ACCIDENTS INVESTIGATION BRANCH
Department of Trade and Industry

Slingsby T61A G-AYUO
Report on the accident near Wycombe Air Park, Bucks., on 17 February 1973

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List of Civil Aircraft Accident Reports issued by AIB in 1974

No	*Short title*	*Date of publication*
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2/74	Piper PA 30 Twin Comanche G-AXRW at Shipdham Aerodrome, Norfolk, January 1973	April 1974

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Department of Trade and Industry
Accidents Investigation Branch
Shell Mex House
Strand
London WC2R 0DP

10 December 1973

The Rt Honourable Peter Walker MBE MP
Secretary of State for Trade and Industry

Sir,

I have the honour to submit the report by Mr R D Westlake, an Inspector of Accidents, on the circumstances of the accident to Slingsby T61A powered glider G–AYUO which occurred near Wycombe Air Park, Bucks on 17 February 1973.

I have the honour to be
Sir
Your obedient Servant

V A M Hunt
Chief Inspector of Accidents

Accidents Investigation Branch
Civil Aircraft Accident Report No 3/74
(EW/C 438)

Aircraft:	Slingsby T61A G–AYUO
Engine:	1 Stamo MS 1500/1
Registered Owner and Operator:	Airways Aero Associations Ltd
Pilot:	Mr A L Thurlow – Killed
Passengers:	One – Killed
Place of Accident:	Near Wycombe Air Park, Bucks.
Date and Time:	17 February 1973 at 1525 hrs

All times in this report are GMT

Summary

At a height of about 200 feet during an approach to land, the aircraft, a self launching motor glider, was seen to enter a steep nose-down attitude from which there was no observed attempt at recovery. It crashed into a ploughed field 200 yards from the airfield boundary, and was destroyed. The pilot and his passenger were killed.

The report concludes that the accident was caused by a loss of control in the pitching plane. There is no evidence of any technical reason for the loss of control, but from medical evidence it appears possible that the pilot suffered an epileptic attack.

1. Investigation

1.1 History of the flight

Mr Thurlow had received authorisation for local flying with his wife as passenger, and after completing a flight of 20 minutes he refuelled the aircraft.

He then took off for a further flight at 1500 hrs, and between 1515 hrs and 1520 hrs the aircraft was seen at a height of about 700 feet to 800 feet over Wycombe Marsh in the vicinity of Mr Thurlow's home. According to an eyewitness, after making some steep turns and a number of dives at estimated angles of 20° to 30°, the aircraft headed in the direction of Wycombe Air Park apparently climbing and flying satisfactorily.

The aircraft was next seen making a shallow approach to the glider landing strip 350° at Wycombe Air Park. At a height of about 200 feet and some 400 yards distant from the southern boundary of the airfield, the aircraft's nose was seen to drop slightly. The aircraft quickly adopted a steep nose-down attitude from which there was no observed attempt at recovery; it crashed into a ploughed field about 200 yards short of the airfield boundary and was destroyed.

The pilot and his passenger were killed; there was no fire.

1.2 Injuries to persons

Injuries	*Crew*	*Passengers*	*Others*
Fatal	1	1	–
Non-fatal	–	–	–
None	–	–	–

1.3 Damage to aircraft

The aircraft was destroyed.

1.4 Other damage

None.

1.5 Crew information

Anthony Lawrence Thurlow, aged 42, held a current Private Pilot's Licence, endorsed for aircraft in Group 'A' and an R/T Licence for VHF only; he also held the British Gliding Association Silver 'C' Certificate. His most recent medical certificate was dated 20 November 1972 and was valid until 30 November 1973.

At the time of the accident Mr Thurlow had accumulated a total of 177 hours and 27 minutes flying powered aircraft, and 130 hours and 56 minutes flying gliders.

During a dual familiarisation flight on 14 January 1973 he had satisfied the Thames Valley Gliding Club of his ability to fly the Slingsby T61A, and since then he had flown a further one hour and ten minutes on G–AYUO prior to the day of the accident.

1.6 Aircraft information

1.6.1 *Maintenance and construction*

G–AYUO was built by Slingsby Sailplanes Kirkbymoorside, Yorkshire, in 1971 and had a valid certificate of airworthiness in the General Purpose Category. The aircraft had been maintained in accordance with the provisions of an approved maintenance schedule. A daily inspection was carried out on the morning of the day of the accident.

The Slingsby T61A is a version of the German Scheibe SF–25B Falk, built in the United Kingdom under licence. It is a side by side, two seater, low wing, self launching motor glider and is powered by a Stamo MS 1500/1 engine driving a fixed pitch wooden propeller.

