ACCIDENT

Aircraft Type and Registration:	Rutan Long-Ez (Modified), G-BPWP
No & Type of Engines:	1 Continental Motors Corp O-240-E piston engine
Year of Manufacture:	1989 (Serial no: PFA 074A-11132)
Date & Time (UTC):	7 July 2018 at 1131 hrs
Location:	Dunkeswell Airfield, Devon
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - 1
Injuries:	Crew - 1 (Serious) Passengers - 1 (Minor)
Nature of Damage:	Aircraft destroyed
Commander's Licence:	Private Pilot's Licence
Commander's Age:	80 years
Commander's Flying Experience:	641 hours (of which 465 were on type) Last 90 days - 5 hours Last 28 days - 2 hours
Information Source:	AAIB Field Investigation

Synopsis

The pilot was operating his aircraft with a mixture of automotive gasoline (Mogas) and aviation gasoline (Avgas) 100LL in the left fuel tank and Avgas 100LL in the right fuel tank. While on base leg to land on Runway 04 at Dunkeswell Airfield the engine, which was being supplied with fuel from the left fuel tank, suddenly stopped. The pilot established a glide to land in a field in the undershoot, but at a late stage in the approach he spotted a fence running across his chosen landing site. Whilst manoeuvring to avoid the fence the aircraft touched down firmly, seriously injuring the pilot; the passenger sustained minor injuries.

The likely cause of the engine stopping was either carburettor icing or a vapour lock in the aircraft fuel supply to the engine.

History of the flight

The pilot and his passenger planned to fly from Biggin Hill Airport, where the aircraft was kept in a hangar, to Dunkeswell Airfield. The aircraft departed at 1013 hrs, with the right fuel tank selected and about 20 gal of fuel on board. The flight progressed through southern England without event, during which time the pilot selected the left fuel tank when the right tank indicated about 6 gal. The fuel selector remained in this position for the rest of the flight.

As the aircraft approached Dunkeswell, the pilot requested joining instructions. At about this time the passenger advised the pilot that the fuel tanks indicated 4 and 6 gal (left and right tanks respectively) and asked the pilot if he should change tanks. As the engine was "running fine" the pilot replied "no". The Radio Controller informed the pilot that he should join right-hand downwind for Runway 04. Having joined downwind at about 1,000 ft aal, the pilot selected carburettor heat to HOT; he could not recall if he turned the fuel booster pump ON at this time. He then turned the carburettor heat to COLD at the end of the downwind leg.

The pilot became aware of two aircraft lining up on Runway 04 and decided to extend the downwind leg. Once the two aircraft had cleared the runway, he turned on to base leg and attempted to re-establish his normal circuit profile at a speed of 65 to 70 kt. The pilot believes that he turned the carburettor heat to HOT while on base leg.

Just before the pilot turned onto final approach, the engine stopped without warning. The pilot transmitted a PAN followed shortly thereafter by a MAYDAY. He attempted to restart the engine once, to no avail, and prepared to land in a field in the undershoot. He does not recall changing fuel tanks or checking that the fuel booster pump was ON. At about 20 ft agl he became aware of a fence ahead of the aircraft and turned left to avoid it. The aircraft subsequently landed firmly with left bank applied.

Once the aircraft had come to rest the pilot asked his passenger if she was "OK", opened the canopy and told her not to move but to await assistance. The airfield's emergency response vehicles were quickly on the scene and, with some of the eye witnesses, administered first aid to the occupants. The local RFFS, ambulance and air ambulance arrived soon thereafter and removed both occupants from the aircraft and transported them to hospital; the passenger, who had minor injuries, went by road and the pilot, who suffered serious injuries, went by air.

Weather information

The accident flight took place after a period of high ambient temperatures. The METARs for London Biggin Hill Airport indicated that the temperature, between 0500 hrs and 2100 hrs, during the seven days prior to the accident varied between 12°C and 29°C (Table 1). On the morning of the accident the recorded temperature varied between 21°C and 26°C.

