ACCIDENT

Aircraft Type and Registration:	Luton LA4A Minor, G-AWMN	
No & Type of Engines:	1 Volkswagen 1800 piston engine	
Year of Manufacture:	1987 (Serial no: PFA 827)	
Date & Time (UTC):	3 February 2019 at 1145 hrs	
Location:	Near Belchamp Walter, Essex	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - 1 (Fatal)	Passengers - N/A
Nature of Damage:	Aircraft destroyed	
Commander's Licence:	UK Private Pilot's Licence	
Commander's Age:	55	
Commander's Flying Experience:	317 hours (of which 150 were on type) Last 90 days - n/k Last 28 days - n/k	
Information Source:	AAIB Field Investigation	

Synopsis

The pilot was conducting a test flight in G-AWMN to renew the aircraft's Permit to Fly. Whilst climbing away from the runway, the aircraft was observed to bank to the right and then descend steeply to the ground.

It was not possible to definitively determine the cause of the accident. It is possible that the engine stopped producing power due to carburettor icing which led to a stall from which the aircraft was not able to recover. The investigation also identified that, despite wire locking being present, the barrel from an aileron flight control turnbuckle was missing, but it could not be determined if this had been missing prior to the accident.

History of the flight

The pilot began operating G-AWMN from Waits Farm, near Belchamp Walter, Essex in July 2012. In recent months he had been completing test flights in G-AWMN to renew the aircraft's Permit to Fly following a period when it had not flown. It was reported that he had completed one test flight in December 2018 and a second in January 2019.

On the day of the accident the pilot arrived at the airfield at approximately 1030 hrs. He spoke to the airfield owner and another pilot. He told the other pilot that he did not intend to take off until approximately 1200 hrs. Before he took off in his own aircraft at 1100 hrs, the other pilot conducted a radio check with the pilot of G-AWMN. The pilot

of G-AWMN did not mention what he intended to do on his flight to either person and no documents were found describing what tests the pilot intended to conduct.

No one witnessed G-AWMN taking off and it is not known exactly when the aircraft was started up. The airfield owner heard G-AWMN start up but was not sure exactly what time this occurred, but he was informed of the accident approximately 10 – 15 minutes later.

Figure 1

Waits Farm showing the accident and witness locations

A witness (Figure 1 – Witness 1), working in a nearby garden, thought he heard an aircraft start up, taxi and then take off. He first saw the aircraft climbing away from the airfield heading north-east and described it as “travelling quite slowly.” He then saw the aircraft bank sharply to the right and descend, at an approximate 45° angle, to the ground. He did not see the aircraft hit the ground, but he heard the impact. He recalled that he could hear the engine when the aircraft was climbing away from the airfield but did not remember hearing it after the aircraft banked right. During the period that he was able to hear the engine he did not remember it sounding unusual. He ran towards the accident site but, approximately three minutes after the impact and before he could reach the scene, the aircraft caught fire.

A couple walking in a nearby field (Figure 1 – Witness 2) heard an aircraft flying towards them from the airfield. When they looked in that direction, they saw the aircraft banked to one side and then descend to the ground. They heard, but did not see, the impact. They also ran to the scene but did not reach the aircraft before it caught fire.

Another couple who were working in a nearby garden heard the aircraft but did not see it. Their attention was drawn to it when they heard the engine noise suddenly stop. A few seconds later they heard a "dense thud" which they thought sounded like an aircraft crash.

The accident occurred at approximately 1145 hrs. The fire service, ambulance, police and air ambulance attended the scene promptly and the remaining fire was extinguished. The pilot was fatally injured.

Several other people reported seeing or hearing aircraft in the surrounding area which appeared to be having engine problems. However, the timings and descriptions suggest these were unlikely to be the accident aircraft.

Meteorology

The day of the accident was cold with a clear sky and light south-westerly wind. The nearest airfield that records weather reports is Stansted which is 17 nm south-west of the accident site. At 1150 hrs, Stansted recorded the surface wind as 220° at 7 kt, visibility greater than 10 km, no discernible cloud, temperature 4°C and dew point -2°C.

The pilot who took off from Waits Farm at 1100 hrs reported that, when he started his engine, the surface wind was west south-westerly at approximately 7 – 8 kt, the temperature was - 1°C and the grass was wet with melting frost.

