ACCIDENT

Glider Type and Registration:	Glaser Dirks DG600 Glider, BGA 3445 (Tail No 656)
No & Type of Engines:	None
Year of Manufacture:	1988
Date & Time (UTC):	18 September 2005 at 1230 hrs
Location:	Ridgewell Airfield near Great Yeldham, Essex
Type of Flight:	Private
Persons on Board:	Crew - 1 Passengers - None
Injuries:	Crew - 1 (Fatal) Passengers - N/A
Nature of Damage:	Glider destroyed
Commander's Licence:	FAI Gold C Certificate (August 1981) and 3 Diamonds completed July 1985
Commanders Age:	74 years
Commander's Flying Experience:	4,186 hours (estimated 2,000 on type)
Information Source:	AAIB Field Investigation with BGA assistance

Synopsis

At a height of approximately 350 ft during a winch launch, the glider was observed to be climbing at a slightly steeper than normal angle. The glider's airspeed was perceived to be abnormally slow and the winch engine lost rpm. The winch operator adjusted the winch throttle setting to allow the engine to accelerate but this had little effect. The glider stalled, yawed to the right and entered a right-hand spin; during this manoeuvre the cable separated from the glider. Height was insufficient for recovery and the glider struck the ground whilst spinning, fatally injuring the pilot.

History of the flight

The glider had been removed from its transportation trailer and assembled on the previous day by the pilot who, after an aerotow launch, carried out a flight of three hours. The glider was then left assembled overnight. Although no record was found of a Daily Inspection being completed, the pilot was known to be meticulous regarding the maintenance and inspection of the glider. It is therefore reasonable to assume that an inspection was carried out during the following morning, prior to the accident launch.

The accident flight was the pilot's only flight that day. Witnesses said that his behaviour before the flight was normal and he appeared to be in good spirits.

The glider's ground run and acceleration were normal. However, as the glider rotated into the full climb, its pitch attitude increased to an angle beyond that normally expected. During the full climb witnesses perceived that the glider's airspeed reduced. The load on the winch cable increased to the point where the winch rpm began to decrease so the winch operator reduced the throttle setting to allow the engine to recover. It was expected that the pilot, when feeling the reduction in pull from the cable, would reduce his climb angle, allowing the winch to accelerate, and then continue the launch. However, witnesses reported seeing the winch cable slacken at approximately 300 ft with the glider in a markedly nose-high attitude. The glider began to yaw to the right, the nose dropped and the cable separated from the glider. The glider's right wing dropped and it entered a right-hand spin from which it did not recover before it struck the ground.

An ambulance and an air ambulance both attended the scene but the pilot had not survived the impact with the ground.

Pilot information

The pilot was very experienced holding a full Gold 'C' FAI[1] Certificate with three diamonds that he had completed in July 1985. He had held a BGA Assistant Instructor's category but had allowed this to lapse in 2001. The pilot's logbook entries showed that he flew regularly, the flights being of long duration and were for the most part long-distance cross-country flights. He was also an authorised BGA glider inspector who serviced his own glider.

Meteorological information

At the time of the accident there was broken cloud with a base of 1,500 ft and good visibility. The surface wind was light and from the north-west.

Footnote

[1] Fédération Aéronautique Internationale – the world air sports federation.

Glider description

The DG600 is available with 15 m and 17 m wing spans and all variants make use of full-span flaperons. The larger wing span is achieved by the use of wing tip extension sections; these are secured to the wing's main spar with a metal tongue and shear pin. The accident glider was modified in Germany in 1998 and, at the time of the accident, was flying with longer wing tips, with built-in winglets, at a span of 18 m.

The wings and horizontal stabiliser/elevator can be removed to allow storage and transportation of the glider. When reassembled, the glider was considered to be 'self-connecting' in that the wing and elevator control circuits automatically engaged with the fuselage control circuits.

The 'self-connecting' features of this glider type make use of flared torque tubes in the fuselage flaperon and airbrake control circuits. These align and engage the wing control rods as the wings are slotted into the fuselage. The spars of the left and right wings form a tongue and fork joint, secured to one another by stainless steel pins at each end of the joint. The horizontal stabiliser and elevator also make use of a similar 'self connecting' feature.

The glider is fitted with three water ballast tanks, one 6 litre tank in the fin and one 90 litre tank in each wing. These are used to trim the glider in the cruise to improve its glide performance. All of these ballast tanks can by emptied in flight through the use of cable operated valves.