Date	Minimum temperature (°C)	Maximum temperature (°C)
7 July	21	26
6 July	18	29
5 July	17	26
4 July	12	24
3 July	14	23
2 July	16	25
1 July	19	26

Table 1

Day time temperatures at Biggin Hill Airport

An aftercast produced by the Met Office stated that at the time of the accident, Dunkeswell Airfield was affected by an area of high pressure that gave a slack mainly north-north-westerly air flow. There was no weather and FEW clouds at 2,000 ft amsl. The temperature was 25°C, the dew point temperature was 14°C and the relative humidity was 56%. The QNH was 1024 hPa.

Accident site

G-BPWP came to rest in a field slightly to the left of the extended centreline, and approximately 550 m from the threshold of Runway 04, at Dunkeswell Airfield. The ground marks and damage to the aircraft indicated that the aircraft initially landed heavily on the left mainwheel and nosewheel. The left landing leg structural cross beam member failed at the centre of the fuselage, the nose landing leg detached, and the forward section of the fuselage was badly damaged when it struck the ground. The left fin and canard also contacted the ground with sufficient force to break the main spar in the left wing and damage the canard. Following the initial impact, the aircraft continued to travel across the ground for a further 54 m before stopping on a heading of 340°(M). The aircraft was 11 m from the fence which the pilot tried to avoid. See Figure 1.

Figure 1

Accident site

Recorded information

Sources of recorded information

Recorded data was available from ground-based radars, an aircraft tracking system[1], the pilot's portable GPS unit and tablet computer that were recovered from the aircraft. Data from a flight navigation software application[2], installed on the portable tablet, provided a complete track log of the accident flight with the data ending after the aircraft had come to a stop. This data comprised GPS-derived position, track, altitude and groundspeed recorded at a rate of once per second. The recordings from the radar, tracking system and GPS unit ended shortly before the aircraft landed.

To compensate for an inaccuracy in the tablet computer's GPS-derived altitude, the aircraft's altitude was reduced by 56 ft in order that the recorded height of G-BPWP aligned with the terrain elevation at the point that the aircraft landed.

RTF communications at Dunkeswell Airfield were not recorded.

Interpretation of recoded data

The pilot followed a route to Dunkeswell Airfield that he had entered into the navigation application on his tablet computer. The final approach is illustrated in Figure 2, with the GPS data during the final seconds of the approach at Figure 3.

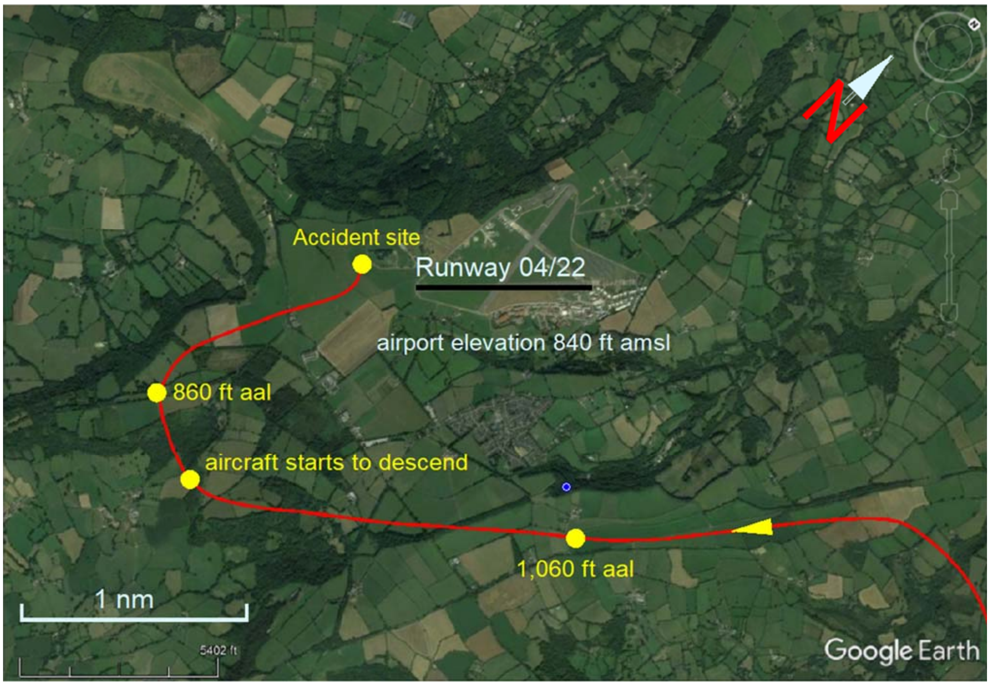

Figure 2

Ground track on approach to Runway 04

Footnote

1 www.flightradar24.com (as of July 2018).
2 SkyDemon flight navigation software application.