Using the chart published in the CAA Safety Sense Leaflet 14 – '*Piston Engine Icing*'[1] the temperature and dew point is indicative of a relative humidity of 60 – 70%. The chart suggests that with these conditions there is a moderate risk of carburettor icing at cruise power and a serious risk at descent power. However, the leaflet highlights that with wet ground and light winds the local humidity could be higher and further increase the risk of icing.

Airfield information

Waits Farm (Figure 2) has a small privately-owned airfield with hangar space for a few light aircraft. The owner keeps his own aircraft there and rents hangar space and use of the airfield to a few other pilots. The airfield has a bulk fuel tank to store aviation fuel (100LL).

There is a single taxiway leading to the eastern end of a 500 m grass runway orientated approximately 07/25. Runway 07 has a slight up-slope. A prominent windsock is located to the north of the runway.

Aircraft normally take off and land into wind. The surface wind on the day of the accident was south-westerly which would suggest Runway 25 would be the preferred runway for takeoff and landing. The start of Runway 25 is closer to the hangar so requires less taxiing and no need to backtrack the runway. The aircraft that took off before the accident and

Footnote

[1] http://publicapps.caa.co.uk/docs/33/20130121SSL14.pdf [accessed 8 August 2019].

returned later in the day used Runway 25. As no one witnessed G-AWMN taking off, it is not known which runway was used. However, the aircraft was seen climbing away from Runway 07.

Figure 2
Waits Farm Airfield

The airfield owner reported that he inspected the runway after the accident and, despite the soft ground, found no tyre marks in the first third of Runway 07. This suggests that no aircraft had used this part of the runway recently.

Personnel information

The pilot held a UK Private Pilot's Licence with a valid Single Engine Piston rating. This licence allowed the pilot to operate non-EASA aircraft, such as G-AWMN, in UK airspace.

His logbook records that he had a total of 317 hours of flying experience, of which 150 hours were in G-AWMN.

It records that, on 6 July 2015, he had an engine failure in G-AWMN which resulted in a forced landing in a field. The logbook suggests that the aircraft flew again on 15 July 2015 and completed 18.5 hours of flying between July 2015 and October 2017. The last flight in G-AWNM was recorded on 17 October 2017.

There were no flights recorded between October 2017 and July 2018. In July and August 2018, the pilot completed two training flights in a Piper Warrior aircraft. The last entry in the pilot's logbook was a licence proficiency check (LPC) on 25 August 2018. The examiner who conducted his LPC commented that he was a safe and competent pilot.

Witnesses reported that the pilot flew G-AWMN on two occasions in the months before the accident flight, once in December 2018 and once in January 2019. No record was found of these flights. It is therefore not known exactly how many flying hours the pilot had completed in the last 28 or 90 days.

Medical and pathological information

The pilot had 'self-declared' that he was medically fit to fly on 17 September 2018; this declaration was valid at the time of the accident. Self-declaration allows the pilot to fly non-EASA aircraft, such as G-AWMN. The pilot had previously held a CAA class 2 medical but, this expired on 20 October 2018.

The post-mortem report stated that the cause of death was *'multiple traumatic injuries.'* There was evidence of '*significant bony trauma about both knees'* and of a *'significant head injury.*' The report found there was a *'small amount of carbon pigmentation within the airways suggesting there may have been some respiratory effort at the time of the onset of the fire.'* However, the report stated that this was '*most likely weak and not prolonged.'*

The post-mortem found no evidence of any significant underlying natural pathology or of an acute pathological event.

No drugs or alcohol were detected in the post-mortem blood or urine samples.

Accident site

The aircraft crashed in a harvested arable field close to the extended centreline of the landing strip from which it had departed (Figure 3). The surface of the field was bare earth which was extremely soft and wet. Activity of emergency services had disrupted the surface around the wreckage and obscured some impact marks.

Figure 3
Accident site

The engine was partly buried by the force of the impact, but its final orientation was consistent with the aircraft having descended steeply nose-down with the left wing hitting the ground just before the right wing. An intense post-impact fire had destroyed almost all the wooden structure, leaving only the extreme outboard section of the right wing and aileron unburnt. There was no evidence of impact damage in these unburnt areas. Charred remains of curved wooden members indicated that the tail-plane, rudder and elevators were present at the site but nothing identifiable as the wooden structure of the fuselage or of the left wing survived the fire. Numerous metallic components did survive including the highly disrupted fuel tank and various steel struts, brackets, hinges, bracing wires and control cables. The aluminium alloy cowling panels were severely disrupted and fire-damaged; a number of molten lumps of aluminium alloy were found at the scene.

