

**ACCIDENT**

<b>Aircraft Type and Registration:</b>	Piper PA-28-140 (Modified) Cherokee, G-EEKY	
<b>No &amp; Type of Engines:</b>	1 Lycoming O-320-D3G piston engine	
<b>Year of Manufacture:</b>	1969	
<b>Date &amp; Time (UTC):</b>	5 November 2005 at 1144 hrs	
<b>Location:</b>	Heathlands Farm, Kings Lynn, Norfolk	
<b>Type of Flight:</b>	Private	
<b>Persons on Board:</b>	Crew - 1	Passengers - 1
<b>Injuries:</b>	Crew - None	Passengers - None
<b>Nature of Damage:</b>	Nosewheel, propeller and right wing tip damaged, engine shock loaded	
<b>Commander's Licence:</b>	Private Pilot's Licence	
<b>Commander's Age:</b>	29 years	
<b>Commander's Flying Experience:</b>	90 hours (of which 4 were on type) Last 90 days - 4 hours Last 28 days - 1 hour	
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot and further enquiries by the AAIB	

**Synopsis**

After a short descent from 2,000 ft altitude with the carburettor heat control set to HOT, the pilot was unable to advance the throttle sufficiently to sustain level flight and a forced landing into a field ensued. A subtly different throttle restriction was present two hours after the forced landing but the repair agency was unable to reproduce a throttle restriction a few hours later. A subtle and temporary mechanical restriction or an unusual form of carburettor icing seem the most likely explanations.

**History of flight**

The pilot was undertaking a local area flight from RAF Marham, Norfolk at 2,000 ft agl. Before descending to 1,200 ft agl to join the circuit, she set the carburettor

heat to HOT and retarded the throttle to 1,500 rpm. Upon levelling the aircraft she set the carburettor heat to COLD and attempted to open the throttle but its range of travel was restricted to between closed and half open which limited the engine speed to 1,500 rpm. At this power setting the aircraft was unable to maintain level flight. She attempted to clear the restriction by selecting the fuel pump ON, changing the fuel tank selector and reselecting the carburettor heat selector to HOT, but all without success.

The pilot then flew a forced landing into a field 5 nm north-west of RAF Marham while her passenger assisted her by transmitting a MAYDAY message.

Upon touchdown, after a ground run of approximately 30 m, the nose wheel dug in to the soil and the propeller struck the ground, stopping the engine instantly. Having secured the aircraft both occupants vacated it uninjured.

The pilot and her passenger, who had extensive military aircrew experience, added that initially they thought the restriction might have been caused by carburettor icing. However, they later discounted this theory because the engine was running smoothly throughout the descent and forced landing.

### **Aircraft damage**

The Chief Flying Instructor (CFI) from the flying club at RAF Marham attended the landing site approximately two hours after the accident. Upon inspecting the aircraft, he too found a restriction with the throttle. He found he could move the throttle lever only from half travel to fully open; he found a restriction when he tried to retard the throttle from half travel to closed.

The aircraft and its engine were inspected by the repair agency. The agency found damage to the underside of the engine cowl, the nose wheel, the right wing tip and the propeller. Although the carburettor was found pushed up against the fire wall as a result of the landing, the agency found no restriction with the throttle linkage from the throttle quadrant to the carburettor. Subsequently the engine and carburettor were sent to another repair facility for shock-load testing. Upon testing the throttle linkage and the carburettor, nothing was found that might have caused a restriction.

### **Weather**

An automatic METAR recorded at RAF Marham at 1150 hrs was provided by the Met Office. It showed a surface wind of 220°/11 kt, visibility in excess of 10 km,

with an air temperature of +11°C and a dew point of +6°C. The pilot reported the surface wind was 230°/15 kt, a temperature of +11°C and a dew point of +8°C.

### **Carburettor icing**

The aftercast temperature and dew point, for the time of the accident, were plotted on the Carburettor Icing Chart in Safety Sense Leaflet 14 found in LASORS and AIC 145/1997. The combination falls in the '*Serious Icing - Cruise Power*' sector.

Despite the use of carburettor heat in the descent, icing could have formed downstream of the accelerator pump in the vicinity of the discharge valve and discharge nozzle inside the carburettor. In this situation the throttle could behave as if it had some form of restriction without necessarily inducing rough running.

### **Analysis**

The throttle restriction discovered by the Chief Flying Instructor was different to that reported by the pilot but it could have been caused by damage sustained during the forced landing. However, no mechanical interference with the linkage was identified by the repair agency. Nevertheless, irrespective of how carefully the agency examined the aircraft in-situ, it is possible that some unintended easement of the damaged engine bay components alleviated a subtle mechanical restriction.

One explanation for the throttle restriction in the air was an unusual form of carburettor icing. Given the ambient meteorological conditions and the flight profile preceding the discovery of the throttle restriction, carburettor icing in the vicinity of the discharge valve and discharge nozzle might have caused a mechanical restriction. However, it seems very likely that ice formed in this way would have dissipated after two hours in the 11°C ambient air temperature. Ice formation could explain why the pilot

was unable to open the throttle but the CFI was able to open it fully two hours later. However, ice in the air does not explain why the CFI was unable to close the throttle on the ground after the ice would have melted.

Either a subtle and temporary mechanical restriction or an unusual form of carburettor icing seem the most likely explanations.

### **Conclusion**

The accident was attributable to a throttle restriction but the origin of the restriction could not be identified.