The DG600 glider makes use of a wing cross-section designed for high performance gliding. Trials during the introduction of this glider into the UK showed it to have 'sharp-edged' stall characteristics, giving little or no tactile warning to the pilot before stalling. In order to satisfy UK requirements for the issue of a Certificate of Airworthiness, the BGA raised a requirement to install an additional stall warning system. This modification did not change the stall characteristics of the glider; it provided the pilot with an audible warning to indicate that the glider was approaching a stall.

The stall warning system fitted to the glider consisted of two orifices on either side of the fuselage, one close to the wing leading edge and one at approximately mid-chord. The pressure readings from these orifices are fed into a cockpit mounted variometer. As the angle of attack of the glider's wing approaches the stalling angle, the airflow over the wing changes giving a differential pressure between the forward and mid-chord orifices. This produces a movement of the variometer needle, and an audible signal to warn the pilot of an impending stall.

Glider's maintenance history

The glider had been purchased from new by the pilot and another syndicate member and was operated by them until the accident date. All of the maintenance and inspection entries in the glider's log book were carried out by the pilot who was a BGA authorised inspector.

The glider was initially operated on a Permit to Fly until January 1992, when BGA approved modifications to the glider stall warning system were incorporated, allowing the glider to be granted a full Certificate of Airworthiness.

The glider's logbook confirmed that it had been maintained in accordance with current BGA requirements. The last airworthiness report was completed on 14 June 2005 and the last entry in the glider logbook, dated 13 June 2005, states that it had accumulated 2,274.5 flying hours and 804 winch launches.

Glider's flight characteristics

The manufacturer's flight manual for the glider gives the following information regarding winch launches:

'Set the wing flaps at +10º.

Set the trim nose up for a winch launch.

Use the normal winch launch procedure.

After reaching 60 m (200 ft) gradually pull back some on the stick so that the glider will not pick up excessive speed'

'Recommended winch launch airspeed 110-120 km/h (60-65 kts)'

***'Caution**: Don't fly with less than 90 km/h (49 kts) and not more than 150 km/h (81 kts)'*

The flight manual states that with the flaps deployed, the glider will drop a wing when stalled; it also provides the following guidance regarding spin recovery:

'Height loss during recovery is 50-80m (160-260 ft), the max speed is 190 km/h (103 kts)'

Airfield information

Ridgewell is an unlicensed grass airfield on the site of a former military airfield owned by the Essex Gliding Club. The airfield has two grass runways orientated 09/27 and 05/23. On the day of the accident, operations were being conducted from Runway 23.

Wreckage and impact information

The glider came to rest in a ploughed field 15 m beyond the left edge of Runway 23. The right wing spar had failed resulting in the separation of both the left and right wings from the fuselage. The forward fuselage was significantly disrupted and the aft fuselage had failed immediately ahead of the fin.

Ground marks showed that the first contact with the ground was made by the right wing tip on the runway, 10 m from the field boundary. Measurements indicate that the glider hit the ground 40º to 50º nose down and with 15º to 20º of right roll. The ground marks indicated that the right wing tip extension broke away from the wing shortly after the first impact mark. Approximately 2 m beyond the first impact mark, the main section of the right wing tip made contact with the ground. The right side of the forward fuselage hit the ground at the runway boundary; the force of this impact fractured the right side of the nose initiating the break up of the forward fuselage and canopy. It appears that at some point shortly after this impact, the right wing spar failed, allowing the right wing to separate and slide across the field. The fuselage and left wing continued into the field for a further 23 m before coming to rest. Sections of the forward fuselage outer skin, together with glider instrumentation and glider tools were scattered along the debris trail.

Before the pilot was extricated from the wreckage, it was noted that the seat harness lap straps were securely fastened. However, the shoulder straps were unfastened, the right strap being under the pilot and showing signs of being dragged across the surface of the field, and the left strap pinned under a section of cockpit internal structure. The emergency services and witnesses who were first on the scene confirmed that they had not removed the shoulder harnesses prior to the arrival of the AAIB investigators.

A substantial section of the glider instrument panel, containing a number of instruments including the ASI, was found in the wreckage trail. When examined, the ASI was reading 25 KIAS although it appeared to be undamaged.

Due to the detachment of the wings from the fuselage, continuity of the flaperon and air brake control circuits could not be confirmed on site; however continuity of the elevator and rudder circuits was verified prior to recovery of the glider.