One lightly damaged propeller blade protruded visibly upwards from the engine to which it was still attached, whereas the other blade, recovered from underneath the engine, had broken off at the root.

The accident site was compact with no evidence of any visible wreckage trail of items from, or parts of, the aircraft.

Recorded information

No radar returns for G-AWMN were recorded, either by civilian or military installations, covering the area of Waits Farm and neither were any radio transmissions from G-AWMN recorded.

A mobile phone was found at the accident site and a tablet device was recovered from the pilot's car. The phone was extensively damaged and, although communication records were obtained which showed the cell towers that the phone had connected to, the data was not of sufficient fidelity to determine the track of the accident flight. Examination of the tablet identified that typical aviation applications were installed but none provided any insight into the planning of the accident flight.

Aircraft information

General

The Luton LA4A Minor was designed in 1958 as an update of a legacy 1930's ultra-light aircraft. It was intended for amateur construction using commercially available drawings. An aircraft owner, from the design drawings, has responsibility for the building of an aircraft, and the Light Aircraft Association (LAA), through its inspectors and LAA Engineering, can provide guidance and processes to help the owner ensure that the aircraft build meets the minimum airworthiness requirements appropriate to the type.

Figure 4

G-AWMN before the accident (used with permission)

The LA4A has a largely wooden structure with fabric covering. It has a high 'parasol' type wing arrangement, the wing structure being mounted on a system of cable-braced, streamlined, metal tubular struts, well above the fuselage and its single seat open cockpit (Figure 5). The bracing cables incorporate turnbuckles to enable the wing rigging to be adjusted.

Figure 5

G-AWMN cockpit (used with permission)

Flying controls

The flying controls are conventional, with cables operating the control surfaces (rudder, elevators and ailerons). For each flight control, a number of turnbuckles are used to adjust rigging and alter cable tensions. Each turnbuckle (Figure 6) consists of a cylindrical barrel, which incorporates left and right hand threaded bores in opposite ends, and a hole bored at mid-length.

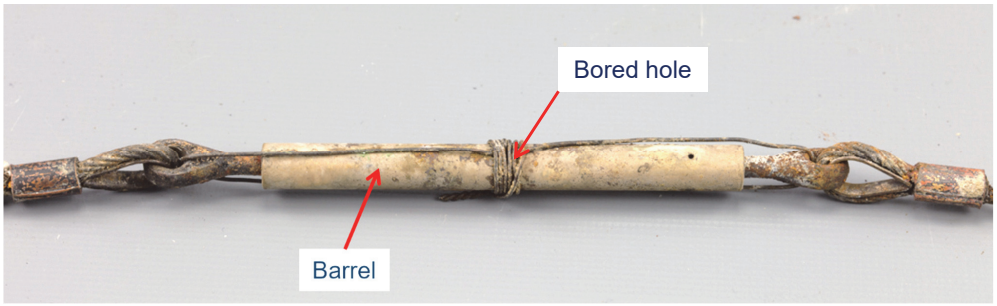

Figure 6

A typical turnbuckle recovered from G-AWMN

Threaded eye-bolts, each pair having respective left hand and right hand threaded portions, are screwed into the barrel ends. Rotating a barrel enables cable tension to be increased or decreased, depending on the direction of rotation, without twisting the eye-bolts or cables.

The cable ends pass through holes in each eye-bolt and are bent backwards around a protective metal member and secured to the parent cable by a swaged collar. Once adjusted for tension, the assembly's security is maintained by wire locking the eye-bolts to one another and to the barrel. This is achieved by passing locking wire through the holes in each of the eye-bolt ends. Rotation relative to the barrel is prevented by the wire being passed through the bored hole and the ends being twisted together. On all turnbuckles on G-AWMN the wire locking ends were repeatedly wrapped around the centre of the barrel.