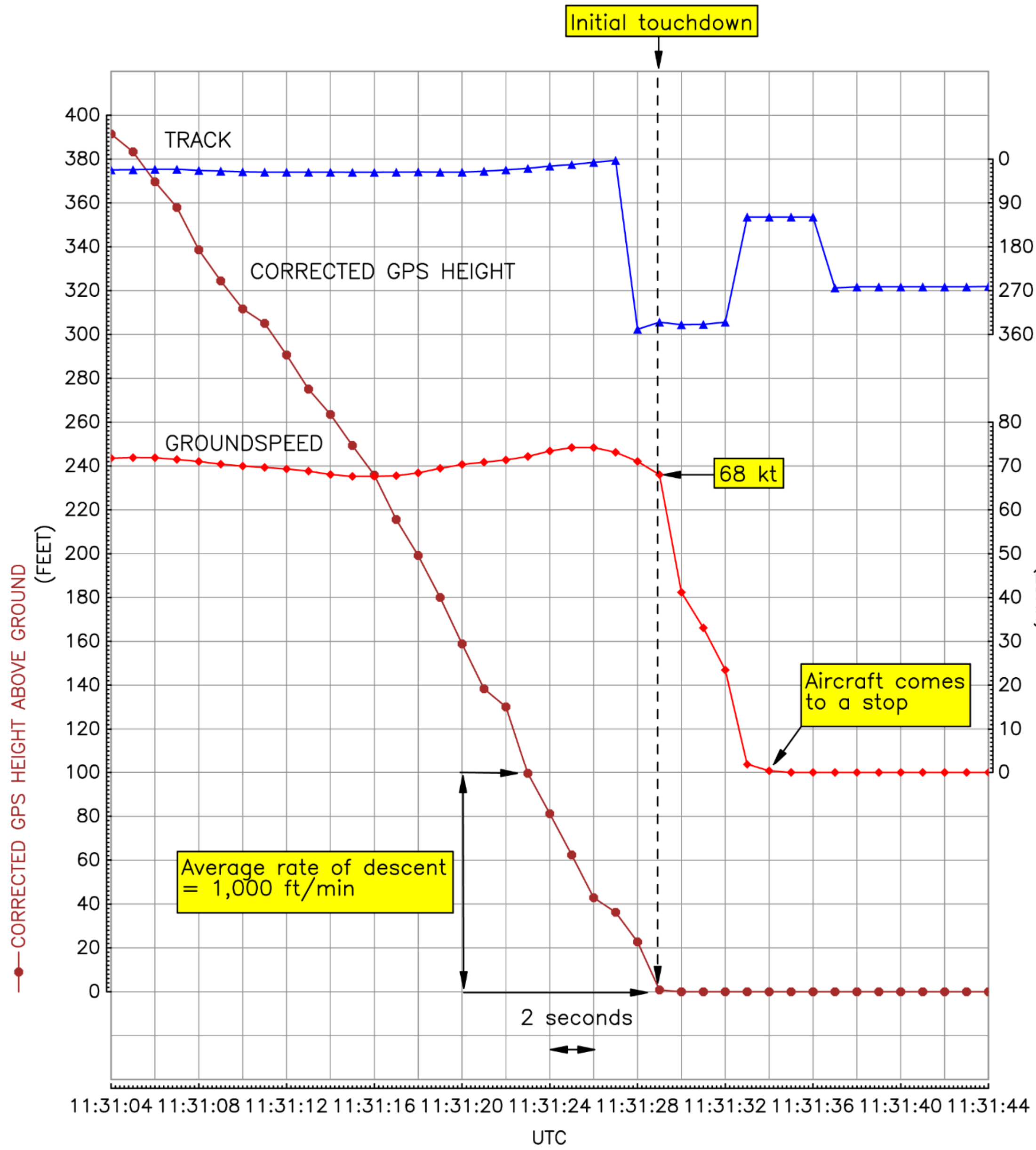

Figure 3

GPS data during final approach

As the aircraft descended on the final approach its average groundspeed was 70 kt. The recorded wind at Exeter airport, 10 nm to the south-west, was 3 kt and variable in direction. Based on this wind, the estimated true airspeed of G-BPWP would have been between 67 kt and 73 kt.

