

ACCIDENT

Aircraft Type and Registration:	Aerotechnik EV-97 Eurostar, G-CCKK	
No & Type of Engines:	1 Rotax 912-UL piston engine	
Year of Manufacture:	2003	
Date & Time (UTC):	15 June 2005 at 1802 hrs	
Location:	Near Wotton-under-Edge, Gloucestershire	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - 1
Injuries:	Crew - 1 (Fatal)	Passengers - 1 (Fatal)
Nature of Damage:	Aircraft destroyed	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	48 years	
Commander's Flying Experience:	321 hours (of which 129 were on type) Last 90 days - 22 hours Last 28 days - 7 hours	
Information Source:	AAIB Field Investigation	

Synopsis

The aircraft was being flown from Shobdon Airfield in Herefordshire to its home base at Hullavington Airfield in Wiltshire. As the aircraft approached the Cotswold Hills the pilot encountered worsening weather conditions. The aircraft diverted from track in an apparent attempt to avoid the poorest weather; it was seen manoeuvring at a very low height and appeared to be preparing for a forced landing. During this manoeuvring the aircraft was seen to roll quickly to its left and descend steeply until it struck the ground. The investigation concluded that the aircraft had suffered an aerodynamic stall with insufficient height for the pilot to effect a recovery. No safety recommendations are made.

History of flight

On the evening of the accident the pilot had flown from Hullavington Airfield, where the aircraft was kept, to Shobdon Airfield in Herefordshire. The pilot was accompanied by a friend with whom he had flown on a number of occasions. The pilot's flight log, which was recovered from the aircraft, recorded his take-off time as 1550 hrs. Hullavington is an uncontrolled airfield situated beneath the western edge of the RAF Lyneham Control Area and a standing agreement was in place for the pilot to notify RAF Lyneham ATC by radio of his movements into or out of Hullavington. However, there was no record of the pilot having done so on this occasion. There was also an agreement that the pilot would telephone the Army operations centre at Hullavington with his intentions prior to flight, though again no such call was made.

The direct flight to Shobdon is a distance of 51 nm, and the pilot recorded landing there at 1630 hrs. As the aircraft was taxiing after landing, the pilot was asked if he required fuel and he said that he did not. The pilot 'booked in' at the flying club operations room at 1640 hrs, at the same time he notified an intended departure time of 1700 hrs. Both the pilot and his passenger appeared to personnel at Shobdon to be relaxed and in good spirits and they took time to have a meal and a hot drink in the restaurant before leaving for the return journey. Both made mobile telephone calls to relatives, though neither made any relevant comments about the flight to Shobdon or the proposed return journey. The latest weather information was available on a notice board in the club building but staff could not recall if the pilot checked this information. Pre-flight preparations at the aircraft were not witnessed but the airfield manager saw the aircraft take off. He recalled that there was a cloud base of between 1,200 ft and 1,500 ft with good visibility.

Other than the take-off time, which the pilot recorded on his log as 1725 hrs, there was no recorded information available to assist with a reconstruction of the accident flight between takeoff and the point at which the aircraft was observed by eye witnesses just prior to the accident. Radar recordings from Clee Hill and Burrington radars were analysed but the aircraft, which was not transponder equipped, was not displayed. During the radar analysis, it was noted that the lowest primary radar returns that had been obtained along the route from any aircraft were in the Shobdon area, for an aircraft reported to be at 2,300 ft altitude. Enquiries at airfields and ATC units along the route from Shobdon to Hullavington established that there was no record of the pilot having been in radio contact with any of them, nor was there any requirement for him to have made such contact. It was also established, from mobile telephone records, that the only calls made prior to the accident by either the pilot

or his passenger were those made whilst the aircraft was on the ground at Shobdon.

The aircraft was seen in the accident area by witnesses on an adjacent golf course. The accident site was some 10 nm from the pilot's destination at Hullavington. The aircraft was seen flying low in poor weather and manoeuvring in a manner which suggested to some witnesses that the pilot was seeking a place to land. During this manoeuvring, the aircraft was seen to roll quickly to the left and descend rapidly in a nose-low attitude, disappearing behind trees before it struck the ground. The two occupants were fatally injured in the impact.