As a result of its non-proprietary nature, considerable differences in detailed design and component selection can be found in examples of the LA4A type. Hence no surviving example can fully serve as a pattern for details of the pre-accident configuration of G-AWMN. In particular, the locations of the turnbuckles, so far as could be determined from the wreckage of G-AWMN, did not entirely replicate the locations shown on the only flying control cable drawing available.

Engine

The LA4A type is capable of being powered by a range of engine types. G-AWMN utilised a 1,766 cc horizontally opposed four-cylinder air cooled engine of the type used to power Volkswagen cars and camper vans. The engine drives a two-bladed propeller manufactured from a single continuous length of laminated timber, bolted to the drive flange on the forward end of the engine crankshaft.

The ignition system consisted of two 'Skycraft' ignition modules mounted on the rear of the installed engine. Carburation was by means of a single Zenith-Stromberg automotive carburettor. An air box, incorporating a controllable intake flap, was positioned upstream of the carburettor. The engine log book recorded that a modified air box was installed on or before 6 November 2018 following the installation of a different fuel pump whose geometry prevented fitment of the previous air box. The flap enabled direct ambient air delivery to the carburettor to take place but, when closed, caused heated air to be drawn into the air box via a section of hose from a single muffler surrounding one of the four individual exhaust pipes. This provided heated air to remove ice from the carburettor intake. The flap was controlled by a lever in the cockpit.

Aircraft performance

There are no published manuals describing the handling characteristic or performance of the LA4A and, as the aircraft are handmade from drawings, each is slightly different. As no other pilot regularly flew this aircraft, it is not possible to know the exact handling characteristic of G-AWMN.

However, pilots who have flown other Luton LA4A Minors describe them as having benign stall characteristics. There is no tendency to drop a wing if the aircraft is stalled in balance. Due to the high drag, the aircraft does require a steep nose-down attitude to maintain speed in a glide.

The CAA publish Handling Sense Leaflet 02 - '*Stall/Spin Awareness*'[2] which highlights the hazard of stalling following an engine failure shortly after takeoff or during a go-around. The leaflet states:

> *'One of the most critical phases of flight is just after take-off or when going around from an approach to land. At low level, at relatively low speed and with a high nose attitude, an engine failure will lead to a rapid deceleration and increasing angle of attack. To avoid any possibility of stalling and spinning, the pilot must promptly and positively select a lower nose attitude, to achieve and maintain a safe gliding speed. If the aircraft has already decelerated below the recommended gliding speed, this may initially require an attitude lower than normal.'*

History of G-AWMN

Construction of the original aircraft took place over an extended period; the maiden flight having taken place in 1987. Since then, according to its maintenance records, it had flown approximately 330 hours and had been owned by four different people. The accident pilot acquired the aircraft in 2007 after it had been damaged in a previous accident in Ireland[3]. He rebuilt the aircraft and first flew it on 4 December 2011.

Footnote

[2] https://publicapps.caa.co.uk/docs/33/ga_srg_09webHSL02.pdf [accessed 8 August 2019].

[3] The accident on 29 July 2007 was investigated by the Air Accidents Investigation Unit of Ireland. The report is available at http://www.aaiu.ie/sites/default/files/upload/general/9720-0.PDF [accessed 8 August 2019].

On 6 July 2015, the aircraft suffered an engine failure in flight and the pilot landed the aircraft in a field near Wickham St. Paul. Documentation submitted to the LAA states that the aircraft did not fly again until after the Certificate of Clearance was issued by the LAA on 30 November 2018. Similarly, neither the aircraft nor engine log books contain any reference to any flights after 6 July 2015. However, the pilot's logbook recorded that the aircraft flew again nine days after the engine failure and completed 18.5 hours of flying between July 2015 and October 2017.

The documentation submitted to the LAA shows that a programme of work was completed on the aircraft on 8 November 2018. A worksheet of that date shows that the wings had been removed for road transport and subsequently refitted, with fasteners checked and replaced as necessary. The aileron cables were inspected, reconnected, wire locked, and checked for correct operation and full movement. The wing strut bracing tension was adjusted and the turnbuckles wire locked. All control hinges were inspected and lubricated with full movement checked. The wheels were removed, the tyres inspected, and the brakes cleaned and adjusted. All of these were signed for by an engineer.

A final recorded action was a dual inspection of control cables which was signed for by the engineer and countersigned by the owner/pilot.

