ACCIDENT

Aircraft Type and Registration:	Grob G109B, G-KHEH
No & Type of Engines:	1 Grob 2500 E1 piston engine
Year of Manufacture:	1986 (Serial no: 6436)
Date & Time (UTC):	10 June 2018 at 0959 hrs
Location:	Near Raglan, Monmouthshire
Type of Flight:	Training
Persons on Board:	Crew - 2 Passengers - None
Injuries:	Crew - 2 (Fatal) Passengers - N/A
Nature of Damage:	Aircraft destroyed
Commander's Licence:	Private Pilot's Licence
Commander's Age:	68 years
Commander's Flying Experience[1]:	550 hours (of which 27 were on type) Last 90 days - 7 hours Last 28 days - 2 hours
Information Source:	AAIB Field Investigation

Synopsis

The aircraft collided with a dead tree whilst conducting a field landing exercise. It has not been possible to determine conclusively whether the aircraft was suffering from an engine problem, most likely carburettor icing, during the descent, however, the engine was under power at the point it collided with the tree. Had it been necessary, the aircraft should have been able to avoid the tree and carry out a landing in the field beyond. It was considered most likely that the pilots did not see the tree until it was too late to avoid it.

History of the flight

The instructor arrived at Usk Airfield at about 0800 hrs on the morning of the accident and at 0900 hrs attended the airfield brief, held to advise club members of airfield information, local NOTAMS and the plan for the day's club flying.

The instructor owned a touring motor glider (TMG) which he used at times to provide training to club members. At the end of the briefing he was approached by one of the club members, a qualified glider pilot[2], who asked if he could do some practice field landings in the TMG with the instructor that morning. The instructor agreed.

Footnote

[1] Powered flight hours only. The commander also had approximately 2,100 hours flying gliders.
[2] Referred to in this report as the student.

It is not known whether a brief took place or the details of the intended flight, but the TMG took off from Usk Airfield at about 0947 hrs with the instructor and student on board. Witnesses report seeing the aircraft shortly after this time near the town of Raglan, about 4 miles north of the airfield. Recovered flight data shows the aircraft flew an orbit over an area of fields approximately 1.5 miles to the north-west of the town, before commencing an apparent final approach for a practice force landing into a large field (Figure 1).

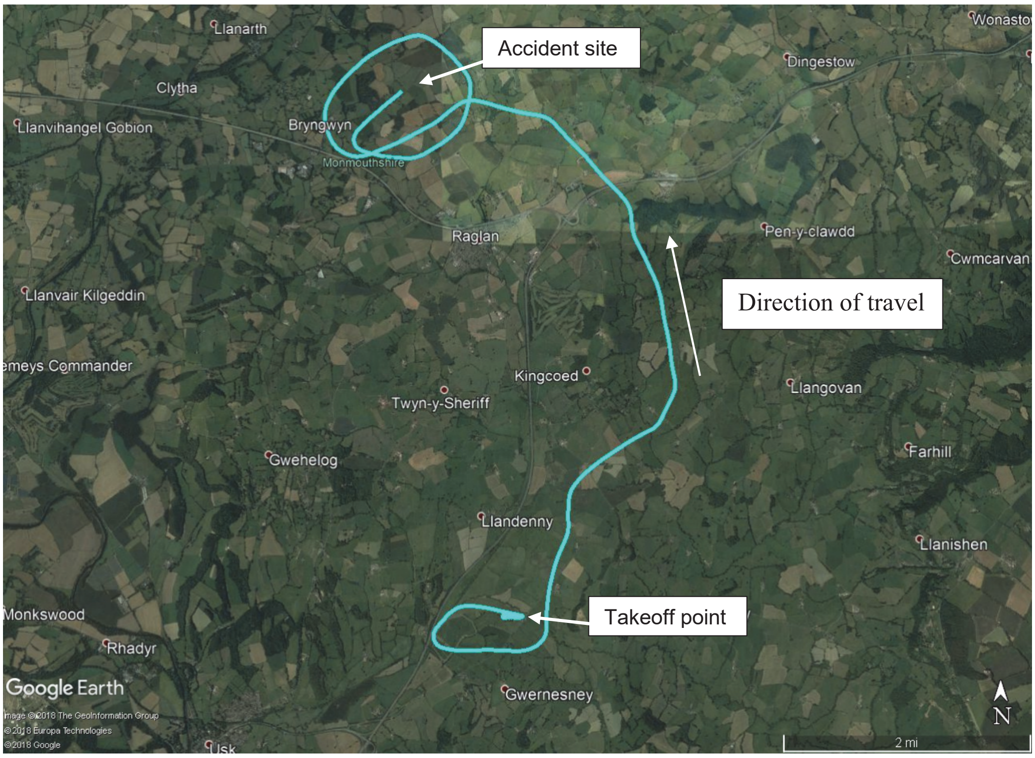

Figure 1

G-KHEH flight of 10 June 2018

The aircraft was also seen by several witnesses flying low along its final track towards the selected field. One of these witnesses, who was standing outside some farm buildings about 1,200 m from the accident site, saw the aircraft pass close-by and described hearing the engine spluttering, as if it was running out of fuel.