When the aircraft was about 800 m (0.4 nm) from the runway threshold it was at approximately 200 ft agl. The aircraft then started to alter track to the left, turning away from the extended runway centre line. Shortly after the aircraft touched down at a groundspeed of about 68 kt and at a calculated vertical descent rate of approximately 1,000 ft/min. The aircraft came to a stop five seconds later.

Aircraft information

The Rutan Long-Ez is a tandem two-seat, homebuilt aircraft with a canard wing configuration, a pusher engine and a tricycle landing gear consisting of a fixed main gear and a mechanically retractable nose leg. The aircraft is mainly constructed from glass fibre with a foam core. Only the pilot's position is equipped with flying and engine instruments. The pilot and passenger were both secured by a four-point harness.

The main wings are swept and tapered and at each wingtip there is a winglet which also acts as a fin and on which is mounted a moveable flap (rudder) which provides yaw control. See Figure 4. Ailerons are mounted on the inboard trailing edge of each wing and a canard, located in front of the cockpit, is fitted with full span elevators. The aircraft is also equipped with an electrically operated speed brake mounted on the lower fuselage just forward of the engine. The elevator and ailerons are connected mechanically through a system of rods, cables and cranks to a side stick mounted on the right side of the cockpit. The rudders are connected by cables and pulleys to the rudder pedals.

Figure 4

Rutan Long-EZ

Fuel system

Fuel is stored in two 19 gal integral tanks, located in the wing strakes, which gives a claimed[3] duration of up to eight hours. The tanks are fitted with baffles and the fuel contents is established by noting the level of the fuel that can be visually observed through a section of the tank walls in the rear cockpit that have not been covered with a gel coat (Figure 5). The pilot cannot see the fuel contents directly from the front cockpit and therefore must either rely on the passenger or use a mirror[4] mounted on the side of the front cockpit.

Footnote

3 Owner's Manual.
4 There are two scales for each tank, with one the mirror image of the other.

Figure 5

Fuel contents gauge

The outlet pipes from the fuel tanks are fed to a three-way fuel selector valve (OFF, LEFT, RIGHT) mounted on the front cockpit floor. From the selector valve the fuel is fed through a gascolator mounted in the engine bay to an electrical fuel boost pump and an engine-driven mechanical fuel pump, which provides fuel under pressure to the single carburettor mounted on the bottom of the engine.

There is almost no head of pressure between the fuel tanks and the mechanical fuel pump and with a low quantity of fuel in the tanks the mechanical pump would need to suck fuel through the fuel system. The electrical fuel booster pump is fitted at the lowest point in the fuel system and when selected ON would help to ensure that there is a positive fuel pressure at the inlet side of the mechanical fuel pump. The aircraft Owner's Manual states that the intended function of this pump is to ensure a degree of redundancy for the mechanical pump during take-off and landing.

The switch for the fuel booster pump was mounted on the circuit breaker panel fitted on the right side of the front cockpit. The engine throttle, mixture and carburettor heat controls were mounted on the left side of the front cockpit.

The Owner's Manual provides the following warning concerning the use of fuel, which reflects the fuel types[5] available in the USA during the 1980s.

Footnote

5 It should be noted that fuel specifications in Europe and the USA differ. There is also a significant difference in Mogas produced in 1980 and 2018.

> *'Caution*
>
> *Under no circumstances should fuel of a lower octane rating than that specified by the manufacturer for your engine be used. Be sure the minimum octane is clearly labelled by each fuel cap. Color coding for 80/87 is red, 100LL is blue and 100/130 is green. Auto gas especially the high aromatic content no-lead should never be used.'*

The Light Aircraft Association (LAA) advised the investigation that the Rutan LongEz has not been approved to use Mogas of any specification. The advice from the LAA on the use of Mogas in light aircraft considers: possible chemical degradation of composite fuel tanks; degradation of rubber and elastomeric fuel system components; corrosion of metallic engine and fuel system parts; increased tendency for vapour lock and carburettor icing.