An application for Renewal (revalidation) of the Permit to Fly was signed by the owner/pilot on 10 November 2018 and received by the LAA on 13 November 2018.

On 30 November 2018, the LAA issued a Certificate of Clearance, valid until 28 February 2019. This was an authorisation to carry out test flights with the alternative fuel pump and air box fitted. The authorisation limited flight to within a 35 nm radius of Waits Farm and stipulated that the pilot conducting the test must have a minimum total experience of 100 hours, including 10 hours on type, and that they must be in current flying practice.

Aircraft examination

General

Due to the absence of the majority of the aircraft, the examination was necessarily limited in scope and almost entirely restricted to metallic components, in particular the power unit and the flying controls.

Engine

An external examination of the power unit indicated that the propeller remained correctly bolted to the drive flange on the forward end of the crankshaft. One blade was only lightly damaged whilst the other blade, recovered from underneath the engine, had failed at the root. The fracture was consistent with a backward bending load which was not the failure orientation to be expected from a propeller blade impact occurring with the engine delivering power. Although neither propeller blade showed any evidence of the chordwise scoring which could be expected with an engine delivering power, the impact and fire damage to the outer section of the broken blade precluded a reliable

assessment of power at impact as this is the area where such evidence is normally most obvious.

The body of the engine-mounted fuel pump had broken away from the engine crankcase as a result of the impact. Part of the internal rocking lever remained attached to the surviving portion of the pump body adjacent to the mounting flange. The remainder of the body of the unit was not only separated, but a portion of it was not identified amongst the recovered items. The portion incorporating the main spring and diaphragm was nonetheless identified and dismantled. Both the spring and diaphragm were examined and found to be intact and capable of functioning correctly. As a result of the post-impact fire, a number of other parts of the aircraft fuel system could not be identified.

The two electronic ignition units were removed and subjected to rig testing at the premises of the supplier. Following rectification of a small impact damage feature, both units were mounted in the test rig and found to operate satisfactorily.

The carburettor was severely heat damaged and its examination revealed no useful evidence.

Strip examination of the engine unit involved removing the cylinder heads from both pairs or banks of cylinders, removing all four cylinders and splitting the crankcase into its two halves. All internal revolving and reciprocating parts of the engine were then examined. The internal condition of the engine was good, no defects were found amongst those components and all bearings, gears and moving surfaces showed no evidence of seizure or a lack of lubrication.

Examination of the combustion chambers and the piston crowns revealed an absence of the characteristic brown colouring normally found in aviation piston engine types which have operated for periods with the correct air/fuel mixture. Instead, all combustion chambers and piston crowns within all cylinders exhibited a distinctive black finish. The combustion chamber colouring was compared with that of a Volkswagen-derived aero-engine recently removed from an aircraft which was known to have had high power at impact. The normal characteristic brown colouring, mentioned previously, was present in the combustion chambers and on the piston crowns of this other engine.

Flying controls

The cables for the flying controls were severely disordered and only two of the many pulleys had survived the fire. The rudder control cables were identified as being complete from the rudder bar in the cockpit to the rudder bell crank, which is normally attached directly to the rudder. It was noted, however, that a turnbuckle barrel had fractured at mid-length (across the bored hole) but the turnbuckle remained capable of transmitting force as a result of the wire locking remaining intact (Figure 7).

The rear elevator operating bell crank was identified along with operating cables and turnbuckles. These were found to be almost entirely intact from the pilot's control column to the rear bell crank with the exception of a turnbuckle barrel that linked the control

column to the elevator. The barrel had fractured as a result of bending and was severely affected by heat; all features which are consistent with impact and the effects of the post-impact fire.

Figure 7

Fractured barrel in a rudder flying control turnbuckle

Examination of the roll control system revealed that, for the turnbuckle on the aileron balance cable, both eye-bolts and most of the locking wire was present but the barrel was absent (Figure 8).