The aircraft was also seen by two witnesses who were standing outside their house about 500 m from the accident site and were surprised to see the aircraft pass low overhead. They described hearing the engine misfire or splutter, as if it was being restarted. However, one of these witnesses also described the aircraft as being quiet as it flew overhead and the other that it was making a loud noise. The aircraft passed out of sight and both witnesses reported that a few seconds later they heard the engine noise increase, so they expected to see it climb away. Instead they heard the sound of an impact.

Another witness in the garden of a house about 260 m from the accident site also saw the aircraft fly overhead. They reported the engine sounded 'sluggish' but not spluttering. They stated the aircraft was very low and descending, so they assumed it was in the process of landing in the field. They stated that shortly after losing sight of the aircraft it sounded as if the engine had stopped, followed a few seconds later by the sound of an impact.

The aircraft was also seen by the driver of a car travelling on a lane running adjacent to the accident site. He had stopped when he saw the aircraft approach the boundary of the field appearing as though it was attempting to land. He described it flying towards the gap between a large dead oak tree and a mature tree to its right[3] (Figure 2). He did not consider the gap was wide enough for the aircraft to pass through and watched as it changed course, just before the trees, to the left. He then saw the right wing clip the dead tree and the aircraft invert before coming to rest in the field beyond. The driver made his way quickly to the accident site to offer assistance where he was joined by another person, but it was soon apparent that neither of the occupants had survived.

Accident site

The field in which the accident site was located had a hedge running along its south-western perimeter in which there were several mature trees, one of which was a dead oak tree (Figures 2 and 3). A 2 m section of the aircraft's right wingtip was found in this tree suspended together with a broken bough, both having been entangled in the tree by some aircraft wiring. Photogrammetry assessment of the dead tree and examination of the damage to the right wing determined the height of the impact with the tree was approximately 57 ft agl.

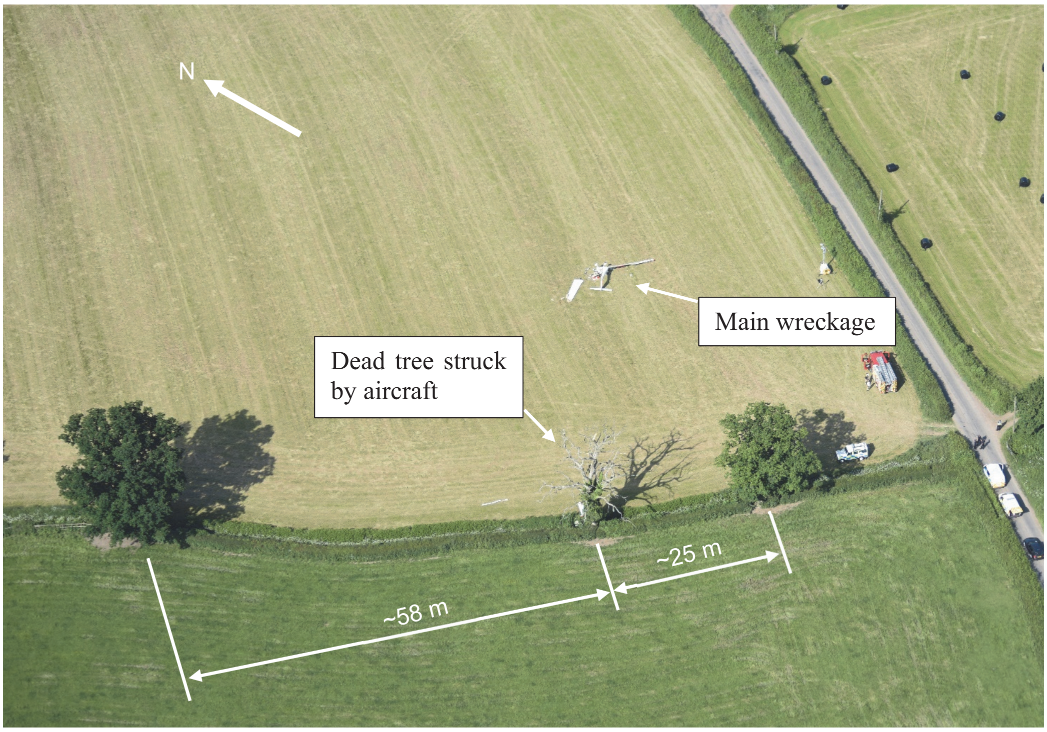

Figure 2

Accident site
(image courtesy of South Wales Police)

Footnote

3 Descriptions from the pilots' perspective.

Figure 3

Accident site showing impact point with tree and wreckage
(image courtesy of South Wales Police)

The aircraft had come to rest, inverted, approximately 55 m from the hedge line. There was no post-impact fire. Impact marks showed that the aircraft had struck the ground at a steep angle, inverted. The right wing, which had separated during the impact sequence, was found close to the fuselage.

The engine and forward section of the cockpit lay to the side of the fuselage, connected to it by the fuel supply tube and electrical wiring. The instrument panel was recovered from within the severely disrupted cockpit area, the switches were all found in the OFF position and the ignition key in PARK. It is considered likely that the switch positions were altered during the accident sequence and subsequent recovery. The carburettor heat selection knob was partially extended and had been bent forward. The choke was fully closed. The position of the throttle control levers could not be determined due to the level of disruption in the cockpit.