Engine

G-BPWP was fitted with a rear mounted four-cylinder, air cooled, Rolls-Royce Continental 0-240E[6] engine driving a two-bladed fixed-pitch pusher propeller. The initial engine specification permitted the engine to be operated on leaded automotive gasoline.

The Owner's Manual provides the following information regarding carburettor icing:

> *'The Continental engines are particularly susceptible to carburator ice. Icing can occur during cruise in moist air, particularly at low cruise power settings. When in moist conditions, check carburator heat often or cruise with heat on.'*

Carburettor heat

The carburettor is mounted on a flange located approximately 9 cm beneath the front part of the crankcase. Air enters the induction system through an intake located on the bottom of the fuselage and passes through an air filter and into an airbox before entering the carburettor. From the carburettor the air and fuel mixture passes through the induction manifold to the cylinders. Carburettor heating is provided by ducting unfiltered air from around the engine exhausts into the airbox and into the carburettor. The selection of the source of air is by a flap valve within the airbox which is operated by a lever mounted on the left side of the front cockpit.

As the carburettor is not mounted directly onto the crankcase, the amount of conducted heat available to melt ice forming within the venturi and on the butterfly valve may not be as high as on other makes of engine where the carburettor is bolted to a combined sump and intake manifold. Moreover, the amount of heat provided by the carburettor heating system will be dependent on the temperature of the exhausts which may be lower when the engine is operating at low power settings such as during a descent.

Footnote

[6] The 0-240E engine is an experimental version of the 0-240A engine and has a compression ratio of 8.5 to 1.

G-BPWP

G-BPWP was built in the 1980's and was first registered and flew in July 1989. The aircraft was registered to the current owner, the pilot, in March 1999 and was operated on a CAA Permit to Fly, administrated by the LAA. The last Permit Certificate of Validity was issued on 15 June 2018 and was valid until 30 June 2019. As part of the Permit to Fly Revalidation a flight test was undertaken on 14 June 2018 during which the following air speeds were recorded while testing the aircraft's slow speed characteristics:

> *'Natural buffet speed 64 kt*
> *Minimum airspeed achieved 57 kt'*

Aircraft examination

The aircraft was initially examined by the AAIB at the accident site, followed by a more detailed examination at their facilities at Farnborough.

General

The impact forces during the accident were mostly absorbed by the left wing and the nose section of the fuselage, which were extensively damaged. The nose landing gear leg, which was in the extended position, detached from the aircraft at the point of impact. The main landing gear structural cross member also failed. The cockpit area, seat harnesses and canopy remained intact. The speed brakes were found in the retracted position.

Engine

The engine and propeller were undamaged and all the main engine components were intact. The throttle was found at the fully forward, OPEN, position, the mixture was at RICH, the carburettor heat was at the COLD position and both magneto switches were ON. The engine turned freely by hand.

There was clean oil in the engine and the oil filter was clean. The spark plugs were in a good condition and the colour of the plugs and the piston heads indicated that the engine had been running normally. There was no evidence on the cylinder bores of the pistons having started to seize. All the engine valves and the drives for the magnetos and mechanical fuel pump operated when the engine was rotated by hand.

The operating arm and the diaphragm in the mechanical fuel pump were intact. The carburettor and the floats were intact and all the valves and linkages operated smoothly. Clean fuel was found in the gascolator, mechanical fuel pump and carburettor fuel bowl.

Fuel system

The main fuel cock was found at the LEFT tank position and the electrical fuel booster pump switch was found at the OFF position. Both fuel tanks were empty; however, when they were filled with water prior to the recovery of the aircraft, the water leaked out from both fuel tanks along the seams of the tank walls which had been damaged in the accident. Fuel of a light green colour was found in the fuel pipes and fuel components between both fuel tank outlet pipes and the carburettor. There was no evidence of debris in the fuel tanks, aircraft or engine fuel system. When electrically tested the pump operated normally.

Fuel onboard during the accident flight

The pilot reported that for economic reasons, since December 2017 his practice had been to operate the aircraft with Avgas 100LL in the right tank and a mixture of Avgas 100LL and 95 octane unleaded Mogas in the left tank. The fuel was kept in separate tanks in case he experienced an *"airlock[7]"* with Mogas.