The water ballast tank drains were exercised and all tanks were found to be empty. There was no evidence of water spillage at the accident site and it was concluded that no ballast had been carried on the accident flight.

Glider launching winch

Ridgewell Airfield is equipped with a motorised winch for launching gliders. The winch is fitted to a wheeled trailer and powered by a Ford V8 engine which has been converted to operate on LPG (Liquefied Petroleum Gas). The winch is operated from a cab at the front of the unit which is protected by a steel safety cage. The engine is equipped with a hand throttle and an automatic gearbox, the engine output being transmitted through dog clutches to two cable spools. The spools are fitted with guillotines to sever the cables if the glider fails to release the cable. The glider launch cables are fitted with a 'weak link' close to the eye end of the cable which is designed to fail and release the glider in if an excessive load is applied to the glider; the strength of the link required is dependent on the type of glider being launched. Examination showed that the cable used was free of visible defects. The 'weak' link fitted to the cable was intact and of the correct type for launching BGA 3445.

The LPG bottle used during the accident launch was found to weigh 28 kg. Full bottles typically weigh 38 kg, and bottles considered 'empty' weigh approximately 20 kg.

The winch operator was trained and experienced in launching gliders using the winch, and when interviewed reported that there were no abnormalities with the winch immediately before or during the launch of BGA 3445. The winch operator stated that the launch was initially normal, with the glider rotating into a steep climb. This increased the load on the winch cable and the winch operator attempted to increase the engine rpm by opening the throttle a little but this had no effect. As the glider reached a height of about 350 ft, the engine picked up speed and the operator noticed that the cable was slack, so he attempted to increase the engine speed to take up the slack. Some slack was taken up but the glider appeared to him to be stalling and it started to fall to the glider's right. The cable separated from the glider after it had turned through about 70º to the right. At that point the operator stopped the winch.

The winch was examined before its operation and was tested by towing calibrated loads along the runway. No abnormalities were observed during the examination, the testing or the subsequent launch.

Detailed examination

Examination of the ground marks and accident site showed that the glider was structurally intact immediately prior to impact. The wreckage was recovered to the AAIB and subsequent investigation concentrated on the glider's controls, cable release, instrumentation and seat harnesses.

Controls

The flaps and ailerons on the DG600 are combined to form a single moveable surface or flaperon on the trailing edge of each wing. The pilot's roll inputs and flap selections pass through a 'mixer' unit which transmits both inputs to the trailing edge control surface. (See Figure 1 below).

