of 5.6 degrees the total quantity of fuel required to initiate a flow at the engine fuel filter inlet was 7.5 litres (1.98 US gals).

The aircraft manual states that the total unusable fuel is 3.5 US gals or 1.75 US gals per side. However the manufacturers' certification data shows that in level flight the demonstrated total unusable fuel is 1.6 US gals or 0.8 US gals per side.

1.19.3 The Flap System Investigation

When the flap switch knob was depressed to the "DOWN" position and released, it did not return to centre off position. The flap motor brought the flaps down to the 40º position but the motor continued to run after the flaps had reached their final down position. The investigators were informed by the aircraft manufacturers that the cockpit flap switch for this aircraft should be spring-loaded so that the switch knob returns to the neutral position when released by the pilot.

Contrary to what is stated in the Owners Manual carried in the aircraft, limit switches did not automatically shut off the flap motor. Further examination showed that whilst retraction limit switches were installed on this aircraft, extension limit switches were not. Further contact with the manufacturer confirmed that if Mod.SK150-41 was not recorded as incorporated, then only one (ie."UP") limit switch was installed. The modification is not mandatory and inspection confirmed that it was not installed on this aircraft. However, the combination of a faulty flap switch in the cockpit and the absence of an extension limit switch in the flap mechanism would increase the likelihood of full flap extension and continuous flap motor over-run. It was subsequently found that the Owners Manual presented to the Investigation as belonging to the aircraft was not, in fact, appropriate to the Aerobat version of this aircraft.

1.19.4 The flap system and low fuel contents

The normal landing procedure is to select flaps in increasing increments of 10º, 20º, 30º and full down. However, as the engine speed and airspeed are reduced for landing, the nose down angle increases. If the fuel contents are in the region of the stated flight Manual figures for unusable fuel, then at high nose down angles it is possible that the tank fuel outlet can be unported, allowing air to enter the fuel lines.

A post accident test was carried out on a similar aircraft to EI-AUC. It was found that at an engine speed of 1700 RPM, 10 degrees flap and 70/80 MPH the aircraft maintained a level attitude. However, with 40 degrees flap and airspeed of 60 MPH the nose down angle increased to 6.6 degrees.

1.19.5 Pilot Safety and Warning Supplement

The aircraft manufacturer issued the following Pilot Safety and Warning Supplement in June 1998:

Fuel Planning With Minimum Reserves

Airplane accidents involving engine power loss continue to reflect fuel starvation as the primary cause or a contributing factor. Some of these accidents were caused by departing with insufficient fuel onboard to complete the intended flight.

Fuel exhaustion in flight can mean only one thing - a forced landing with the possibility of serious damage, injury, or death.

A pilot should not begin a flight without determining the fuel required and verifying its presence onboard. To be specific, during VFR conditions, do not take off unless there is enough fuel to fly to the planned destination (considering wind and forecast weather conditions), assuming the airplane's normal cruising airspeed, fly after that for at least 30 minutes during the day, or at least 45 minutes at night.

Flight Coordination VS. Fuel Flow

The shape of most airplane wing fuel tanks is such that, in certain flight manoeuvres, the fuel may move away from the fuel tank supply outlet. If the outlet is uncovered, fuel flow to the engine may be interrupted and a temporary loss of power might result. Pilots can prevent inadvertent uncovering of the tank outlet by having adequate fuel in the tank selected and avoiding manoeuvres such as prolonged uncoordinated flight or sideslips which move fuel away from the feed lines.

It is important to observe the uncoordinated flight or sideslip limitations listed in the respective operating handbook. As a general rule, limit uncoordinated flight or sideslip to 30 seconds in duration when the fuel level in the selected fuel tank is ¼ full or less. Airplanes are usually considered in a sideslip anytime the turn and bank "ball" is more than one quarter ball out of the center (coordinated flight) position. The amount of usable fuel decreases with the severity of the sideslip in all cases.

1.19.7 Engine Icing

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 chart at Fig.1 shows the wide range of ambient conditions conducive to the formation of induction system icing for a typical light aircraft piston engine. 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%. The forecast and aftercast figures for temperature and dew point at the time of the accident indicate that there was a risk of serious icing, particularly with descent power. Carburettor icing is prevented by heating the intake air in an exhaust heat exchanger.

On this aircraft the carburettor heat control knob is on the centre control console of the instrument panel. 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.

2 Analysis

The aircraft took off with a fuel contents of 4 gals (IMP) each side. This equates to 4.80 US gals each side or a total contents of 9.60 US gals. The flight manual for this aircraft states that 3.50 US gals are unusable. The aircraft had therefore a usable fuel contents of 6.10 US gals.