Witness information

Eye witnesses to the final moments of the flight were on the Cotswold Edge golf course, situated on the edge of the Cotswold escarpment overlooking the village of Wotton-under-Edge to the west and the Severn Vale beyond. The course lies approximately north-east / south-west with a marked down slope from an elevation of 795 ft at its north-eastern end to 700 ft at the south-western end. The accident site was at an elevation of 630 ft, about 250 m from the south-western end of the course.

The two witnesses closest to the accident site were towards the lower part of the course. It had been raining heavily but this had become a light drizzle. There had been low cloud as they descended the slope, and on looking back up the slope they could see mist settling on the higher part of the course. At the same time, conditions were brighter towards the west, and it was possible to see down the hillside towards Wotton-under-Edge and the Severn Vale. The golfers remarked at the time that the weather was changeable.

They were first alerted to the aircraft's presence by the sound of its engine behind them. Although the noise was not loud, it suggested to them that the aircraft was both close and low. They turned to look back down the slope and saw the aircraft emerge from cloud or mist at a very low height and in level flight or a shallow descent. As they watched, the aircraft flew in a north-westerly direction from their left to right, about 300 m away, close to the south-western boundary of the golf course and then appeared to enter a controlled, moderate turn to its left, away from them. The aircraft initially appeared to be maintaining altitude as it turned through about 270 degrees until it was heading back directly towards the fairway and the two witnesses. Their impression was that the aircraft was preparing to land on the fairway; one witness described the aircraft as slowing down noticeably during the latter stages of the turn and appearing to commence a descent. When the aircraft was pointing towards them it rolled wings level for a brief period but then started to roll again to the left, in a manner described by the witnesses as "*sudden*" and "*violent*". As the aircraft rolled, it turned away from the witnesses and its nose dropped until it was in a near vertical descent. Both witnesses described seeing the underside of the aircraft during its final steep descent, though the actual impact was hidden from their view by a line of trees.

One of the witnesses alerted the emergency services by mobile telephone as they ran to where the aircraft had crashed. Whilst still some distance from the accident site, the witnesses noticed a strong smell of fuel. They continued to the aircraft, but it was clear that they were unable to help the two occupants. The witnesses continued to pass information to the emergency operator but were advised to move away from the aircraft for their own safety. The fire brigade was the first of the emergency services to arrive, and was directed from the main road to the accident site by one of the witnesses.

Neither witness described any sounds of misfiring from the engine. One witness thought that there had been a change in engine note as the aircraft appeared to slow down during its turn, and the other noticed some changes in note but thought they may have been because the aircraft was turning. When the aircraft disappeared from view in its final descent, both witnesses perceived a brief period of silence before the sound of impact, but thought this was more likely due to the sound being blanked by the trees. Both witnesses agreed that the aircraft had remained very low during its manoeuvring, and that it had not re-entered cloud.

Two further witnesses on the golf course saw the aircraft. They were a little way up the slope from the two previous witnesses but described the weather as misty and noted that from their position it was not possible to see down towards the valley. Both witnesses described seeing the aircraft appearing at a very low altitude but lost sight of it before the final descent as it appeared to fly back into the mist. Both the witnesses heard the engine noise reduce as the aircraft turned away from them, though neither of them saw any of the final manoeuvring or the descent into the ground.

Wreckage examination

Initial examination of the wreckage indicated that the aircraft had struck the ground in a steep nose-down and slightly right wing down attitude, but at a relatively low forward speed. At the time of the accident the aircraft was structurally complete but initial assessment indicated that the engine appeared to have been producing no power. The fuel tank contained a significant amount of fuel.

The wreckage was removed to the AAIB's facility at Farnborough, where a more detailed examination was carried out. No evidence was found of any pre-impact

failure of the aircraft or its flying controls. A separate examination of the engine revealed that there was no pre-impact mechanical defect in the unit, the two ignition systems were able to perform satisfactorily and the carburettor float chambers contained significant amounts of fuel.