The airbrake control lever was found in the stowed position. The left airbrake was found deployed but it was considered that this was due to the wing coming to rest inverted.

Ground marks at the main impact location indicated that the propeller was rotating at the time it contacted the ground. The composite wooden propeller had fragmented and one of the propeller blade tips was located 16 m from the initial impact point (Figure 4), indicating that the engine had been producing power at the time of impact.

Fuel was found in the fuel supply line to the engine and more than 50 litres of fuel were drained from the fuel tank.

Figure 4
Location of propeller blade tip in relation to wreckage

Aircraft information

The Grob 109B is a two-seat side-by-side, dual control touring motor glider with a T-type horizontal stabiliser and fixed, tail dragger landing gear (Figure 5). It can be used as a conventional powered aircraft for touring but can also be used as a glider, during which times the engine is shut down and the drag minimised by feathering the propeller. The aircraft is constructed mainly from glass-reinforced plastic. Its wings are detachable with a wingspan of 17.4 m and air brakes which extend out of the upper surface. It is powered by a Grob 2500 E1 air cooled engine with a Hoffman HO-V 62 R variable pitch propeller. The engine and fuel system are designed to run on AVGAS 100LL fuel.

Figure 5
Example of a Grob 109B

The Grob 2500 E1 is a four-cylinder, 2.5 litre, twin carburettor, single magneto engine. The controls for throttle, choke and carburettor heat are operated from the centre console, with an additional throttle control on the left instrument panel combing. The engine controls actuate three transverse control rods which synchronise the inputs to the dual carburettors situated either side of the engine. The engine is not particularly loud when running, especially when at low power settings.

The propeller pitch can be set to CLIMB, CRUISE or FEATHER positions, and the position is altered by pulling one of two handles located on the centre console in the cockpit (Figure 6). The CRUISE propeller position is set by pulling the propeller control handle (also referred to as the 'prop control knob') when the engine is set above 2,300 rpm. The CLIMB position is set by pulling on the propeller control handle whilst the engine speed is at or below 1,400 rpm. The FEATHER setting is used when the aircraft is gliding and the engine has been shut down. It is set by pulling the 'prop feather handle' then turning it through 90º.

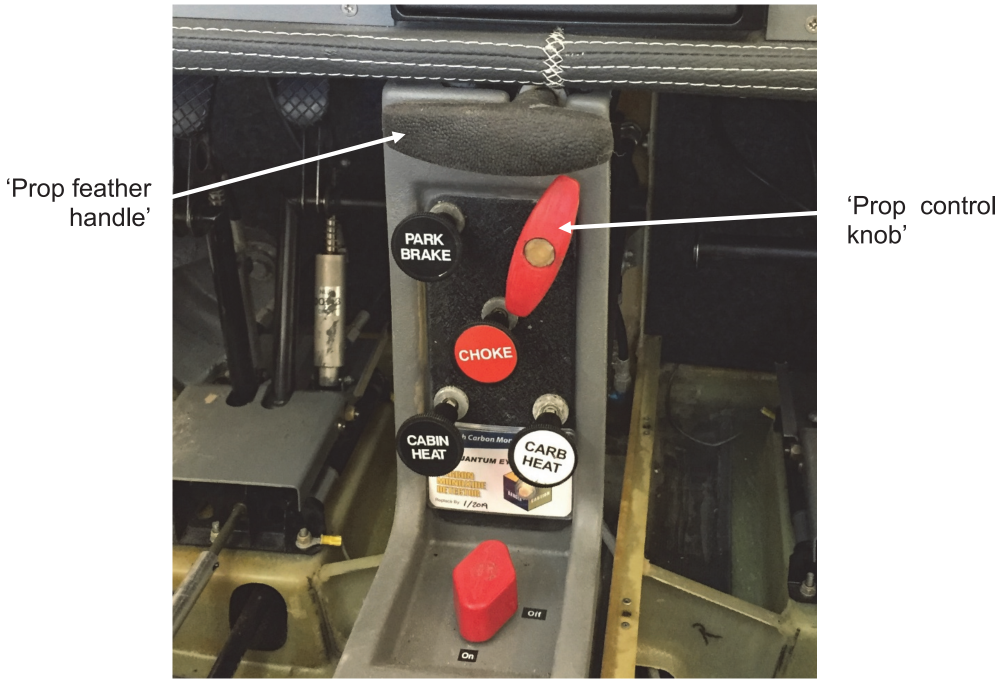

Figure 6

Grob 109B propeller pitch controls

The aircraft's flight manual provides the following reference speeds:

- Stall speed (airbrakes retracted) 39 kt
- Normal range 45-92 kt
- Approach speed 62 kt
- Best climb (prop in CLIMB) 59 kt

The manual also states the aircraft has a glide ratio of 1:28 at 62 kt and a minimum sink rate of 217 ft/min and 58 kt.

Aircraft examination

The aircraft wreckage was recovered to the AAIB facility in Farnborough for further assessment.

Examination of the flying controls did not reveal any pre-impact issues.