The fuel situation in US gals following the accident was:

	LH Tank	RH Tank	Total
Fuel Removed	3.43	2.11	5.54
Unusable(FM)	1.75	1.75	3.50
Usable	1.68	0.36	2.04

Given that the fuel consumption for the training mode was in the region of 6 US gals/hr the remaining usable fuel represented a flight time of 20 minutes.

An estimated fuel consumption, prior to flight, of 6 US gals/hr would leave 3 US gals remaining after a 30 min flight. This would ideally have given 1.5 gals of usable fuel in each tank. However, variation in fuel consumption in climb and descent would tend to bring the theoretical fuel level following a 30-minute flight down to the actual usable fuel recovered after the accident. A variation in fuel flow from each tank would cause a differential in fuel quantity remaining in each tank

The total flight time since the last refuelling was 3 hours 25 min. A fuel consumption of 6 US gals / hr would give a fuel quantity required of 20.52 US gals, which leaves a quantity of 2 US gals of usable fuel remaining. .

During the post accident test on the right fuel tank with the aircraft level, it was found that at least 4 litres of fuel were required to sustain a minimum flow of fuel. With 7.5 litres or roughly 2 US gals of fuel in the tank it was found that fuel flow would be cut off at 5.6 degrees nose down. With a fuel quantity of 8 litres (2.11 US gals) in the tank the fuel flow would be cut off at approximately 6 degrees nose down. This is due to the position of the outlet point on the tank relative to the tank base. It is assumed that the same results would be obtained from the left tank.

Tests have shown that, with the fuel contents remaining in the right hand fuel tank and a selection of 40º flap that the nose down attitude would reach a critical angle where the tank outlet could, under certain circumstances, be unported and air enter the fuel lines.

The instructor indicated that the engine lost power whilst the flap was set at 10° and that 40º was selected only after he committed to an emergency landing. Had the pilot selected a higher flap angle for a normal landing on RWY 25 there still could have been a danger of air entering the fuel line.

In a coordinated left turn, there should have been fuel at the left tank outlet port to supply fuel to the fuel shut-off valve at the junction of the left and right fuel lines. However, if the turn is uncoordinated in conditions of low fuel quantities, there is a possibility of air entering the line to the engine carburettor. In such a case a temporary loss of engine power might result.

Due to the weather conditions prevailing at the time of the accident the likelihood of engine icing cannot positively be ruled out. The instructor indicated that he cycled the carburettor heat on and off during the downwind phase and both he and the pupil said that the carburettor heat was "ON"during left base leg. It is possible that when cycling the carburettor heat that some of the ice particles melted, only to refreeze in the induction system. When the system was placed fully "ON" there may not have been enough time for the ice to melt before the engine power was reduced, throttling back to 1700 RPM, coincident with the engine failure. This narrowing of the opening would again accelerate the icing process thereby cutting off the fuel/air mixture.

The fuel tank dipstick was not recovered following the accident.

At the time of the accident the aircraft had some serious defects:

(a) Identification of the fuel gauges.
(b) Serviceability of the fuel contents system.
(c) Cockpit flap switch faulty.
(d) Engine general condition.

All the above aircraft systems were signed off as serviceable in the aircraft log book on the annual inspection on 6th May 1999. There is no record of any further work being carried out on these systems after that date apart from an engine inspection on 25th June 1999 following an engine start-up fire. However, there were NIL defects recorded following flights, which took place on the day previous to the accident. The responsibility for the proper reporting, recording and rectification of faults rests with the owners of the aircraft (and the pilot of the day). The pre-flight fuel check, as per the LAMS maintenance schedule for this aircraft (Check A), requires the pilot to *"check visually that quantities are compatible with indicator readings."* Clearly this check had not been carried out.

There were discrepancies in the logbook figures, over the last four flights, between the flight times recorded therein and the actual hours flown as recorded in the club Flight Information Sheet. This might indicate an organisational and management problem within the club.

3 Conclusions

3.1 In flight planning, the pilot did not allow for an adequate margin of safety with regard to fuel reserve for the intended training flight.

3.2 The investigation found that the right hand tank had a total of 0.36 US gals of usable fuel remaining while the left hand tank had 1.68 US gals of usable fuel. With the low level of usable fuel remaining, coupled with the flight configuration at the time, there is a possibility that the right hand tank outlet could have become unported thereby allowing air to enter the fuel lines to the engine.