The right fuel tank was last refuelled from the self-service Avgas 100LL pump at Biggin Hill on 13 June when the pilot uplifted 39 litres (8.6 gal) of fuel. It then flew 4 hours over 5 flights before the accident at Dunkeswell.

The left fuel tank was refuelled with Mogas, from two jerry cans, just prior to the accident flight. The jerry cans had been stored in the hangar for approximately 4 weeks prior to the accident flight.

The pilot reported that after passing Crewkerne, which was approximately 17 nm from the accident site, there were 4 and 6 gal of fuel in the left and right tanks respectively. Based on the available refuelling records, and the pilot's fuel planning figures, the AAIB calculated that there should have been sufficient fuel onboard the aircraft to complete the flight.

Fuel tests

Three small samples of fuel were recovered from the aircraft before it was moved from the accident site. The samples were taken from the fuel line between the right fuel tank and selector valve; the selector valve with the left fuel tank selected OPEN; and the drain on the carburettor fuel bowl.

The quantity of fuel was not sufficient to determine the composition and characteristics of the fuel; therefore, the samples were analysed by Gas Chromatography – Mass Spectrometry. All three samples appeared to be virtually identical and contained lead and no more than 1% by volume of ethanol. The laboratory concluded that the samples were a mixture of automotive gasoline (Mogas) and Avgas 100LL.

The laboratory advised that automotive gasoline (Mogas) generally has a higher vapour pressure than Avgas 100LL and therefore the use of automotive gasoline will increase the likelihood of vapour lock and carburettor icing.

While the engine had been operating on a partial mixture of unleaded Mogas containing ethanol, which had not been approved by the LAA when operating on an LAA Permit to Fly, and which the engine specification and aircraft Owner's Manual did not allow, the use of Mogas had not appeared to have caused any damage or deterioration to the engine or aircraft fuel system.

Footnote

7 See the section in this report on vapour lock.

Carburettor icing

Carburettor icing occurs in humid air when the temperature drop in the venturi is sufficient to cause the water vapour to freeze and ice to form on the surfaces of the carburettor throat. This can change the airflow sufficient to cause rough running, a loss of engine rpm or the engine to stop. Carburettor icing can occur at ambient air temperatures above 30°C and is more likely to occur at idle or during cruise power settings.

An aftercast from the Met Office reported that at the time of the accident the air temperature was 25°C and the dew point was 14°C. From the CAA graph on the probability of carburettor icing (Figure 6), at the time of the accident there would have been a moderate risk of carburettor icing during the cruise and a serious risk during the decent.