Examination of the engine was conducted by the AAIB with the representatives from the manufacturer present; no issues were found that may have degraded the engine performance. The carburettor heat baffles for the left and right carburettors were found in the HOT and COLD positions respectively. Internal witness marks within the units confirmed that the baffles were both in the HOT position at the time of impact, which corresponded with the position of the carburettor heat knob in the cockpit. It is considered the right baffle subsequently moved during the impact sequence.

The magneto was removed for assessment at an approved overhaul facility. Due to impact damage it could not be tested, however, strip examination determined that it was likely to have been functioning normally prior to the accident.

The propeller pitch mechanism was examined and determined to have been in the CLIMB position.

Analysis of the fuel sampled from the aircraft fuel tank found that the fuel was predominantly AVGAS 100LL aviation gasoline, however, the results suggested there were small traces of automotive gasoline (MOGAS) present in the sample.

Recorded information

A tablet computer was recovered from the aircraft wreckage and taken to the AAIB for examination. The device had suffered superficial damage but after replacing the screen, appeared to function correctly. The instructor was known to use SkyDemon, a flight planning and navigation App, which records aircraft GPS position, altitude and time. This information was successfully downloaded from the tablet for a number of flights.

Accident flight

The recording commenced at 0924:41 hrs with the aircraft on the ground at Usk Airfield. Takeoff commenced at 0947:31 hrs after which the aircraft tracked towards Raglan, achieving a maximum GPS altitude of 1,264 ft amsl.

Upon passing abeam Raglan, the aircraft commenced a right hand circuit overhead the accident site at approximately 1,100 ft amsl (Figure 7).

At 0957:02 hrs, while on the crosswind leg, the aircraft commenced a descent which continued for the rest of the flight. Vertical speed was calculated as the rate of change of GPS altitude to ascertain the rate at which the aircraft was descending throughout the manoeuvre. A negative vertical speed represented a rate of descent; a positive vertical speed a rate of climb.

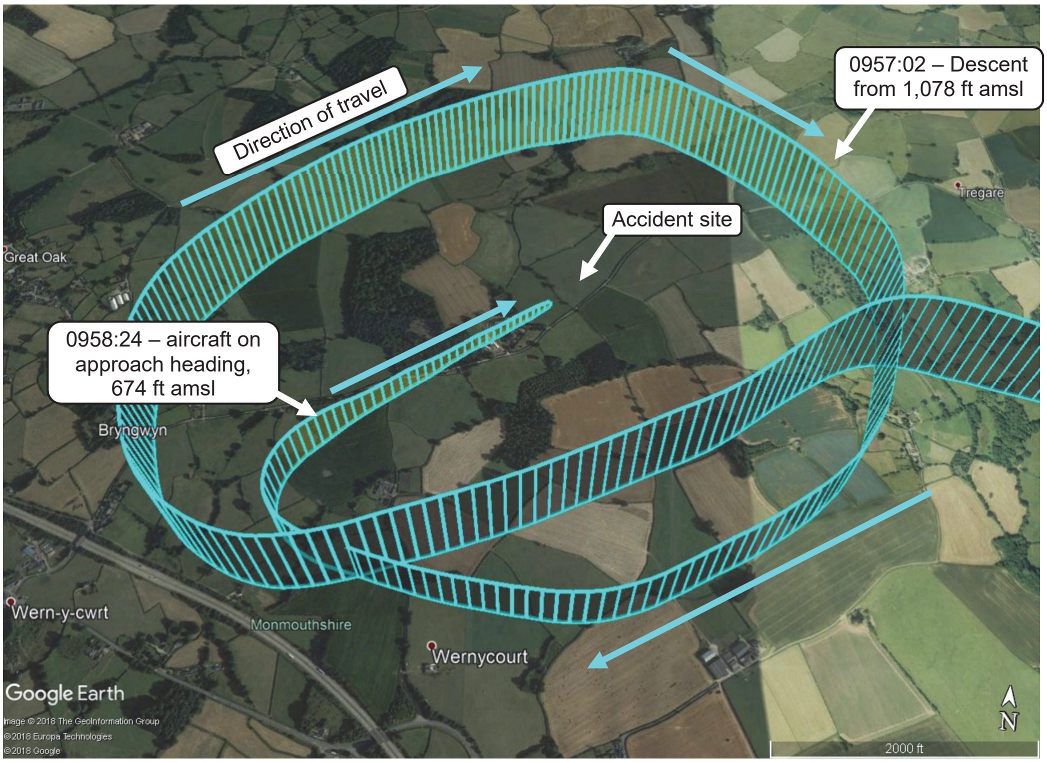

Figure 7

G-KHEH final stages of flight

Between the start of the descent and the turn to the final approach track, vertical speed varied at between +100 to -790 ft/min, with the aircraft descending 400 ft over one minute 20 seconds (Figure 8). Ground track covered over this period was approximately 1.6 nm, equating to an average ratio of 1:24. Calculated groundspeed varied between 54 kt and 77 kt.

At 0958:24 hrs the aircraft was positioned on the final approach track at an altitude of approximately 674 ft amsl (about 444 ft agl). The recorded aircraft positions do not show any significant deviation in the aircraft track during the last 30 seconds of the recording.