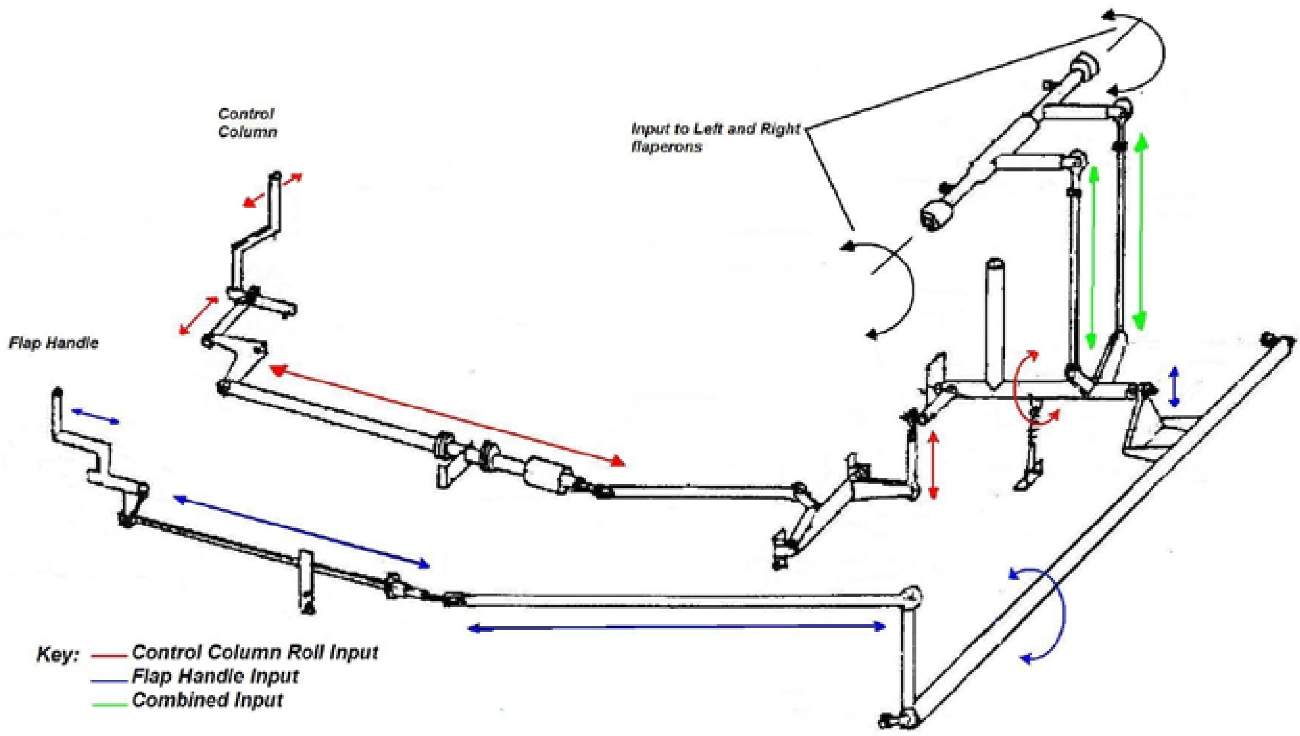

Figure 1

DG600 Flaperon control circuit
(Modification of manufacturers drawing)

The continuity of the primary control circuits from the cockpit to the wing joint and tail was verified; no evidence of restriction, jamming or pre-impact damage was identified in the flap, spoiler or elevator circuits. However, a connecting turnbuckle which transmitted aileron inputs into the 'mixer' unit had failed. Analysis of the fracture surface showed the characteristics of a single overload failure with no evidence of fatigue or pre-existing defect.

The 'self connecting' mechanisms on the 'mixer' unit and the wings were examined and no evidence of incorrect connection or a mechanical disconnect in flight was identified. The wing control surfaces were operated through their full range of movement from the wing root connection points and no binding or jamming of either the flaperons or the spoilers was identified. The position of the flap lever prior to impact could not be determined.

The glider was fitted with an automatic pitch trimming system operated either by a lever on the control column or a handle on the left cockpit wall. In order to set the trim, the pilot pulls the lever. This engages a rack and pinion arrangement in the elevator circuit. The control column is then moved to the position for the desired flight speed and the lever is released setting the trim. Examination of the system showed that all systems tensions and dimensions were within the manufacturer's limitations. Witness marks on the rack and pinion within the system indicated that the glider had been trimmed in a nose-down position at impact, corresponding to the recommended setting specified in the manufacturer's Flight Manual, when launching the glider.

Cable Hook and Release Mechanism

BGA 3445 was fitted with a single cable hook positioned at the C of G and located below the cockpit. The hook mechanism is designed to release the cable automatically if the launching/towing cable becomes angled to the rear of the perpendicular to the longitudinal axis of the fuselage. This is known as 'back releasing'. Back releasing can occur at the top of a winch launch or at any stage if the cable becomes slack and is dragged rearwards relative to the glider. The launching/towing cable is normally released manually by the pilot.

The cable hook recovered from the wreckage was found to be in good working order; both the manual and automatic cable release mechanisms worked and no defects were observed with the hook assembly.

Instrumentation

The glider was equipped with primary flight instrumentation consisting of an ASI, artificial horizon, altimeter, compass and a turn and slip indicator. In addition the glider was fitted with two variometers and a gliding computer with integral GPS. One of the variometers was used in conjunction with pressure tappings close to the wing roots to provide a stall warning system for the glider.

The glider was fitted with a nose mounted pitot orifice which provided a 'total' (pitot) pressure supply to the instruments; this was blocked by a very tightly packed accumulation of earth which appeared to have been driven into it during the impact sequence. Two static ports were provided, one on each side of the forward fuselage supplying static pressure to the primary flight instruments.

BGA 3445 was also fitted with a fin mounted receptacle for an additional probe which provided independent pressure readings to gliding computers and variometers. Two types of probe were available, a 'multi-probe' and a 'total energy' probe. The 'multi-probe' provided pitot, static and 'total energy'[2] pressures through three concentric tubes, the 'total energy' probe provides only a 'total energy' pressure through a single tube. To accommodate both types of probe, the fitting has three outlets, each connected to a different coloured tube, red, green and transparent.

