ACCIDENT

Aircraft Type and Registration:	Grob G115, G-BOPT
No & Type of Engines:	1 Lycoming O-235-H2C piston engine
Category:	1.3
Year of Manufacture:	1988
Date & Time (UTC):	19 June 2005 at 11:10 hrs
Location:	Barton Airfield, Manchester
Type of Flight:	Training
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - None Passengers - N/A
Nature of Damage:	Significant damage to landing gear and propeller
Commander's Licence:	Student pilot
Commander's Age:	35 years
Commander's Flying Experience:	59 hours (of which 53 were on type) Last 90 days - 15 hours Last 28 days - 5 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot

Synopsis

Whilst flying solo circuits the student pilot encountered a rough running engine. He attempted to clear the problem without success and found himself high on the approach with no alternative area in which to land. The aircraft touched down at the end of the runway, coming to rest in rough ground with damage to the landing gear and propeller. The pilot was uninjured. No cause for the engine problem has been found although conditions were conducive to carburettor icing.

History of the flight

The student pilot had completed three circuits with his instructor at his home airfield before continuing on a solo circuit exercise, the instructor watching from the air traffic control tower. Runway 20 was in use, a grass runway 528 m long. The weather at the time was reasonable with a southerly wind of about 6 kt, visibility of 8 km in haze and no significant cloud. The temperature was 26ºC with a dew point of 20ºC.

Having disembarked his instructor the student taxied to the runway threshold. He could not recall whether he completed a pre-takeoff engine check at this point, but stated that the needle of the engine rpm gauge was oscillating more than normal whilst the engine was at low power with the aircraft stationary prior to lining up.

He had completed an engine check earlier during his flight with the instructor and no problems were apparent. In addition, although the gauge was oscillating, the engine noise remained constant and so the student did not believe there was a problem.

The student successfully completed two solo circuits and was downwind on his third circuit when the aircraft's engine began to run roughly. He completed his downwind checks, which included briefly selecting the carburettor heat to hot. The student did not attribute the rough running to carburettor icing and so he returned the carburettor heat control to cold. Indeed he stated that whilst the carburettor heat was selected to hot, the engine continued to run roughly, but when he returned it to cold the engine seemed to run more smoothly.

On turning onto base leg the engine's rough running became worse. The student stated that despite this, the engine temperatures and pressures were indicating normal. He re-selected carburettor heat to hot before reducing the throttle to idle in order to commence his base leg descent. At this point the rough running became considerably worse and the student tried selecting different power settings in order to try and rectify the situation. This was to no avail and, anticipating an engine failure, the student set the throttle to idle and raised the aircraft's nose to preserve altitude. He left the flaps up until he could be certain of making the airfield.

The student turned onto finals and again tried selecting power, but the rough running continued. Once confident of being able to complete a glide approach to the runway, the student reported on finals to ATC and glanced down at his airspeed indicator, which was indicating a speed well above his required approach speed. In response, the student instinctively pitched the aircraft up in an attempt to slow down, however he then realised he had become too high on the approach and was likely to overshoot the runway. He considered, however, that he had no option other than to continue, due to the problem with the engine. He selected full flap and at 300 ft height he instinctively set the carb heat to cold. Aware of his excess height on crossing the threshold, the student looked for somewhere else to land, but in the absence of anywhere better decided to continue his attempt to land on the runway. The instructor had been watching the approach from the Tower and realising the student was too high, uttered the phrase "go round", as if willing him to do so. The controller overheard the instructor's comment and told the student pilot to go around. The student tried to apply power but once again the engine response was poor and so he returned the throttle to idle.

The aircraft finally landed at the far end of the runway, bounced and landed again beyond the end of the runway on some rough ground. The pilot braked hard and the aircraft came to rest on sloping ground just short of the airfield perimeter. The student was unhurt and had no difficulty vacating the aircraft. The airfield emergency services were on the scene in just over two minutes.