During the turn onto the final approach the groundspeed decreased and, shortly after becoming established on the final approach, this had reduced to about 53 kt. During the subsequent final 30 seconds of the flight, vertical and ground speeds are seen to fluctuate with the vertical speed varying between -100 and -2,000 ft/min and the groundspeed varying between 45 kt and 62 kt (Figure 7). In general, when the vertical speed decreased, the groundspeed increased and vice versa.

During the last four seconds, recorded data shows the aircraft in a descent with decreasing vertical speed and groundspeed increasing from 45 kt. The last recorded position was at 0958:56 hrs with the aircraft at 284 ft amsl (about 54 ft agl) located approximately 43 m before the tree.

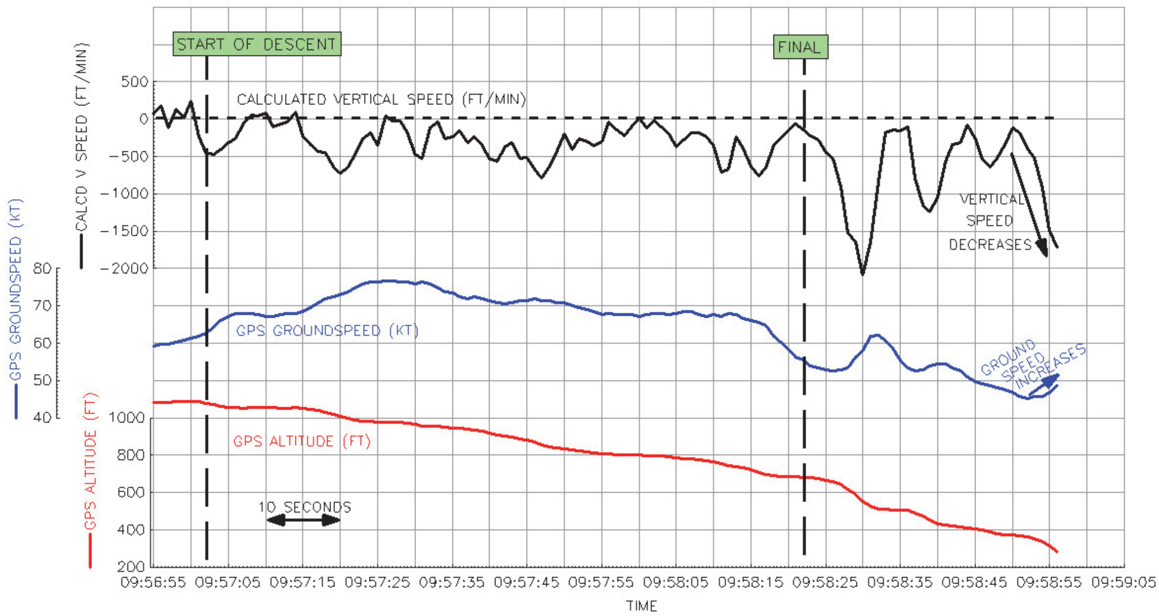

Figure 8

G-KHEH flight data parameters for the final two minutes of flight

Previous flight

The tablet computer contained a recording of a flight on 2 June 2018 where it was reported that the aircraft was performing practice fields landings. A review of this flight revealed that the minimum height achieved during these manoeuvres was 350 ft agl.

Pilot information

Instructor

The instructor was an experienced glider pilot and had qualified as a fully rated gliding instructor in 1999. He had previously held the position of Chief Flying Instructor at the South Wales Gliding Club at Usk Airfield. He had gained a Private Pilot's Licence in 1996 and qualified as a TMG instructor in 2003.

The instructor had owned a Hoffman H36 Dimona TMG from 2002 until it was destroyed in an accident in 2016 whilst being flown by another pilot[4]. He replaced it with G-KHEH later the same year.

It is unclear from the instructor's logbook entries how many flights he had made which had included training of field landings. His logbook recorded a field landing training flight on 2 June 2018, but he appears not to have conducted any other field landing training flights for over a year prior to this.

Footnote

[4] See section on BGA Motor Glider Accident Statistics.

Student

The student had originally flown paragliders for many years before starting to fly gliders at Usk Airfield in 2007. He had flown a total of 260 hours in gliders and normally only flew in the vicinity of the airfield. His logbook records his only known landing at another airfield was in May 2011 in order to qualify for his British Gliding Association (BGA) Silver Badge, which he was awarded in the same month. He had completed his annual gliding check on 23 December 2017 and was described by one of the senior club instructors as a competent pilot.

The student's only recorded field landing practise took place in August 2009. The flight of one hour and forty-one minutes was in a Dimona TMG with the same instructor involved in this accident.

Field landing training

Gliders may, at times, have insufficient lift to be able to reach an airfield in order to land. On these occasions they are forced to make a field landing. The potential for having to conduct a field landing increases when flying away from the immediate vicinity of an airfield, for instance on a cross country flight. Pilots undertaking such flights therefore need to gain and practise the necessary skills. This procedure cannot readily be practised in a glider, however, the use of a TMG allows pilots to glide down to relatively low heights, leaving the engine at idle or low power, and then be able to climb away again by re-applying power.