BGA 3445 was fitted with a 'total energy' probe. The red and green tubes were blanked with tape, leaving the clear tube open to provide the 'total energy' pressure. The probe consisted of a 60 cm long pipe with a 'Y' shaped end piece as illustrated in Figure 2.

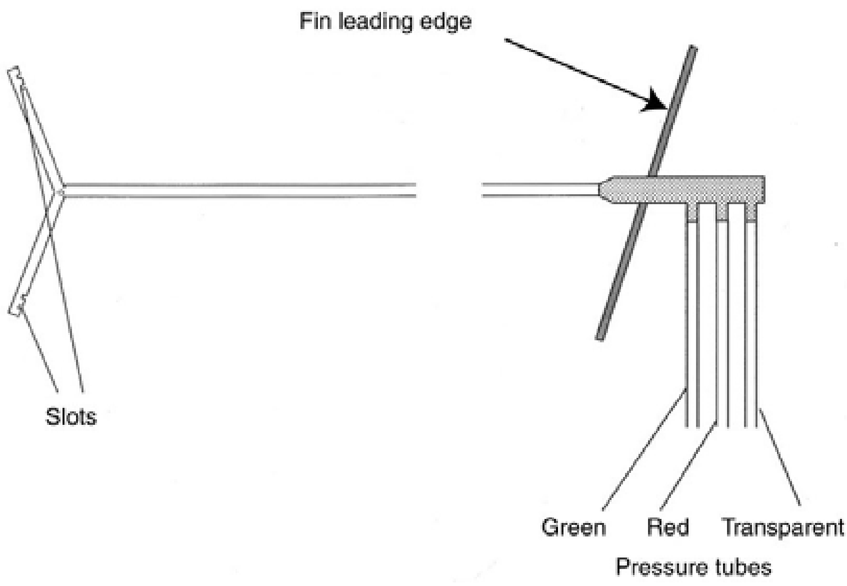

Figure 2

BGA 3445 Total Energy Probe Installation

Two slots were cut in the aft face of each side of the 'Y' shaped end piece allowing the 'total energy' pressure to be transmitted through the probe.

Anecdotal evidence suggests that the pressures obtained from a 'total energy' probe may be affected by the attitude of the glider but they are sufficiently stable to be used by variometers and gliding computers.

A reconstruction of the pitot static system showed that the gliding computer, flask variometer and the primary flight instruments were connected to the same pitot and static sources, including a static pressure input from the tail mounted total energy probe, see Figure 3.

During the reconstruction it was not possible to identify a connection to the separate total energy input of the gliding computer. However, it was found that the computer fitted to this glider was capable of being programmed to generate an equivalent total energy signal using pitot and static pressure inputs. Therefore, it is possible that there was no total energy input to the gliding computer.

In order to determine what effect, if any, this would have on the accuracy of the ASI, the glider's pitot static system and instrumentation were replicated and subjected to dynamic testing through a range of 0º to 75º Angle of Attack (AOA). The test results showed that at steady speeds of 40 kt and 50 kt the indicated airspeed remained constant as the 'total energy' probe was moved through the measured AOA range.

Due to disruption of the forward fuselage and severe damage to the variometer used for the stall warning system, the pressure tappings and associated piping could not be tested.

Footnote

2 *'Total energy'* is a term used to describe a pressure produced by a *'total energy'* probe. Its properties are such that it eliminates the effects of airspeed changes on variometers which indicate a glider's rate of climb or descent.