The engine may be switched off in flight if the aircraft is to be used as a true glider and is usually either switched off or set to idle rev/min for approaches and landings which are then made according to gliding procedures. A lanyard operated recoil starter may be used to restart the engine in flight but on this flight the lanyard was not attached and consequently the engine was to be kept running throughout.

The aircraft is of mixed tubular steel, wood and fabric construction and is equipped with conventional flying controls. Dual control columns in the cockpit connect through a common yoke to push rods operating the ailerons and elevators. Steel cables connect the dual rudder pedals to the rudder.

Spoilers, spring loaded to the closed position, are fitted to the upper surface of each wing. The spoilers are extended by pulling either of two levers, one on the left side of the cockpit, the other in the centre. The primary effect of extending the spoilers is to increase the aircraft rate of descent; a slight nose-down change of trim occurs when the spoilers are opened and conversely a nose-up change of trim when they are closed. Longitudinal trim is achieved through a wooden trim tab attached to the wooden trailing edge member of the starboard elevator by three hinges; movement of this tab is effected by a bowden cable which runs aft from a lever and quadrant situated between the cockpit seat cushions. After passing through a cable guide on the under surface of the starboard elevator, the cable is attached to the trim tab actuating lever. A spring is fitted between the elevator and the trim tab actuating lever and with trim neutral this spring is in partial compression. With nose-up trim applied the spring is further compressed, whilst application of nose-down trim causes the tab to be moved by extension of the spring. On the first few aircraft of this type built by Slingsby Sailplanes, including G–AYUO, cutouts had been made in the elevator fabric covering to inset the trim tab attachment hinges, so that the wood in these areas was not protected. Subsequent to the accident the manufacturer called for an inspection

on all Slingsby T61 aircraft before the next flight, and detailed the remedial action to be taken on aircraft with trim tabs fitted in this way. The inspection was made mandatory by the Civil Aviation Authority.

1.6.2 *Handling characteristics*

Glide approaches to land with engine off or rev/min set to idle are made with the left hand operating the spoiler lever and the right hand operating the control column.

The longitudinal control forces are light; the effect of longitudinal trim alone, or in conjunction with operation of the spoilers is easily controllable and does not produce an abrupt nose-down pitch of the aircraft.

Aircraft behaviour at the stall is docile and in straight flight with engine rev/min at idle, a gentle nose drop occurs. Recovery from the stall is easily achieved by simply releasing the back pressure on the control column; this results in very little height loss.

1.6.3 *Weight and balance*

The exact weight of the occupants is not known, but from estimated weights, it is considered that the take-off weight was below the maximum authorised all-up-weight and that the centre of gravity was between the specified limits of 7.40 inches to 12.90 inches aft of the datum position.

1.7 Meteorological information

The weather at the time of the accident was good. Local observations estimated the visibility as more than 5 nm, the surface wind as light northwesterly, and no significant low cloud. The accident occurred in daylight.

1.8 Aids to navigation

Not applicable.

1.9 Communications

Not applicable.

1.10 Aerodrome and ground facilities

Not applicable.

1.11 Flight recorder

Not required and not fitted.

1.12 Wreckage

The aircraft crashed in a ploughed field about 200 yards short of the airfield boundary. At impact it had been on a heading of 010° magnetic and in an attitude estimated as 70° to 80° nose-down; eye-witnesses stated that it appeared to have been in a straight dive.

Examination of the wreckage indicated that the aircraft had been complete at impact and that the engine had been delivering power. The fuel cock and the engine ignition switches were found in the 'off' position but it was established that these had been so positioned by one of the rescuers. In order to extricate the occupants the tail of the aircraft had been pulled down to a horizontal position.

The pre-impact position of the spoilers could not be determined due to the fact that they remained movable against their springs, whilst the extensive damage to the cockpit made it impossible to obtain any valid information as to the position of the spoiler operating levers. When first seen the spoilers were open and being held by distortion of the wing structure; when the aircraft was moved they closed of their own volition under spring action. The spoilers are hinged at their front edges and it is considered that they had been shock loaded into the open position on impact with the ground. No evidence of pre-crash failure or malfunction was found other than that the wood of the starboard elevator trailing edge member beneath the centre and outer hinges attaching the trim tab had deteriorated due to water penetration. The trim tab had become detached from the elevator but was still connected to the aircraft by the bowden cable and compression spring. The direction and manner of detachment of all three hinges was consistent with inertia loads sustained on impact and therefore tab detachment is not attributed to the deterioration of the wood in the hinge attachment areas.