It was determined from a detailed internal examination of the propeller reduction gear that the engine had been producing power at impact, although the amount of power could not be determined. (Unlike more common types of light aircraft engine, at all but high speeds, this type of geared unit will not 'windmill' if the engine ceases to develop power.)

It was noted that the airspeed indicator body was intact, the glass unbroken and the needle was registering slightly above zero. Calibration showed that the instrument had a fairly constant datum shift present throughout the speed range. It was concluded that this datum shift was consistent with the effect of impact forces on the internal mechanism.

Aircraft information

The EV-97 aircraft type was developed in the Czech Republic and supplied in kit form by the manufacturers to enable it to be completed by the customer. The design was evaluated by the Popular Flying Association (PFA), a British based member's organisation which works in accordance with powers delegated by the Civil Aviation Authority (CAA). As a result of this evaluation it was approved for amateur construction and operation in the United Kingdom. Additionally, an example of the type was test flown by a CAA test pilot and judged to have normal handling qualities which met the requirements laid down many years earlier, by the Authority, for very light aircraft.

The process of inspection, test flying and recommendation for issue of the Permit to Fly document for individual aircraft in this category, when amateur built from a kit, is administered and supervised by the PFA. This procedure was followed in the case of G-CCKK, which qualified as a microlight type by virtue of its maximum all-up weight and stalling speed falling below maxima specified in the relevant regulations. The aircraft was not equipped with any gyro flight instruments. More comprehensively equipped examples of the aircraft have been built having higher empty weights resulting in them being certificated as conventional light aircraft.

G-CCKK was completed by the owner and a number of associates in 2003 and was independently inspected during, and at the end of, the construction process by an experienced inspector approved by the PFA. Thereafter he test flew the finished aircraft. He confirmed that it performed and handled in the expected manner. The aircraft was then issued with a Permit to Fly by the CAA on the recommendation of the PFA. The Permit was revalidated on 5 November 2004 following a detailed inspection and flight test.

This aircraft was fitted with a Rotax 912 liquid cooled engine equipped with a carburettor heating system. This heating system consists of a cast water jacket type heat exchanger, supplied from the engine cooling system, surrounding the downstream end of the air passage within the carburettor. The heat exchanger is positioned adjacent to the plane of the throttle butterfly on this installation and is intended to ensure that the internal surfaces of the carburettor remain at temperatures above freezing during all phases of flight. The system is not selectable and is, therefore, always active. It does not heat the induction charge appreciably and, unlike conventional carburettor heating systems, has minimal effect on the available power. The arrangement is understood to be

effective in all normal operational phases other than immediately after start-up, or those involving prolonged use of low power, when cooling of the water system occurs. Additionally, on EV-97 aircraft, the induction air is drawn from a region within the engine cowling near the radiator.

Meteorological information

An aftercast was obtained from the Meteorological Office. The synoptic situation at 1800 hrs on 15 June 2005 showed a moderate, moist, west-south-westerly airflow over west and south-west England. The weather was cloudy and overcast with outbreaks of generally slight rain or drizzle. The surface visibility was 15 to 20 km but deteriorating to between 4,000 m and 7 km in slight rain or drizzle. Visibility was as low as 100 m where cloud covered high ground. The freezing level was at 10,000 ft. There would have been a scattered cloud cover at 1,500 ft to 2,000 ft, with a more extensive cloud cover beginning at 3,000 ft to 5,000 ft.

With sea temperature in the Bristol Channel of 13°C to 14°C, and a moist airflow from that direction, it is likely that the cloud base would have lowered in outbreaks of slight rain or drizzle to between 900 ft and 1,200 ft, possibly even as low as 300 ft to 500 ft as a result of stratus forming over the high ground. At 1,000 ft the air temperature was 12.4°C and dew point 9.9°C, giving a humidity of 85%. These values placed the conditions during the flight within the area for serious risk of engine induction system icing, according to the widely used chart of probability of induction icing in typical light aircraft.