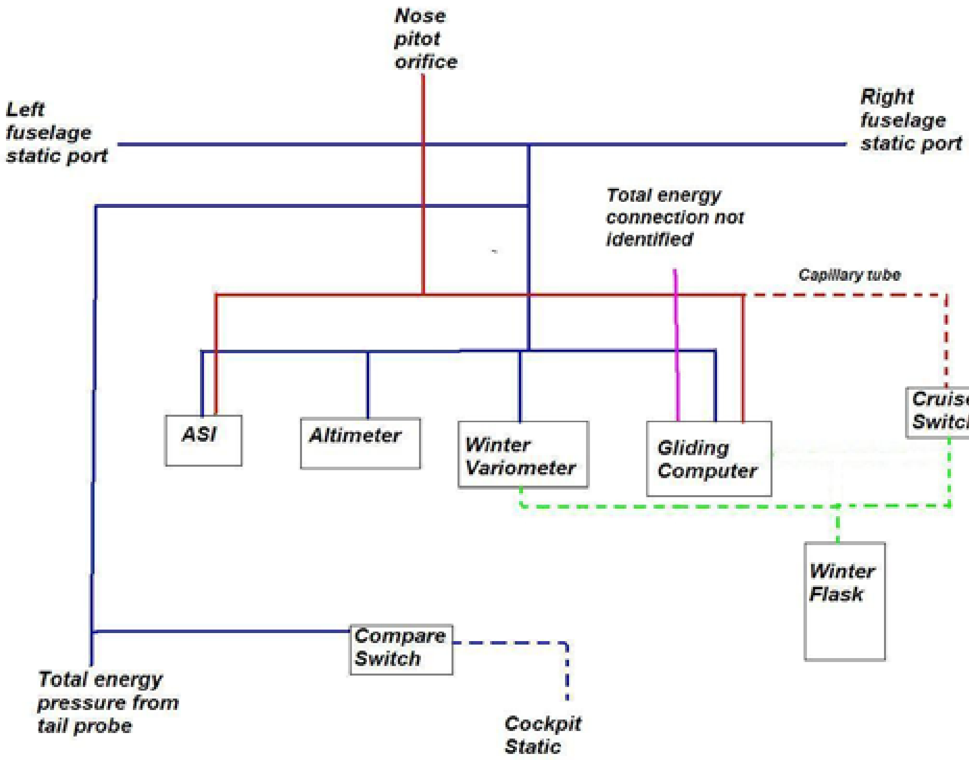

Figure 3

BGA 3445 Pitot static system schematic diagram

Harness

The glider was fitted with a four-point nylon harness consisting of two shoulder straps and two lap straps. The harness buckle was attached to the right lap strap. The shoulder and left lap straps were released from the buckle by turning the release mechanism on the front of the buckle through 45º in either a clockwise or anticlockwise direction. The buckle was also fitted with a shoulder strap release tab behind the shoulder strap slots (see Figure 4),

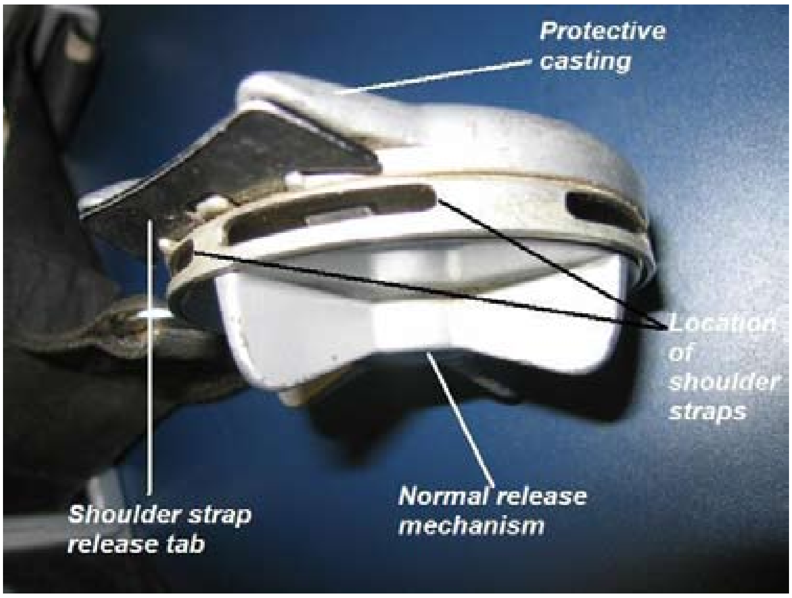

Figure 4

BGA 3445 Seat harness buckle

Pushing the tab forward would release both shoulder straps but leave the lap straps secure. The tab requires a force of 19.6 Newtons to operate it and is protected from inadvertent operation by two projections on the rear of the buckle casing. During the impact, the seat structure failed but the harness attachments remained intact. The straps were free from tears or damage; the buckle was also free from damage and functioned normally. Evidence of soil was found on both the inner and outer faces of the right shoulder strap but not on the other straps. Both lap straps showed some degree of 'hardening' of the webbing where it passed through the adjustment points. This is typical of the nylon material subjected to a high load. The shoulder straps did not exhibit this 'hardening'.