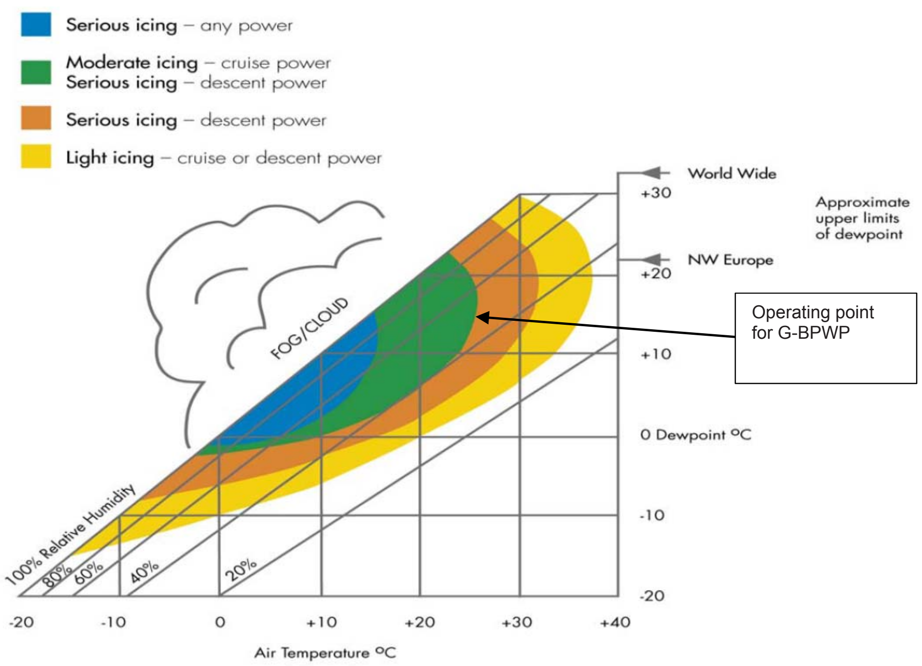

Figure 6

Probability of carburettor icing

Vapour lock

If fuel turns to vapour in the aircraft fuel system, large bubbles can form at high points within the fuel system or in a constriction in the fuel pipe which can prevent the passage of fuel to the engine. This phenomenon is known as 'vapour lock' and the effect can be a 'dead-cut' of the engine. Vapour lock is most likely to occur on aircraft fitted with engine-driven mechanical fuel pumps and where there is a low head of fuel pressure between the fuel tanks and the mechanical fuel pump.

In comparison with 100LL and UL91 Avgas, Mogas has a much higher vapour pressure and consequently fuel systems using Mogas are at an increased risk of vapour lock. An increase in the fuel temperature and drop in the fuel pressure within the fuel system, particularly in areas such as the diaphragm in the mechanical fuel pump, can release bubbles of gas sufficient to cause vapour lock. The LAA have advised that the risk of vapour lock occurring inside an engine-driven pump may increase greatly during a long throttled-back descent because the reduced flow rate through the pump allows the hot pump body time to heat the fuel inside to a higher temperature.

It should be noted that even when an aircraft has been cleared to use either Avgas or unleaded Mogas, the vapour pressure of a mixture of Avgas containing a small quantity of Mogas will be almost as high as that of pure Mogas.

The LAA has produced a Technical Leaflet (TL 2.26[8]) regarding the use of unleaded Mogas in piston engines. Due to the greater risk of 'vapour lock' the LAA have placed an operating limit on the use of Mogas of the fuel tank temperature not exceeding 20°C and the altitude not exceeding 6,000 ft.

Aircraft Owner's Manual

The first edition of the Long-Ez Owner's Manual[9], published in May 1980 states:

> *'Descent/Landing*
>
> *Circuit Breakers – In*
> *Fuel – Fullest tanks*
> *Mixture – Rich as required*
> *Carb Heat On [HOT] as required*
> *Boost Pump – On below 1000 ft AGL*
> *Gear – Down below 110 knots*
> *Landing Brake – On as required'*

In the section on '*Emergency Procedures'* it states:

> *'ENGINE FAILURE*
>
> *…In the event of inflight engine stoppage, check mixture – RICH, fuel – switch tanks, boost pump on, magnetos, BOTH, and attempt a restart.*
> *…*
>
> *ENGINE OUT APPROACH*
>
> *If an engine-out landing is unavoidable, check wind direction, choose your landing area and establish your glide at 70 to 75 knots…Remember that with the engine out and prop windmilling, your glide will be considerably steeper than the normal engine-idle glide that you are accustomed to…Shut off the fuel valve…Turn your electrical power and mags off before touchdown to minimise any potential fire hazard…'*

Footnote

8 LAA leaflet TL 2.26 can be found here: https://www.lightaircraftassociation.co.uk/engineering/TechnicalLeaflets/Operating%20An%20Aircraft/TL%202.26%20Procedure%20for%20using%20E5%20Unleaded%20Mogas.pdf {accessed Nov 2018]

9 This manual was provided by the designer for guidance only and has no formal approval or recognition.

CAA Safety Sense Leaflet

The CAA's Safety Sense Leaflet, 1e, '*Good Airmanship'*[10] *states:*

> *'23 EN-ROUTE*
> *…*
> *d) Don't overlook en-route checks such as **FREDA** – **f**uel, **r**adio, **e**ngine, **DI** and **a**ltimeter. 'Engine' should include a carb heat check.*
> *…*
>
> *29 CIRCUIT PROCEDURES*
> *h) In most piston-engined aircraft, apply full carb heat early enough to warm it up BEFORE reducing power.'*

It is good airmanship to do a FREDA check approximately every 20 minutes and prior to making an approach to land.

Analysis

Operational aspects

The Long-Ez Owner's Manual includes, in the Descent/Landing checklist, the following selections: fullest fuel tank, carburettor heat HOT and fuel booster pump ON. However, despite the passenger advising the pilot that he had 4 gal in the left and 6 gal in the right fuel tank, he elected to leave the left (lowest) fuel tank selected. Had the pilot selected the fullest tank (right) the engine would have been supplied by Avgas during the later stages of the flight which is less susceptible to carburettor icing and vapour lock. The pilot acknowledged that he should have kept the carburettor heat selected HOT throughout the approach and landing.