Other instructors at the gliding club reported that when practicing field landings using a TMG they would conduct the takeoff and climb the aircraft to about 2,000 ft. They further reported that on reaching a suitable local area they would select the propeller pitch to fine before selecting the carburettor heat ON and closing the throttle, leaving the engine running at idle power. The student would then select a suitable landing area, flying a circuit to line up for an approach to the selected area. The approach would be continued until it was obvious whether the landing would have been successful, whilst remaining high enough to ensure sufficient clearance remained from obstacles to apply power and climb away. It was not uncommon for the aircraft to descend as low as 40 ft agl before climbing away.

Medical information

Post-mortem reports recorded no medical issues with either the instructor or student which may have contributed to the accident. It was noted that the instructor was found occupying the left seat of the aircraft and had his left hand gripping the control column.

Three pairs of prescription glasses and one set of sunglasses were recovered from the accident site. Two of the pairs of glasses were in cases, the third pair had been damaged and was found within the cockpit area.

The instructor held a valid LAPL medical certificate at the time of the accident. He had suffered an ocular choroidal melanoma of his left eye, although this had been successfully treated and visual field tests in July 2017 had shown him to be within normal limits in each eye.

A medical examination for his LAPL certificate revalidation on 28 November 2017 found the instructor to have normal distance vision corrected with glasses in both eyes separately. A limitation on his medical certificate required him to wear corrective lenses when flying and to carry a spare pair.

A review of the instructor's medical record by the CAA aeromedical department could find nothing to suggest from his visual history and examination findings that his vision, and in particular his history of eye melanoma, was a cause or contributory factor to the accident.

The student did not have, or require, a flying medical certificate and was reportedly in good health. He only required glasses for reading.

Meteorology

A Met Office aftercast reported the UK was subject to a slack north-easterly airflow on the day of the accident with generally benign conditions over the country. In the area of the accident there was good visibility, in excess of 9 km, and small areas of scattered or broken cumulus and stratocumulus cloud with a base of 2,000-4,000 ft amsl. The wind was light and variable, ranging between approximately 010-080º and 5-10 kt.

Temperatures and dew points at the time of the accident recorded at three airports, all about thirty miles from Raglan, ranged from 19ºC/13ºC (Gloucester Airport), 17ºC/15ºC (Bristol Airport) and 19ºC/14ºC (Cardiff Airport). The freezing level was 10,000 ft amsl.

The Sun's elevation at 1000 hrs was approximately 52º and during the aircraft's final approach to the field, its position was approximately 90ºs to the right of the aircraft's track.

Carburettor icing

Based on the range of reported temperatures and dew points at the time of the accident, serious carburettor icing would have been possible on an engine at descent power.

To protect against carburettor icing, the Grob G109B is fitted with carburettor heaters and additional protection is achieved through the configuration of the engine which, when the carburettor heaters are off, takes air from the rear of the engine bay where it is warmer than ambient air. The aircraft manufacturer reported that during their flight tests and marketing flights only one event of carburettor icing was known. On this occasion the aircraft had been flying at a high-powered cruise at 4,500 ft in heavy rain.

British Gliding Association (BGA) guidance

Part 2 of Version 2 of the BGA Motor Glider Handbook, published in May 2018, contained information on flight procedures. This included the following sections:

> *'CARBURETTOR ICING*
>
> *Carburettor icing is a constant threat in the climate of Northern Europe. Therefore engine handling techniques including use of carburettor heat should be understood and used effectively.*
>
> *Use of carburettor heat before well before of* [sic] *starting descent, when engine airflow is high, can clear the carburettor venturi of any ice. Subsequent use of carburettor heat in descent is necessary but will be less effective. Setting power several hundred RPM above idle will help to keep the engine warm, and also better simulates the performance of modern gliders.*
>
> *Some MGs are not fitted with carburettor heaters, eg Fourniers, Rotax engine types. In this case, the intake air will be drawn from a warm area of the engine compartment. This does not make these engines immune from carburettor icing. It is still important to use enough power to keep the engine oil temperature above the manufacturers quoted minimum.*
>
> *The CAA publish a series of safely* [sic] *leaflets, one of which contains further useful information on avoiding engine icing.*
>
> *OPERATION AT MINIMUM HEIGHT*
>
> *MGs are frequently used to train glider pilots in the techniques of field landing and aerotow rope breaks. Although this training is invaluable, it should be remembered that it is still subject to the rules of the air. These rules do not prohibit flying below 500 feet AGL, but it is illegal to fly within a 500 foot 'bubble' containing persons, vessels and structures. Farm animals probably merit an even bigger separation distance.'*

This information was reinforced by the publication of a document entitled '*Conduct of Field Landing Training*' in July 2018 (Appendix 1).

BGA motor glider accident statistics

Prior to this accident, there had been 106 reports of motor glider accidents and incidents to the BGA since October 2007; two involving fatalities and four involving serious injuries. Of these, two had involved motor gliders carrying out field landing training where the aircraft had been unable to climb away. One was caused by the aircraft's inability to clear trees at the far end of the selected field after having descended to about 50 ft agl before commencing the go-around. This was due to the marked upslope of the field and the prevailing weather conditions. The other involved a Dimona TMG owed by the instructor, but being flown by a different instructor, which, having descended to about 100 ft agl, attempted to go around, but was forced to make a forced landing after the engine failed to respond. No cause for the lack of response could be established although carburettor icing was considered possible[5].