The seating position in the DG600 is semi-reclined, (see Figure 5), with a smoothly curved backrest. Typical fuselage pitch attitudes during a winch launch are between 35º and 45º; this results in the pilot's torso effectively lying flat on the seat back with his hips and legs raised. In this position the mass of the pilot's hips and legs would exert a force on the pilot's torso which would tend push the pilot 'up' the seat back. Acceleration of the glider in the initial stages of the launch can also contribute to this effect. Any tendency for the pilot to move in this direction would normally be restrained by the harness shoulder straps.

Load and Balance

After taking into account the mass of the pilot and the tools carried on board the glider, calculations show that it was being operated within its established centre of gravity limitations.

Witnesses

Statements were taken from a number of witnesses and the majority have confirmed that after the initial part of the winch launch, which was normal, the glider was seen to be climbing very steeply and appeared to be slower than 'normal'. It is difficult to assess quantitively the pitch attitude of a glider during a winch launch, but witnesses generally concluded that this was of the order of 45º.

Medical and pathological information

The pilot's medical certificate, valid until 4 April 2006, was a self-declared certificate countersigned by his General Practitioner. A post-mortem examination determined that the pilot had died of multiple injuries

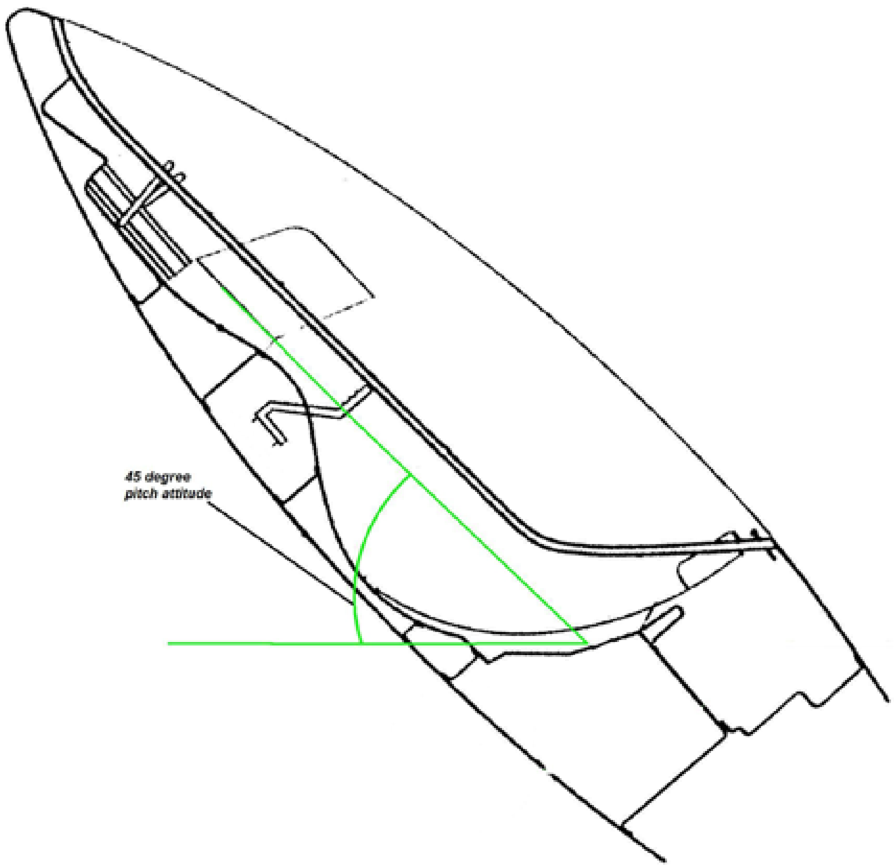

Figure 5

DG600 Cockpit sectional diagram
(Modification of manufacturers drawing inclined to represent a 45º pitch attitude)

sustained in the accident and confirmed that it was not survivable. Injuries to the pilot's left hand suggested that he had not collapsed prior to ground impact. Moreover, there were no medical conditions which were likely to have contributed to this accident but it was not possible to determine from his injuries whether or not the pilot's shoulder straps had been fastened during the ground impact sequence.

Analysis

The launching winch and cable were both serviceable at the time of the accident. The winch operator was suitably trained on the use of the equipment and the launch of BGA 3445 appeared normal until the glider's attitude produced an excessive load on the winch engine.

Analysis of the accident site and detailed examination of the glider showed that it was structurally intact immediately prior to impact. The rudder, elevator and spoilers were correctly connected and free from any restrictions or malfunction and the glider was trimmed correctly. The failure of the aileron turnbuckle was caused by a single overload event occurring at impact. There was no evidence of a restriction in the aileron control circuit or of pre-existing damage.