An indication of the extent of the weather deterioration that evening can be gained from the weather reports from RAF Lyneham, which is some 5 nm from Hullavington, and 15 nm from the accident site. At 1550 hrs, the time

the aircraft departed from Hullavington, RAF Lyneham reported good visibility with the lowest cloud beginning at 3,000 ft. By 1750 hrs, Lyneham was being affected by drizzle, with visibility reduced to 7 km and a lowest cloud base that had reduced to 1,000 ft. The 1850 hrs report showed a visibility of 4,000 m in drizzle, temporarily reducing to 3,000 m, with the cloud base starting at 400 ft and with increased cloud cover at 700 ft.

The commander of the police helicopter, which arrived at the scene about 30 minutes after the accident, was able to provide a detailed account of the weather conditions at that time. The helicopter took off from Bristol Airport and the transit was made in generally good conditions, with a cloud base of around 3,000 ft. However, as it approached the Cotswold escarpment and the accident site, the commander encountered a “*vertical face of cloud*” with layered stratus cloud and hill fog where it met the ground. The helicopter reached the accident site with some difficulty; the cloud base was estimated to be between 100 ft and 200 ft above ground level with a visibility of 500 m or 600 m.

Meteorological flight planning

Some meteorological paperwork was recovered from the pilot's home. The information consisted of a Metform 214, which showed forecast spot winds and temperatures over the United Kingdom. The time for this forecast was 0900 hrs, with a validity period of 0600 hrs to 1200 hrs, and thus did not cover the period of the intended flight. No Metform 215, which shows the forecast in-flight weather conditions for the UK, or any other weather information was found at the pilot's home, among his personal effects or in the aircraft wreckage. Although no printed information was recovered for the period of the accident flight, it was not possible to determine whether or not the pilot had viewed this information before leaving home.

Forecast information for 1500 hrs, with a validity between 1200 hrs and 1800 hrs, would have been available from 1100 hrs. The content of the forecasts for 0600 hrs to 1200 hrs and 1200 hrs to 1800 hrs is summarised below:

Forecast for 0900, issued at 0301 and valid between 0600 hrs and 1200 hrs

An occluded front was shown, which had just moved across the area at a speed of 30 kt. The area associated with the front showed generally broken to overcast cloud beginning at 2,500 ft amsl with a visibility of 15 km. Occasionally the visibility would reduce to 7 km in rain, and the cloud base to between 1,000 ft and 1,500 ft amsl. In isolated areas over the sea and near coasts, conditions would be worse, with 2,000 m in drizzle and cloud beginning at 400 ft. The area associated with the occluded front was subject to isolated heavy showers and thunderstorms, with associated low cloud and visibility.

The area behind the frontal zone, which would be expected to be affecting the area of the flight later in the day, showed generally good visibility, with broken to overcast cloud beginning at 2,500 ft amsl. In isolated areas over land, this was forecast to reduce to 7 km visibility in rain showers and the cloud base to lower to 1,500 ft.

For both forecast areas, the following relevant warnings applied: *“Cloud on hills, moderate ice and turbulence in cloud.”*

Forecast for 1500, issued at 0905 and valid between 1200 hrs and 1800 hrs

This forecast would have been available from 1100 hrs on the day of the accident. In this forecast, the occluded front was shown clear of the Cotswolds but with its northern end shown swinging back south, affecting Wales and western England. The weather conditions associated

with the front were broadly similar to the previous forecast. The forecast for the rest of the south-west, including the accident area, was similar to the previous report, except that increased lower cloud was forecast, associated with isolated rain showers. In these areas, the cloud base was forecast to lower to 800 ft amsl. Again, both sectors had the warning *“Cloud on hills, moderate ice and turbulence in cloud.”*

Visual Flight Rules (VFR)

Because G-CCKK was not equipped with gyroscopic flight instruments, it was restricted to flight under VFR only. The minimum weather conditions for flight under VFR depend on an aircraft's altitude and speed, as well as the category of airspace in which it is flying. In the case of G-CCKK, the pilot would have been required to keep his aircraft clear of cloud and in sight of the surface, and in a flight visibility of at least 1,500 m.