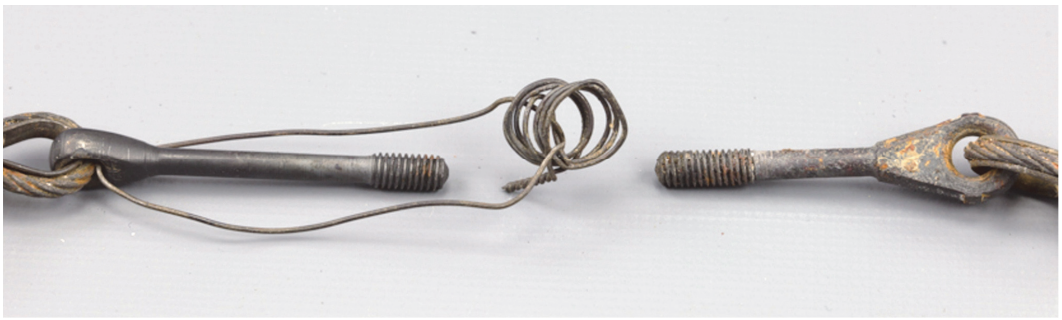

Figure 8

Aileron balance turnbuckle (barrel missing)

Neither threaded eye-bolt showed evidence of significant oxidation, and thus appear not to have been overheated. Lubricating grease was found on both threads but there were no traces of any metal from the barrel. Both corresponding cable ends appeared correctly swaged. The locking wire of one eye-bolt to the missing barrel was present and attached to the eye-bolt. It appeared to have been correctly routed through the hole in the now-absent barrel with multiple coils and the wire end visible where the mid-length bored hole in the barrel would have been. The portion of locking wire extending from the central hole to the other eye-bolt and back was absent. Both wire ends showed the characteristics of tensile failures and both failures were in the area where the mid-length hole in the barrel would have been.

Survivability

The cockpit area was substantially damaged in the impact and subsequent fire leaving no survival space. The accident was not survivable.

Analysis

Purpose of the flight

The pilot was conducting a test flight to renew the aircraft's Permit to Fly. The LAA requires pilots conducting test flights to be in current flying practice and have a minimum of 100 hours total time including 10 hours on type. The accident pilot had significantly more experience than these minimum hours, but it is not known how much recent flying he had completed. His logbook records that he last flew on 25 August 2018 in a different aircraft type. However, witnesses reported he flew G-AWMN in December 2018 and January 2019 although no records were found of these flights.

The aircraft had suffered an engine failure in July 2015. There was a discrepancy in the paperwork regarding whether the aircraft had flown between this engine failure and the recent test flights. The pilot's flying logbook suggested the aircraft had been flown whereas the aircraft log book, engine log book and paperwork submitted to the LAA suggested it had not. This discrepancy was not resolved.

It is not known what specific tests the pilot intended to conduct during the accident flight.

Accident Flight – direction of takeoff

No one witnessed the aircraft taking off from Waits Farm, so it is not known exactly what time the aircraft took off or in which direction. The aircraft was not recorded on radar and no radio transmissions were recorded, so it is not known where it flew after takeoff. The airfield owner heard the aircraft's engine start and remembered being informed of the accident 10 – 15 minutes later which implies the aircraft could not have flown far from the airfield.

The witnesses who saw the accident reported seeing the aircraft climbing away from Runway 07 and this could infer that the aircraft had just taken off from that runway. However, this would mean that the aircraft would have needed a longer takeoff run in order to depart with a tailwind on an up-slope. There were no tyre marks evident on the first third of Runway 07 and therefore, it seems unlikely that the pilot took off in this direction.

Conversely, if the aircraft took off from Runway 25, to arrive where it was seen by the witnesses, it would have needed to fly a 180° turn, return to approach the airfield in the opposite direction, and then climb away. This would be an unusual manoeuvre but one that the pilot may have elected to follow if he had had an aircraft problem and decided to attempt a tailwind landing onto Runway 07. From such an approach, it is possible that the tailwind caused the pilot to go-around and this was when the aircraft was first seen by the witnesses.

Accident Flight – loss of control

Eye witnesses report seeing the aircraft bank to the right then descend in a steep nose-down attitude before impacting the ground and ear witnesses report hearing the engine noise stop before the impact. The investigation found two possible explanations for these observations; either carburettor icing causing the engine to stop producing power or a flight control issue. Both of these possibilities are discussed further below.

Flying controls

The flying control cable system, although disrupted and with most of its pulleys destroyed by fire, appeared to have been intact before the accident with the possible exception of the turnbuckle barrel on the aileron balance cable. The process and sequence of separation of the eye-bolts from the turnbuckle barrel, the absence of the latter and the absence of a section of locking wire could not be explained.