3.3 Weather conditions at the time were conducive to carburettor icing. Even though the engine carburettor heat control was being cycled "on and off" during the downwind phase of landing and "on" at base leg, there is still a possibility that the engine could have been deprived of proper fuel/air mixture due to carburettor icing. This would have to have been coincident with the exact time when the engine speed was being reduced to 1700 RPM.

3.4 The fuel dipstick used to check the aircraft's fuel contents prior to flight was not recovered and its calibration could not therefore be verified.

3.5 Although not always uniformly accurate, fuel gauges give an indication of the fuel tank contents. It is clear that on flights prior to the final flight, these indications were being ignored. The right hand fuel indicator was incorrectly installed on the left whilst the left hand indicator was placed on the right.

3.6 There were deficiencies in the maintenance, daily inspection and management of the aircraft. These matters are the responsibility of the owners of an aircraft operating in the private category.

3.7 The reference in the Owner's Manual (dated 1970), presented with this aircraft, to the flap system operation is not correct.

3.8 Operators should be aware that to take off for a flight with fuel quantities near the limits of Unusable Fuel as specified in the Flight Manual is an *unsafe flying practice*.

3.9 The instructor executed a good approach and forced landing on the field thereby enabling both pilots to exit the aircraft uninjured. He was unfortunate to encounter a standing crop in the soft field which contributed to the "nose over" during the final phase of landing.

4. Safety Recommendations

4.1 The IAA should issue a reminder to owners of this type of aircraft that in accordance with the pre-flight inspection as specified in LAMS/A/1999 Section 7 (A5) that the fuel contents dipstick be used as a means of visually checking fuel contents *against* the indicator readings. It should not be substituted for an indicator reading. **(SR 1 of 2002)**

4.2 The IAA, in conjunction with the management of the club, should review the clubs procedures regarding maintenance, daily inspections and recording of aircraft flying time. **(SR 2 of 2002)**

Misplaced fuel gauges of EI-AUC

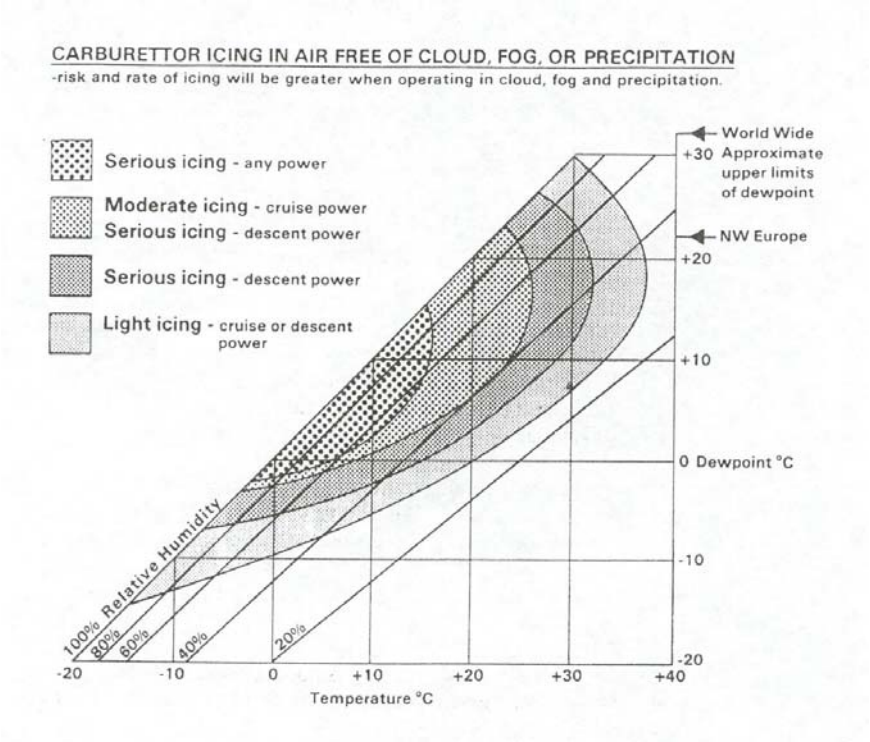

FIG.1

The graph shown above is reproduced from the Irish Aviation Authority (IAA) Aeronautical Information Circular (AIC)NR 11/97, titled "Induction system icing on piston engines as fitted to aeroplanes, helicopters and airships"

A Temp/Dew point of 16°/10°C (forecast for Dublin Airport) or 18°/10°C (Met Eireann aftercast for the accident area) will correspond to conditions where serious icing may occur at a low power setting as during descent, whilst a figure of 14°/12°C (forecast for Casement Aerodrome) will correspond to conditions where serious icing can occur at any power setting.