Medical and pathological information

A post-mortem examination was conducted on both the pilot and passenger. There was no evidence of any pre-existing disease, alcohol, drug or toxic substance which might have caused or contributed to the accident. Both occupants suffered fatal injuries, when the aircraft struck the ground.

Recorded information

Three GPS systems were recovered from the wreckage. One was a conventional GPS receiver which was not powered and thus not in use. The other two units were near identical Pocket PC units with GPS software. Both these units had suffered damage in the accident and attempts to recover track data from the units were unsuccessful. Information recovered from the pilot's home indicated that only one GPS route between Hullavington and Shobdon was stored in one or more of the units' memories, and this was a direct track between the two airfields.

Pilot information

The pilot had gained his Private Pilot's Licence (Aeroplanes) in 1998. In 2001 he completed construction of a Rans S6 aircraft, in which he flew 61 hours before the aircraft was destroyed in a take-off accident in 2002, from which the pilot escaped with minor injuries. The pilot then started to build G-CCKK, completing the aircraft in November 2003. Apart from a trial helicopter lesson, he had flown this aircraft exclusively since that date, accumulating a total of 122 hours in it.

On the day of the accident, the pilot had been working at his home, a few miles from Hullavington Airfield. The pilot's decision to go flying that day was a relatively late one, made either on the day of the accident or the evening before, and had been made after discussion with his passenger. During that day, the pilot had been working at home with a family member, who recalled that the weather there seemed reasonable and with some sunny periods, although it was changeable. The passenger arrived at the pilot's home at about 1500 hrs; the family member left the house at about 1510 hrs and, therefore, did not witness the pilot's final actions before he and his passenger left for Hullavington.

The pilot was known to have discussed with friends the implications of encountering bad weather whilst airborne. He had stated that, if he encountered weather conditions that were too bad to continue, he would be quite prepared to land his aircraft in a field. He was of the opinion that, as his aircraft was capable of quite slow flight, this could be accomplished at little notice and without undue difficulty.

Although many local flights were recorded in the pilot's flying logbook, he would frequently plan to land away at another airfield, and Shobdon was his most frequent destination. Information from passengers who had flown

with the pilot indicated that he used the GPS map display as a primary navigation aid, but would also always have an aeronautical chart to hand. Several charts were recovered from the wreckage, including one which had direct line routes to some of the pilot's usual destinations marked on it. Apart from basic timing information, no other information was recorded on these charts. The pilot's flight log, which was of a home made type, was also recovered from the aircraft. Apart from take-off and landing times and altimeter settings, there was no other weather or navigational data recorded on the log.

Analysis

The decision to undertake the flights had been made a relatively short time beforehand. The fact that the passenger was also the pilot's long time friend may have made him feel obliged to make the flights. The flights were later in the day than the pilot had normally made. In the 18 months that he had been flying this aircraft, the pilot had only twice returned to his home airfield after 1800 hrs local time; the accident flight would have been due to return at about 1900 hrs local time. Whether the relatively late take-off time was due to other commitments, on the part of the passenger or the pilot, is uncertain, but it may have placed some time pressure on the pilot. This is supported by the lack of notification to the airfield authorities and the absence of any navigational calculations on his flight log. It is reasonably certain that the pilot had intended to fly to Shobdon from the outset, as a self-produced airfield guide was found at his house, together with the meteorological information.

