

Aircraft type and registration: Schleicher ASW20BL Glider BGA No 2948

No & Type of engines: Nil

Year of Manufacture: 1984

Date and time (UTC): 16 August 1986 at 1430 hrs

Location: Adjacent to London Gliding Club, Dunstable

Type of flight: Pleasure

Persons on board: Crew — 1 Passengers — N/A

Injuries: Crew — 1 (Fatal) Passengers — N/A

Nature of damage: Glider totally destroyed

Commander's Licence: Gliding Silver "C" certificate

Commander's Age: 24 years

Commander's Total Flying Experience: 136 hours (of which 10 were on type)

Information Source: AIB Field Investigation

The pilot and part share owner of the glider arrived at the airfield at approximately 1130 hrs (UTC) and proceeded to rig the aircraft. Several club members assisted in this task as some difficulty was experienced in inserting the wing main pins. The pilot was left to complete the connection of the flying controls and generally prepare it for flight, the responsibility for this customarily resting with the pilot of a glider.

At approximately 1330 hrs the pilot, who was making her 15th flight on type, was aero-towed to a height of 1100 feet without exhibiting any problems and released into a thermal. For the next hour the glider was seen in the local area by several other glider pilots to be flying normally at heights between 1000 feet and 2000 feet. The weather was reported as generally a westerly wind of 15—25 knots with good visibility and with moderately strong thermal activity. At least one glider pilot airborne at the time experienced patches of moderately strong turbulence in the area. At approximately 1430 hrs witnesses, both on the ground and in the air, became aware of a glider descending at high speed in a near vertical dive to the south west of the airfield, and saw it strike the ground. Several of the airborne witnesses reported seeing the aircraft rotating (rolling) as it descended, the rotation either slowing or ceasing during the descent, and that it had descended from a height in excess of 1000/2000 feet. All reports suggest that the glider structure was intact during this time.

The glider crashed some 200 yards to the south west of the airfield boundary across a hedge which divided two fields of standing crop. It had struck the ground at a speed estimated at between 200/230 knots in a wings level but nose low attitude of 100/105° below the horizontal. Its configuration at the time was airbrakes in, wheel retracted, and flaps at the 0° position. The maximum speed quoted in the flight manual for this configuration is 119 knots.

From the wreckage distribution, ground impact marks, and a detailed examination of the wreckage at the AIB facility at Farnborough, the following was determined:

The glider had been structurally complete prior to impact but with a downward bend of 12° of each wing between root and tip. The impact had completely destroyed the cockpit and fuselage forward of the wing trailing edge and had caused severe disruption to the wings, rear fuselage, and tail. Wreckage was scattered for a distance of some 80 feet along a track of 120°M with the majority laying to the north of the hedge.

The canopy was closed and locked and the pilot's four point harness had remained connected to the release buckle.

A lead ballast weight of 5.875 lbs, including the attachment bolt, was found in the lower part of the fin, the presence of this being recorded in the glider log book as the first entry after the initial Certificate of Airworthiness (C of A) was issued in March 1984.

The effect of the lead weight, which was fitted to improve the glider's performance in competition flying, was to move the centre of gravity (CG) of the empty glider rearwards. The result of this was that the minimum cockpit load had to be raised from its previous value of 143 lbs to 166½ lbs and the maximum reduced from 206 lbs to 200 lbs, to keep the in-flight CG position within the required limits. A cockpit placard recovered from the wreckage, one issued by the manufacturer, stated minimum and maximum loads of 165 lbs and 238 lbs respectively, figures which related to the glider prior to installation of the owner's equipment.

Estimates of the pilot's weight varied from 126 lbs to 145 lbs which, together with a 15½ lb parachute and 5 lbs of clothing, meant that on the accident flight the cockpit load was between 146½ lbs and 165½ lbs. Thus, on this flight, the CG position was either at or up to .78" beyond the aft limit.

The effect of such an aft position was to make the glider more sensitive to elevator control inputs and generally become more unstable in pitch.

A statement is included in the flight manual for the glider which warns of a dangerous deterioration in its stalling and spinning characteristics if the CG position is too far aft. The manufacturer has demonstrated, however, that it is possible to recover the ASW20 from a spin with the CG 1.65" aft of the aft limit.

Information provided by the manufacturer has shown that at very high speeds, particularly with an unloaded or negatively loaded wing, a significant wing twist occurs. This results in a downward load being produced by the outer section of each wing. It was estimated that at 200 knots 7 to 8 degrees of up elevator deflection would be required to overcome such wing deformation in a vertical dive. At higher speeds this effect becomes more pronounced and would require greater elevator deflection to recover from the dive.

There was evidence within the wreckage that, at impact, the elevator control system was positioned between the mid and full up elevator positions.

The glider possessed a current Certificate of Airworthiness, although this and other documents relating to the glider retained the previous cockpit load limits of 143 lbs and 206 lbs.