Analysis

Evidence from the accident site and examination of the wreckage identified that the aircraft's right wing contacted the dead tree at an approximate height of 57 ft agl. This will have caused the aircraft to yaw rapidly to the right, increasing the lift from the left wing. At the same time, there will have been a marked decrease in lift from the right wing due to the damage it experienced and this, together with the possible effects of entanglement in the tree, caused the aircraft to roll. It is likely that the aircraft rolled through approximately 180º before impacting the ground at a near vertical attitude.

Examination of the aircraft did not identify any anomalies that would have affected the aircraft's ability to be controlled, prior to the impact with the tree. Witnesses also describe the aircraft to be seemingly under control.

The data indicates nothing unusual during the initial part of the descent. The reduction in groundspeed to 48 kt (equivalent to an airspeed of approximately 53-58 kt) coincided with the turn onto the final approach, after which both airspeed and vertical speed fluctuate for the remainder of the flight. This might be explained by the student's lack of experience on the aircraft or his attempts to position the aircraft to make the field, had he been flying it at the time. It could also indicate a distraction within the cockpit whilst dealing with an aircraft issue.

Witness statements varied in the description of what was heard. The aircraft engine is normally quiet, especially at idle power, as was described by some witnesses. Other witnesses however described it as loud or that it was misfiring or spluttering. Examination of the engine did not reveal any problems. There was fuel onboard and the small traces of automotive gasoline present would not have affected the operation of the engine. The nature of the damage to the propeller and the distance the propeller tip was thrown from the main wreckage also indicate the engine was producing considerable power at the time of the accident.

The ambient conditions were conducive to severe carburettor icing for an engine at idle power, although the information provided by the manufacturer suggests that the Grob G109B is less susceptible to this occurring. Had carburettor heating been selected during the descent then carburettor icing would have been even less likely to occur.

There is evidence that carburettor heating was selected at the time of the impact. It may have been selected for the duration of the descent, although it should normally have been returned to the COLD position at the point engine power was increased to climb away, to ensure full power was available. It is possible that carburettor heating had not initially been

Footnote

5 AAIB Accident Report Reference EW/G85/08/08.

selected, allowing ice to restrict the flow of air into the engine. Had the carburettor heat then been subsequently selected ON later during the exercise then it may be that the engine was only able to increase power just before the point of the impact with the tree.

BGA guidance recommends maintaining a small amount of power during the descent to both keep the engine warm and to simulate a normal glider's performance. It also recommends carrying out occasional power checks during the exercise and describes this as essential around the base leg to ensure the engine still responds. The descriptions provided by other instructors at the gliding club and the student who flew the field landing exercise on 2 June 2018 suggest that the instructor was likely to have flown the exercise with the engine at idle power.

Whilst it was reported that it was not unusual during a field landing exercise to fly as low as 40 ft agl before climbing away, the data from the flight flown on 2 June 2018 showed that the instructor climbed away from a height of 350 ft agl. The instructor and student should have been aware of the low flying regulations.

The Standardised European Rules of the Air rule 5005(f) states that:

> *'Except when necessary for take-off and landing, or except by permission from the competent authority, a VFR flight may not be flown:*
>
> > *(2) […] at a height less than 150m (500ft) above the ground or water, or 150m (500ft) above the highest obstacle within a radius of 150m (500ft) of the aircraft.'*

The relevant element of CAA ORS-4 No.1174 states that:

> *The Civil Aviation Authority permits, under SERA.3105, SERA.5005(f) and SERA.5015(b), an aircraft to fly below the heights specified in SERA.5005(f) and SERA.5015(b) if it is flying in accordance with normal aviation practice and:*
>
> *(b) practising approaches to forced landings other than at an aerodrome if it is not flown closer than 150 metres (500 feet) to any person, vessel, vehicle or structure.*

It is clear from witness statements and the flight data that the aircraft was below 500 ft agl during its final approach when it passed over, or near, two houses and their occupants. It is possible that this was intentional, or that there was an issue with the aircraft meaning they were unable to avoid the descent below 500 ft.

With the evidence available, it cannot be conclusively determined whether the instructor intentionally allowed the aircraft to descend as low as it did as part of the exercise, or whether this had happened because of an unknown engine issue; most likely carburettor icing. With either scenario the aircraft was able to make a landing in the field, yet the aircraft's right wing collided with the dead tree, despite there being an adequate gap to the left for the aircraft to pass between the trees on the perimeter of the field. The dead tree was considerably less conspicuous than the live trees on either side, whose presence may also have drawn the pilots' attention away from the dead tree. The description of the aircraft banking away from the dead tree at the last moment indicates that one or both pilots saw it just before the collision. The collision was therefore probably due to the instructor and student not seeing the dead tree until it was too late, misjudging their distance from it or the engine failing to respond at the last moment when they expected to climb away and avoid impact.

Conclusion

It has not been possible to determine conclusively whether the aircraft was suffering from an engine problem, most likely carburettor icing, during the field landing exercise. The engine was however under power at the point it collided with the tree.

