

ACCIDENT

Aircraft Type and Registration:	Gemini Flash IIA, G-MVSV	
No & Type of Engines:	1 Rotax 503 piston engine	
Year of Manufacture:	1989 (Serial no: 757-589-5-W550)	
Date & Time (UTC):	12 April 2012 at 1305 hrs	
Location:	Near Clackmannan, Scotland	
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:	None	
Commander's Age:	49	
Commander's Flying Experience:	Not known	
Information Source:	AAIB Field Investigation	

Synopsis

Immediately after takeoff, the weight-shift microlight entered a steep climb. The nose then dropped (probably as a result of a stall) and the aircraft struck the ground in a steep nose-down attitude. The owner piloting the aircraft was fatally injured. This was the owner's first flight in the aircraft and also his first solo flight. There was no evidence that the pilot had received any formal training prior to this attempt.

History of the flight

The owner mentioned to some friends that he would be flying his microlight from a field near Alloa, Scotland on 12 April 2012 and invited them to attend. Two of them arrived at the field. One of them had limited knowledge of aviation and the other was an experienced microlight pilot.

The aircraft was nearing the completion of the rigging process, with the wing already attached to the trike. The experienced pilot assisted the owner to complete the rigging and the owner then carried out an inspection of the aircraft using the pre-flight checklist contained in the operating manual.

Having prepared the aircraft, the experienced pilot taxied it from the small paddock, where it had been rigged, into the large field from which it was intended to operate. The pilot climbed out of the trike and discussed with the owner aspects of the flight to be performed. The engine, which had been idling, stopped, but the owner indicated that this was not unusual when it was not properly warmed up. The owner donned a one piece suit, a protective helmet and secured himself into the trike seat. The experienced pilot pulled the

starting handle for the owner and the engine started. The owner taxied the aircraft around the edge of the field, and lined up facing the south-east diagonal of the field, which was the takeoff run proposed by the experienced pilot.

Power was increased but not sufficiently to take off, and the aircraft accelerated to a fast taxi speed. After it stopped the experienced pilot explained to the owner that he would need full power to become airborne. The owner responded that he was just carrying out a fast taxi and then taxied back to the downwind end of the field. The weather was good with a light, 5 kt wind from the south east. The owner increased the power to a high power setting and the microlight accelerated across the field but veered slightly left of the intended takeoff path. It became airborne and pitched nose-up; this attitude increased rapidly to a very steep climb. The power was then heard to reduce and the nose dropped rapidly. The power then increased and the aircraft struck the ground, nose first. The owner was fatally injured.

Owner's background and flying experience

The owner had not joined a microlight club and no record was found of his having attended any formal flying training course. He did not have a medical declaration, which is required prior to flying solo in a microlight. A pilot stated that he had flown with the owner on one occasion, but the owner was a passenger and did not operate the aircraft. This was prior to the owner purchasing G-MVSV. There was some anecdotal evidence that the owner had taken lessons, but the provider was not traced and it is not known how many lessons were undertaken or if the person delivering them was a qualified instructor. Documentation belonging to the owner was subsequently found that contained the aircraft manuals, together with ground school course notes, including sections on performance and meteorology.

Takeoff technique

The Aircraft Manual provides the following information regarding takeoff:

'Take Off

Take offs are straight forward and the wing will lift the weight and hence fly when the correct airspeed is reached. The correct technique is to hold the wing back slightly during the initial stages of the take off run so as to reduce the drag and increase the acceleration. At around 20 mph, allow the bar to move forward, and as the aircraft accelerates push forwards slightly until the aircraft un-sticks. The trike unit will swing forward under the wing, and a wise pilot will hold the aircraft climb rate down until a safe climb out speed is reached. Never, ever, push the bar full out holding it there as the aircraft claws its way skywards. Climbing on the propeller this way is inefficient, indicative of poor-piloting technique and very dangerous in the event of turbulence or engine failure'

The Aircraft Manual gives the stall speed as 22–24 kt depending on aircraft all-up weight with a height loss of 80-90 ft during recovery.

Pathological and medical information

A post-mortem examination was carried out which established that the pilot had died of multiple injuries sustained as a result of the accident. The pathologist reported that there was no evidence of drugs or alcohol having been consumed or natural disease which could have contributed to the accident.

Accident site details

The field that was being used as an airstrip consisted of an area of pasture bordered by a post and wire fence, giving an essentially rectangular layout. The length of the rectangle was approximately 225 m, with the southeast-facing diagonal providing some additional distance available for use as a runway. The ground was firm, with short grass, although there was a small, poorly drained area in the centre of the field in which standing water was visible.

The trailer on which the aircraft had been transported was found in the adjacent paddock. Additional items were found nearby, including cleaning equipment, a full fuel can and the aircraft manufacturer's instruction manual, which was open at the 'aircraft rigging' and 'pre-flight inspection' pages.

On site investigation

A number of tyre tracks were visible, where the aircraft had been taxied around prior to the flight. In addition there was a straight set of tracks that was considered most likely to have been made on the takeoff run. These originated in the northern corner of the field and curved onto a track of approximately 128°M, which would have been predominantly into wind. The tracks became increasingly difficult to discern, with the nosewheel being the first to disappear completely. No tracks were visible after approximately 110 m from the estimated start of the takeoff roll; this was before the area of standing water in the centre of the field had been reached. The aircraft had come to rest approximately 100 m beyond the estimated lift-off point.