Although only one part of the forecast (Metform 214) was recovered, it is probable that the pilot viewed Metform 215 on the internet at the same time, even if he did not print it. What is uncertain is whether he viewed an updated forecast, as the one found was only valid until 1200 hrs on the day of the accident. The decision to

fly to Shobdon suggests that he may not have, since the forecast for 1500 hrs, which was valid between 1200 hrs and 1800 hrs showed a region of frontal weather moving across Wales towards the Shobdon area. Had the pilot seen this forecast he might be expected to have chosen to fly to another of his regular destinations, less likely to have been affected by the frontal weather. Additionally, the later forecast showed an increased risk of low cloud affecting the higher ground between Hullavington and Shobdon. The relative, who was at home with the pilot during the afternoon, did not recall him doing anything obviously connected with flight preparation. As the later forecast was only available from 1200 hrs local time, it is possible that the pilot did not obtain a weather update after that time.

The briefing chartlets associated with Metform 215 are of small scale and cannot be expected to reflect local weather effects or influences. The direct route from Hullavington to Shobdon, which the pilot had flown several times, ran close to the accident site and over the steep escarpment which forms the western edge of the Cotswolds in this area. The pilot had flown in this area since gaining his pilot's licence so it is reasonable to expect him to have been aware of the potential for localised poorer weather in the vicinity of the Cotswold Edge, particularly when a moist south-westerly airflow prevailed, and the forecast contained the warning '*cloud on hills*'.

The weather report from RAF Lyneham at 1550 hrs showed that, when the pilot departed from Hullavington, the weather was reasonable. As subsequent weather reports from Lyneham reflected, the weather steadily deteriorated after the aircraft had taken off, and continued to do so until after the accident. This deterioration also affected the accident area, as indicated by the Police helicopter pilot's report.

The weather conditions at the accident location, when viewed in conjunction with the generally accepted chart of probability of carburettor icing in typical light aircraft induction systems, were conducive to ice formation at cruise power. It should be noted, however, that the chart data relates to conventional air cooled engines operating with their induction heating systems set to 'cold'. The carburettors and induction system of the Rotax engine installed in G-CCKK were substantially different in design from those for which the accepted induction icing chart data is relevant in that the induction system in this aircraft incorporated a heat exchanger designed to prevent ice from adhering to the internal surfaces of the carburettor, provided the engine cooling water remained hot.

Thus, although the meteorological conditions quoted in the after-cast were conducive to carburettor icing on conventional light aircraft, they almost certainly had no effect on the engine operation of this machine during the cruise. It is also not thought that any descent would have been sufficiently prolonged to create low coolant temperature conditions which might permit significant icing build up. The aircraft was observed and heard to be manoeuvring under power. The engine sounded to witnesses to be running normally and the engine was running at impact. As significant induction icing will result in not only power loss at low throttle openings but also stoppage of the propeller at low flight speeds, for which there was no evidence, there is little possibility that the engine suffered to any significant degree from the effects of induction icing during the period immediately before the crash.

The actual route the pilot took for the flight to Shobdon is not known. The GPS is believed to have contained a direct route to Shobdon, and it was a direct route that was marked on the pilot's aeronautical chart.

Additionally, the times of takeoff and landing of the flight from Hullavington to Shobdon indicate that he flew a reasonably direct route. This would have taken the aircraft over terrain with an approximate elevation of 800 ft amsl, close to the area where the accident later occurred. It would be expected that he may have encountered some poorer weather in this region of high ground on the flight to Shobdon though, if he did, he was obviously able to negotiate it on that occasion.

If the weather had caused the pilot or his passenger concern, they did not show this whilst at Shobdon. Had he been concerned, the pilot would almost certainly have been keen to depart earlier on the return journey in case the weather deteriorated further. Although the pilot did intend to return to Hullavington straight away, as evidenced by the departure time that he entered in the operations log when they arrived at Shobdon; the two men in fact stayed for a meal. The relaxed, unhurried demeanour of the two men would appear to indicate that the pilot had no particular concern regarding the weather they were likely to encounter during their return flight. This suggested that either there was no poor weather in the accident area on the outbound journey, or the pilot was able to negotiate successfully the weather he had encountered. Whichever was the case, the pilot's expectation would appear to have been that a route back through the area would be possible without undue difficulty, and this may have influenced the pilot's decision to continue in the face of the worsening weather when it was encountered on the return flight. The relatively late hour and the proximity of his home base may also have served to add some pressure on the pilot to continue in an attempt to find a way through the weather, rather than to deviate around it or to divert to an alternate airfield.