1.13 Medical and pathological information

A full autopsy was carried out on both casualties. The only relevant finding was the presence of a benign tumour on the pilot's pituitary gland in a position adjacent to the right temporal lobe of the brain. According to neurological specialists, while this might have had no effect on the pilot's flying ability, alternatively it could have caused headaches, a partial loss of vision known as bitemporal hemianopia or even caused temporal lobe epilepsy. The symptoms of temporal lobe or psychomotor epilepsy may range from automatic patterned movements to a full epileptic fit. The presence of such a tumour could produce an attack of psychomotor epilepsy and thus lead to sudden incapacity in flight. There were no indications in the medical history of the pilot from which the existence of this tumour could have been diagnosed.

The severe injuries to the pilot's hands were compatible with his having been rigidly grasping the control lever at impact. This and the observed behaviour of the aircraft would both be consistent with a sudden rigid extension of the arms such as can occur during an epileptic spasm. Other than this there was no evidence to suggest that an epileptic attack had taken place.

1.14 Fire

There was no fire.

1.15 Survival aspects

The accident was not survivable. The seat and shoulder safety harnesses remained intact and fastened, but the cockpit had been severely deformed and the engine had moved rearwards upon impact.

1.16 Tests and research

Although the detachment of the elevator trim tab was consistent with inertia loads during the crash, to eliminate any doubts as to the influence of the trim tab, consideration was given to the effect on the control of the aircraft if the elevator trim tab had become detached or grossly mis-set in flight, perhaps because of the deteriorated condition of the wood beneath the centre and outer hinge attachments. In the opinion of aerodynamicists the worst possible mis-alignment of the trim tab would not generate nose-down forces in excess of 10 lbs at the control column and would therefore be easily contained by the pilot.

2. Analysis and Conclusions

2.1 Analysis

Examination of the wreckage revealed no evidence of any pre-crash defect other than the deterioration of the wood in the area of the elevator trim tab hinge screws; this is not considered to have been a significant factor in the accident.

There is no evidence of any abnormality in the flight prior to the sudden steep nose-down attitude which led directly to the ground impact. The effect of longitudinal trim alone or in combination with spoiler operation would not have produced an uncontrollable nose-down pitch of the aircraft.

As noted in 1.16 the separation of the elevator trim tab was consistent with impact loadings, but in any event it could not have produced forces sufficient to account for a large elevator control movement. Any large elevator movement must therefore have been pilot induced but there is no evidence to suggest any rational explanation for such an action.

Except for inferences which may be drawn from injuries to the pilot's hands and the observed behaviour of the aircraft, there is no evidence that the pilot did suffer an epileptic attack on this occasion and, so far as is known, he had no previous history of epileptic attacks. Consequently, any conclusions drawn from the medical evidence must be regarded as distinctly circumstantial.

However, since the investigation has established that there is no evidence of any technical or other rational explanation for the accident, some credence can be given to the possibility that the pilot suffered an epileptic attack.

2.2 Conclusions

(a) *Findings*

(i) The pilot was properly licensed to carry out the flight.

(ii) The aircraft had been satisfactorily maintained and its documentation was in order.

(iii) The take-off weight did not exceed the maximum authorised all-up weight and the centre of gravity was within approved limits.

(iv) There was no evidence of any pre-crash failure or malfunction of the aircraft or its engine. The deterioration of the wood in the area of the trim tab hinges is not considered significant as a causal factor in the accident.

(v) The separation of the elevator trim tab was consistent with impact forces. In any event maximum mis-alignment of the tab would have produced only a small and easily controllable loading of the control column.

(vi) The sudden steep nose-down pitch of the aircraft which led directly to the ground impact would entail a large and sustained application of down elevator control.

(vii) There was no technical evidence to explain such an action; it is considered that the effect of longitudinal trim either alone or in combination with spoiler operation would not have been sufficient to have caused the abrupt nose-down manoeuvre.

(viii) Medical evidence indicates that the tumour on the pilot's pituitary gland could have resulted in an attack of epilepsy but there was no positive evidence that such an attack occurred.

(ix) The pre-crash manoeuvre could be consistent with a rigidly extended arm movement such as might occur during an epileptic attack; injuries to the pilot's hands lend support to a possible occurrence of this nature.

(b) *Cause*

The accident resulted from loss of control in the pitching plane. There is no evidence of any technical reason for this loss of control but there is a possibility that the pilot suffered an epileptic attack.

R D Westlake
Inspector of Accidents

Accidents Investigation Branch
Department of Trade and Industry
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