It was apparent that the aircraft had struck the ground in a steep, nose-down attitude, banked to the right. The main impact had been borne by the nose of the trike, shattering the fibreglass nose of the fairing and causing

extensive disruption to all the structural members of the trike. This had allowed the propeller to contact parts of the landing gear struts, causing substantial damage to the propeller blades, with one of the tips becoming detached and thrown several metres beyond the main wreckage. The degree of damage suggested that the engine was developing power at impact. The right wing leading edge spar had bowed such that the right wing had partially inverted after it had struck the ground, with part of the trike, including the engine, having come to rest on its underside.

After the accident, fuel was reportedly leaking around the engine and the emergency services had applied clamps to the fuel feed and vent lines that were connected to the fuel tank in the rear of the trike. The tank was subsequently found to contain nearly 4 litres of fuel. Witness information indicated that the total contents had been around 7 litres before the accident.

The right wing leading edge spar had broken close to the apex which, together with some general distortion to the leading edge, was indicative of the right wing's impact with the ground. The fabric of the wing had remained largely intact and there was no evidence of pre-impact damage, such as tears. All the wing battens, which give the wing its cambered shape, were in place.

The aircraft manufacturer recommends that ballast be carried on the rear seat when flying this aircraft solo. No ballast was observed on the rear seat or found after the accident.

History of the aircraft

The aircraft had been owned by a pilot in Yorkshire for most of its life. It was kept under cover and the available records indicate that the Permit to Fly was most recently renewed on 29 April 2008 which, according to the aircraft's log book, was the last time

it flew. It was sold in late summer of 2011. The new owner did not renew the Permit and, when his personal circumstances suddenly changed approximately one month later, he decided to sell the aircraft on. This resulted in the person who was subsequently involved in the accident acquiring the aircraft during the autumn of 2011. The two ownership changes were not notified to the Civil Aviation Authority, who de-registered the aircraft in December 2011.

Detailed examination of the aircraft

It was noted that all but one of the rigging wires had remained intact. The exception was a pitch control cable, running between the right hand end of the 'A' frame control bar to the rear of the wing keel. The cable was encased in a red plastic sheath and appeared to have been cut: a fragment of the sheathing material was found on a piece of propeller blade, indicating that the cable had been severed by the propeller during the impact sequence.

The front strut, which connected the top of the monopole to the front end of the trike keel beam, was made up of three sections that were pinned together. It was found to have broken at the top and at the junction of the central and lower sections. The fractures were consistent with having occurred at impact. A secondary loadpath was provided by a cable within the strut, with integral eye ends that engaged with the same pins that joined the strut sections together. This was a modification introduced to preserve a measure of structural integrity in the event of the strut breaking as a result of a violent contact with the control bar, such as has occurred in aircraft 'tumbling' events. It was found that the lower section of cable was not connected to the centre section, in that the connecting pin, although correctly securing the strut sections, did not pass through the cable eye end.

Elsewhere on the aircraft, it was noted that the trike was suspended, via its mounting block, from the central of three available holes in the wing keel beam, thereby giving the most neutral of trim settings. The adjustable wing tip sections had five settings that controlled the tip incidence and hence the washout angles. It was observed that the right hand tip was set at the No 4 position, which was one stop from the maximum incidence, while the left tip was found to be at the No 2 position, ie one stop from the minimum incidence angle. In fact this position corresponded to the manufacturer's neutral setting, and was marked as such.

The leech lines rigging adjustment controlled the tension in the wires running between the top of the king post and the wing trailing edge. This was found to be at the lowest tension setting, which is the least stable in terms of wing pitching moment. However, all the adjustments described above are permitted by the aircraft manufacturer.

Finally, the wing battens, which consist of specifically profiled alloy tubes that give the wing its upper and lower surface shape, were examined and compared with the manufacturer's drawings. It was found that many of the battens from the left wing had become distorted after contacting the wing cross-tube during the impact. However, either side of the distortions the profiles closely matched the drawings. The right wing battens were more difficult to assess, due to the more severe damage caused to the wing during the impact.

Analysis

The accident occurred on the first attempted solo flight by the owner who may not have undertaken a formal course of flying training and who possibly only had limited experience of flying as a passenger. Whilst the owner appeared to be in good health, he did not hold the required medical declaration prior to undertaking a

solo flight. The individual assisting him to prepare the aircraft was an experienced weight-shift microlight pilot but was not an instructor.

The owner had acquired an aircraft that was de-registered by the CAA and it had not been inspected by appropriate persons for approximately three years. Despite this, the aircraft appeared in good condition and no evidence was found of a pre-impact failure of any component. Enquiries of previous owners suggested that the wing battens had not been adjusted from the manufacturer's settings. The subject owner is unlikely to have altered the wing tip washout or any of the other permitted adjustments, even if he had been aware of their effects, as he had no experience of how the aircraft handled in its as-received state. Examination of the aircraft revealed that a section of the back-up safety cable located within the front strut of the trike had not been connected. This had no bearing on the accident, but could be seen as

another indication of the pilot's lack of familiarity with the aircraft. The omission is likely to have occurred during the process of assembling the wing to the trike.

The engineering investigation did not identify any technical cause for the extreme nose-up pitch achieved during the initial climb. In the absence of such evidence, it is probable that the owner did not use the correct takeoff technique and allowed the wing to remain in a high angle of attack. The rapid nose drop probably occurred as the result of a stall which may have been exacerbated by the reduction in power. The resulting nose-down attitude, with the possible subsequent addition of power so close to the ground, would have made recovery difficult.

The investigation concluded that the accident occurred as a result of the owner attempting a solo flight without undertaking the required training.