When first seen by eye witnesses in the accident area, the aircraft was travelling in a direction almost opposite to that of the track towards Hullavington. Clearly, the pilot had deviated from his intended plan and, in view of the weather at the time, it is probable that this was due solely to the worsening weather conditions. The most likely courses of action that the pilot would be expected to take would be to reverse his route to seek the better weather conditions from which he had come, or to seek a route down to lower ground. The two witnesses who saw the final moments of the flight stated that they could see down the hill to the valley beyond. This would appear to have offered the pilot an escape route from the bad weather and, if he had seen it, it is probable that he would have taken it. However, although the aircraft was clearly flying at a very low height, it was probably immediately below the cloud cover; witness evidence even suggests that the aircraft may have been in cloud intermittently. The pilot's forward visibility was likely to have been severely limited in this case and his concentration would have been on the ground close to the aircraft. That this was probably the case is supported by the fact that the two other golfers, only a short distance up the slope from the first two, were unable to see down the hill to the valley and generally reported worse conditions.

Faced with the weather conditions, and given his expressed intentions to land if caught in bad weather, it is likely that the pilot was indeed seeking a place to land his aircraft. However, such a manoeuvre is not without risk and in poor weather would be demanding for any pilot. Information from the witnesses suggest that the aircraft was slowing down as if preparing to make an approach, though it is quite possible that the pilot intended a landing not on the golf course, but in the field in which the accident occurred. The manoeuvring described by witnesses suggests the pilot was setting up an orbit around his chosen field whilst looking for hazards

that might affect a landing. This is the procedure that the pilot would have been taught during training. The lower cloud over the golf course would have precluded such an inspection, and the pilot would probably have been committed to a landing had he continued to fly towards the upward sloping ground of the fairway and into the lowering cloud base. However, the reducing speed and apparent descent seen by witnesses means that the possibility that the pilot was attempting to land on the golf course cannot be excluded.

Whilst turning, the aircraft would have lost airspeed had the pilot not countered this with increasing power, particularly if the turn was moderate, as described by the witnesses. Additionally, aircraft in this category have relatively low mass and therefore low inertia, and their drag causes them to slow down readily when power is reduced. Having found a landing place, the pilot would have been reluctant to take his eyes away from it in the poor visibility, and the natural tendency would be to reduce power and airspeed, both with a view to remaining close to the field and in preparation for landing. It is probable that the poor weather conditions and the need to land his aircraft served to distract the pilot from monitoring the aircraft's airspeed.

As the pilot sought to land the aircraft, his work load would have been considerable. As the aircraft speed reduced, it would have come closer to an aerodynamic stall. One of the warning signs of an approaching stall that a pilot learns during training is an excessively

nose-high attitude to maintain level flight but, in the poor visibility, the lack of a natural horizon to give this attitude information would have significantly reduced the impact of this visual cue. Witness information indicates that the aircraft may have started a descent just prior to the stall. Although this was interpreted as the beginning of an approach to the golf course, it may have been as a result of the reducing airspeed. If this were the case, the aircraft's attitude would not have been so nose-high, thus also serving to mask the approaching stall from the pilot.

Additionally, the sloping ground beneath and ahead of the pilot, as the aircraft turned to fly towards the golf course, could have induced an incorrect estimate of horizon location in the pilot's perception; a known phenomenon normally associated with difficulties when approaching sloping runways. The impact evidence from the accident site and the final manoeuvre described by witnesses are consistent with a 'wing drop' occurring at the stall and a subsequent departure from controlled flight.

Conclusion

The pilot encountered an area of worsening weather conditions over the rising ground of the Cotswold escarpment. The pilot deviated from his intended track to escape the weather but was unable to find a route to a clearer area. The pilot was probably preparing for a forced landing when the aircraft stalled and departed from controlled flight at a height from which recovery was not possible.