The engine failure procedure in the Owner's Manual states that in the event of an inflight engine stoppage, change fuel tanks and select the boost pump ON before attempting a restart. The pilot did not follow these actions; however, given that the aircraft was at a very low height when the engine stopped, it was not unreasonable to have just attempted to restart the engine as there would have been limited time thereafter to prepare for the forced landing. The priority is always to fly the aircraft followed by actioning checklists if time is available.

The aircraft's estimated airspeed during the final approach was about 70 kt, which was consistent with the recommended glide speed of 70 to 75 kt. The damage to the aircraft, ground marks and recorded data indicate that the pilot may not have arrested the aircraft's high rate of descent sufficiently to prevent it landing firmly.

Footnote

[10] Safety Sense Leaflet 1e can be found here: http://publicapps.caa.co.uk/docs/33/20130121SSL01.pdf (accessed Nov 2018)

Engine failure

The engineering examination established that all the fuel components were serviceable, and the fuel system was clear of debris. The presence of fuel throughout the fuel system and the pilot's report of his fuel status prior to the engine stopping indicates that there was sufficient fuel on the aircraft to complete the flight.

The engineering examination could identify no fault that would have caused the engine to stop.

Carburettor icing

The Owner's Manual advises that the engine is susceptible to carburettor icing and in moist conditions the carburettor heat should be selected ON (HOT) often, or left ON, during the cruise. The humidity at the time of the accident was approximately 50% and there would have been a moderate risk of carburettor icing at cruise power setting and a serious risk at descent power setting.

Prior to the engine stopping, the aircraft had been in the cruise and then descended to circuit height at a relatively low power setting. The pilot stated that during the flight he had adopted his usual technique of applying carburettor heat every 20 minutes and that during the downwind leg he initially selected HOT and then COLD. It is therefore possible that the frequency of application may have been insufficient. It is also possible that the temperature of the exhausts at the low engine power settings might have been insufficient to warm the air sufficiently to clear any build-up of ice.

Vapour lock

The Rutan Long-Ez had not been approved to operate with Mogas and with relatively high ambient air temperatures in the days leading up to the accident, it is likely that the temperature of the fuel in the aircraft tanks was above the Mogas operating limitation of 20°C set by the LAA.

The design of the fuel system on the Rutan Long-Ez is such that at low fuel tank quantities there is no positive head of pressure between the fuel tank and mechanical fuel pump. With the electrical booster pump selected OFF, there would have been a pressure drop within the fuel system, including the suction side of the mechanical fuel pump, as it drew fuel through the system. The low fuel flow at the low engine power might also have contributed to an increase in the fuel temperature as it passed through the fuel pipes and components in the engine bay. The presence of these factors may have increased the possibility of a vapour lock occurring during the later stages of the flight sufficient to cause the engine to stop.

The electrical fuel booster pump is positioned at the lowest point in the fuel system and given the relative position of the fuel tanks its inlet will always have a positive head of pressure. Operation of the booster pump during all stages of the flight would ensure that there is a positive fuel pressure at the inlet to the mechanical fuel pump that might help to prevent vapour lock from occurring.

While the Owner's Manual states that the electrical fuel booster pump should be used to provide redundancy during take off and landing there might be merit in running the electrical pump throughout the flight, particularly when the ambient air temperature is relatively warm. However, consideration would need to be given to the capability and safety of running the electrical pump for long periods. There could be a similar situation with other aircraft that use Mogas and where there is a low head of pressure between the fuel tank and mechanical fuel pump.

Conclusion

The aircraft's engine most likely stopped because of either carburettor icing or fuel vapour lock. The probability of these factors occurring would have increased as a result of using Mogas, which the aircraft was not authorised for, and not ensuring that the electrical fuel pump and carburettor heat were selected ON during the approach and landing. Following the engine failure the pilot would have been faced with a steeper than normal glide approach and most likely did not arrest the high rate of descent sufficiently before the aircraft touched down firmly.

Safety action

> The LAA have advised that they will use this accident to publicise the risk from vapour lock when operating piston engines on Mogas.