The condition of the two eye-bolts, and in particular the absence of the significant oxidation seen on components of other turnbuckles known to have been severely fire affected, was not consistent with this assembly having been excessively heated in the post-impact fire. The presence of lubricant grease on the threads of both eye-bolts also indicated that the assembly had not been greatly affected by the fire. Therefore, it is unlikely that the turnbuckle barrel had melted and was thus absent.

One other turnbuckle barrel in the aircraft had failed at the mid-point locking wire hole. However, had this occurred on the barrel in question, it would have required both fractured ends of the broken barrel to be individually unscrewed from the eye-bolts. An absence of any material from the barrel in the eye-bolt threads indicates that it was unlikely that both eye-bolts had been pulled out of the threads in the barrel by tensile forces. In addition, no mechanism was identified that could leave most of the locking wire intact but result in both eye-bolts becoming unscrewed.

The reason for the loss of continuity at that location was not determined, but the investigation did consider the effect that such a loss of continuity might have had on aircraft handling.

If this turnbuckle barrel was missing prior to flight or failed in flight, it is possible that the aileron circuit would still have functioned whilst held together by the locking wire. However, once the locking wire failed, the pilot would have been left with very limited roll control, although directional control could have been maintained through use of the rudder. Had such a flying control failure occurred, it could support the theory that the pilot tried to return to the airfield. However, with limited roll control and with a tailwind, maintaining runway alignment would have been challenging and might have necessitated a go-around. The presence of such a flying control disconnect could have either directly caused a loss of control or distracted the pilot from the monitoring of his airspeed which could then have resulted in the aircraft stalling.

Engine

The condition of the propeller was consistent with an absence of power at impact. No evidence of pre-impact mechanical failure was identified in the engine. The combustion chambers and piston crowns lacked the brown coating generally associated with petroleum-fuelled piston engines operating normally. Examination of another Volkswagen-derived aero-engine had confirmed that such brown colouring was to be expected in the combustion spaces of a correctly functioning engine. Instead, all G-AWMN's piston crowns exhibited a black finish as normally found in engines which have operated for a period with an over-rich mixture. Such over-rich operation can result from a period of running with significant and increasing carburettor ice formation and which will, eventually, cause the engine to stop producing power. The low temperature and recent clearance of ground frost at the airfield at the time of the accident indicates that conditions conducive to carburettor icing near ground level would have been present.

It is possible that the pilot experienced a rough running engine due to carburettor icing. If the aircraft had taken off from Runway 25 this might be a reason for the pilot to return to the airfield for a landing on Runway 07. However, with the tailwind mentioned earlier, this may have necessitated a go-around during which the engine stopped producing power. It is also possible that, again due to carburettor icing, the engine lost power following a takeoff from Runway 07. Following either scenario, if the pilot attempted to make a forced landing in a field, it would be natural to reduce engine power, and this may explain why witnesses heard the engine noise stop.

It would normally be possible to glide an aircraft into a field if the engine fails, however, this can be particularly challenging when at low speed and with a high nose attitude on a go-around. Owners of other Luton Minors reported that the aircraft requires a steep nose-down attitude in a glide to maintain a safe airspeed. It is possible that the pilot was not able to react quickly enough to the loss of engine power and the aircraft then stalled. It is unlikely that it would have been possible to recover from such a stall at this low height. A loss of engine power due to carburettor icing followed by a stall would be consistent with the witness observations of the aircraft.

Conclusion

The aircraft was seen climbing away from Runway 07 at Waits Farm. It could not be determined if the aircraft had just taken off or if it was going around from an approach to land on Runway 07.

The aircraft was observed to bank to the right and then descend rapidly to the ground which it struck at a steep nose-down angle. The structure was almost totally destroyed by a post-impact fire. The accident was not survivable.

The investigation found that the engine may have stopped producing power due to carburettor icing. It is possible that the pilot was not able to lower the nose of the aircraft quickly enough to maintain adequate airspeed and the aircraft then stalled at a low height from which recovery was unlikely.

The investigation also identified that a turnbuckle barrel was missing from the aileron balance cable. It could not be determined how this component came to be absent nor whether it was missing prior to the accident.

Published 19 September 2019.