Analysis

At the time of writing this report no fault has been found with the engine. The temperature and dew point recorded would have put the aircraft at risk from carburettor icing (Figure 1). The student had been flying circuits and had been using carburettor heat for only a limited period during each circuit. Thus there had potentially been sufficient time for ice to form when the carburettor heat was set to cold and insufficient time for it to clear when the carburettor heat was set to hot.

The flying school's chief instructor commented that whilst he accepts conditions were conducive to carburettor icing, another aircraft of the same type belonging to the

club was airborne at the same time and reported no such icing problems. The student's description of the rough running becoming worse on the selection of carb heat to hot may, however, be an indication of the presence of induction system ice. This rough running condition only clears when the carb heat is set to hot for sufficient time to melt any ice present. Consequently, a false assumption may be made that carburettor heat is making matters worse and so the control is returned to cold when it should be kept at hot. However it is accepted that the rough running could have been induced by some other unidentified cause.

Irrespective of the reason for the rough running, the pilot became distracted in trying to resolve the problem. This, together with his determination to be high enough to glide to the airfield should the engine fail completely, led to the aircraft becoming high and fast on the approach. This matter was made worse by the late selection of flap and by various attempts to apply power when the aircraft was already too high or too fast.

The choice of alternative landing sites was limited by the presence of a dual carriageway beyond the end of the runway and by various buildings and tall hedges on either side. Unable to clear the problem in order to go around and without the option of another suitable landing site, the pilot was committed to landing on the airfield. He was fortunate that despite touching down at the far end of the runway, the aircraft stopped short of the road.

Whilst it is completely understandable that the student might wish to clear what appeared to him to be the principal problem, the rough running engine, this accident highlights the top priority of flying the aircraft with trouble shooting taking second place.

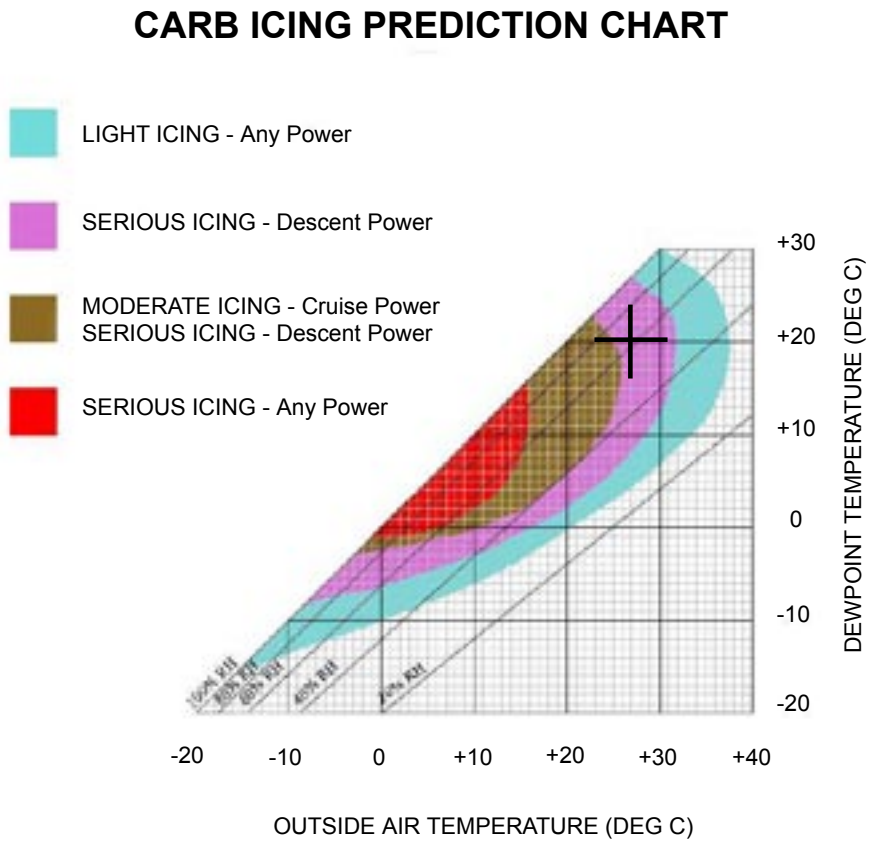

Figure 1