Irrespective of the presence of an engine problem, had the aircraft not collided with the tree it should have been able to carry out a landing in the field. It was considered that the collision was most likely due to the tree not being seen by the pilots until it was too late to avoid it.

Safety action

The BGA publication on 11 July 2018 in response to this and previous field landing accidents emphasises well the main hazards and precautions required in conducting field landing training.

Appendix 1: Conduct of Field Landing Training - BGA 11 July 2018

CONDUCT OF FIELD LANDING TRAINING

Introduction

Recent discussions and events have highlighted a need for more guidance on the way that field landing training is carried out in motor gliders (MGs). This is in addition to the advice given in the BGA Motor Glider Handbook (MGH), which will be amended in due course. While realism is desirable in any training context, the overriding consideration should always be the safety and legality of the flight. This paper will discuss how to achieve the balance between these sometime conflicting requirements.

Legality

The Rules of the Air State that aircraft should not fly closer than 500' to any person, structure, vehicle, or vessel, unless landing or taking off normally. It does not say the aircraft should stay above 500' at all times. Field landing training, and indeed simulated engine failure after take-off, does not qualify as normal aircraft operation and is therefore subject to the rule. It is worth noting that if an aircraft goes below 500' in an apparently remote area, and a person out of sight behind a hedge is approached within 500', the aircraft captain is liable to prosecution. If animals are present in the area, they may be frightened by the sudden appearance of a MG even if it is above 500'. This in turn may give a landowner reason to start legal action.

Engine Handling

Most MGs do not have the safety of twin magnetos or electronic ignition. All suffer to some degree from carburettor icing, whether or not they are fitted with a carburettor heater. Before even starting a descent, instructors should ensure that the carburettor is clear of ice by early use of the carburettor heater, and that the oil temperature is well above the minimum specified by the manufacturer. The carburettor heater should be used throughout the descent, and oil temperature monitored. A small amount of power should be continually used to keep the engine warm and to simulate the performance of the glider. An occasional application of full power will ensure a response is available. This response check is essential around the base leg. If the engine does not behave normally at this point, the exercise should be terminated and the instructor should land in the chosen field. The go around must be planned in such a way that an engine failure on climb out also results in a successful field landing.

Threat and Error Management

Field landing in gliders always carries a higher risk than landing on an airfield. Training for field landing in MGs carries a similar, but often higher risk factor as there are more things to consider for an instructor, and more opportunities to make mistakes. Risk increases exponentially as height is lost, particularly if the exercise is continued below 500'. A normal glider circuit descends through 500' somewhere between low key and base leg. As soon as the base leg is commenced, it should be obvious to both instructor and student whether the approach will be successful, so there is very little reason to continue lower, into the high-risk area. EVEN WHERE LEGAL, LOW APPROACHES CARRY TOO HIGH A RISK TO BE JUSTIFIED ON TRAINING GROUNDS. If a student cannot successfully fly the approach, the airfield is the right environment for remedial action. With more experienced pilots practicing field approaches, the exercise can usually be abandoned at low key, or earlier as the selection is likely to be the major learning point for them.

The Future

Much of our field landing training is carried out by MGIR instructors, who, provided they maintain their gliding Full Rating and licence privileges (inc any refresher training/checks), are not additionally checked as instructors in MGs. This system was adopted a number of years ago in the expectation that Part-FCL would be in place by now. As Part-FCL adoption is still nearly 2 years away, it is probable that the BGA will reintroduce a checking system for MGIR instructors sooner. In the short term, examiners using a MG for 5 yearly refreshers of MGIR qualified instructors, or FI SLMG/TMG revalidation, should require the candidate to teach field landing as a primary or secondary exercise. Further ahead, the MGH will be rewritten to encompass the best advice possible for MG instructors.

Conclusion

The MG accident rate has been too high for several years. Many of these accidents involve propeller strikes, all of which are unnecessary, but are not life threatening. Recently however, there has been an increase in serious accidents, none of which have been shown to have technical causes, but all potentially include issues of threat and error management, particularly at low altitude. A more considered approach to field landing training is essential if the gliding is to retain the independence to train and assess our pilots safely, and without overly restrictive regulation.

11 July 2018

Published 20 June 2019.

Bulletin Correction

The information in the paragraph on page 32, detailing the Standardised European Rules of the Air rule 5005(f) provided by the CAA, has been revised and a paragraph has been inserted following the original boxed quote. The section now reads:

The Standardised European Rules of the Air rule 5005(f) states that:

'Except when necessary for take-off and landing, or except by permission from the competent authority, a VFR flight may not be flown:

(2) […] at a height less than 150m (500ft) above the ground or water, or 150m (500ft) above the highest obstacle within a radius of 150m (500ft) of the aircraft.'

The relevant element of CAA ORS-4 No.1174 states that:

The Civil Aviation Authority permits, under SERA.3105, SERA.5005(f) and SERA.5015(b), an aircraft to fly below the heights specified in SERA.5005(f) and SERA.5015(b) if it is flying in accordance with normal aviation practice and:

(b) practising approaches to forced landings other than at an aerodrome if it is not flown closer than 150 metres (500 feet) to any person, vessel, vehicle or structure.

The online version of the report was amended on 13 February 2020 and a correction will also appear in the March 2020 Bulletin.