The ASI was serviceable and probably accurate immediately before the accident. Although the 'total energy' probe was connected to the primary flight instrument static system, it is considered very unlikely to have introduced errors in airspeed indication during the winch launch.

Calculations based on the weight of the glider, equipment and pilot show that the glider's level flight (1g) stall speed on the accident flight was approximately 35 kt with the manufacturer's recommended flap setting (10º) selected. In the event of a winch launch problem at medium height, published calculations show that, unless immediate and correct recovery action is taken, the glider will decelerate rapidly. For a 45º nose high pitch attitude, this is typically in the order of 14 kt per second.

The glider had been estimated by several witnesses to be flying slower than expected. It was therefore probable that it was flying below the recommended 60 to 65 kt. A 'normal' speed for winching operations with most gliders is approximately 55 kt with higher speeds only being achieved further into the launch path.

It was not possible to quantify the actual speed of this glider at the point of cable release; however in view of the witness reports and 'normal' winch speeds, it is probable that the glider's airspeed was no higher than 50 kt. A cable release in this speed range, if immediate recovery action was not taken, would cause the glider to decelerate below the 1g stalling speed within one second. It is therefore probable that a reduction in airspeed would result in an almost immediate and possibly abrupt stall. If the glider had been operated with a positive flap setting, as recommended in the Flight Manual, it would have 'dropped' one wing as it stalled, rotating the glider and causing entry into a spin.

It was not possible to test the stall warning system for the glider, and therefore no estimation of the interval between the system producing a warning of impending stall, and the glider reaching the stall could be made. Based on the glider's maintenance records and its pilot's qualifications, it is considered likely that the stall warning system was serviceable prior to the accident and would have provided an audible warning of the impending stall if it was switched on. However, the time between the warning and decelerating to the stall speed would have been short.

Examination of the seat harness shows that the shoulder straps were not subject to the same magnitude of loading as the lap straps. The position of the shoulder straps in the wreckage and the soil contamination of the right shoulder strap suggests that they were not secured when the glider hit the ground. There are two likely explanations for this apparent insecurity: either the shoulder straps had not been fastened properly or the dynamics of the ground impact released them very early during the impact sequence.

If the pilot was unrestrained by the shoulder straps during the flight, it is possible that during the launch his body slipped 'up' the seat. The cockpit of the DG600 does not offer any obvious hand holds, with the exception of glider control levers. It is possible, therefore, that the pilot inadvertently pulled back further on the control column before finding a suitable hand-hold for his free hand. This would result in an increase in pitch, an increasing in the load on the winch and a decrease in the glider's airspeed, bringing it closer to its stalling speed. It may also have decreased the pilot's ability to lower the nose sufficiently rapidly to prevent the glider stalling and entering the spin.

Alternatively, the pilot had a reputation for meticulous pre-flight preparation and not to have fastened his shoulder straps would have been out of character. Furthermore, his normal practice whilst boarding the glider was to drape the shoulder straps over the sides of the fuselage, thus preventing the canopy from closing until the straps were brought inboard. There was no suggestion that the launch had taken place with the canopy unfastened. Consequently, it is possible that the shoulder straps were properly fastened in flight but the release tab was moved forwards due to inertial forces as the glider hit the ground and whilst the straps were off-loaded by simultaneous deformation of the cockpit structure.

Survivability

An investigation into the protection offered by glider cockpits during crashes was carried out in 1994 by the TUV Rhineland Group. The investigation carried out laboratory crash simulations using fuselage sections very similar to that of the DG600 with crash test dummies strapped into the cockpit seat. The final test scenario, used by the investigation team, involved a simulated crash from a spin, at high speed and at 45º nose-down attitude.

The results of this test showed that during the impact, there was significant upward deformation of the forward fuselage, which, coupled with the momentum of the structure immediately behind the cockpit, resulted in the cockpit folding upwards crushing the dummy between the seat back and the forward section of the cockpit. As the structure behind the cockpit decelerated, the cockpit sprang back into a nearly normal position with the dummy apparently unharmed. An analysis of the forces involved in the test showed that the impact was not survivable despite the apparent lack of post-test damage to the cockpit.

In the case of BGA 3445, the glider appears to have struck the ground at between 40º and 50º nose down at high speed. Due to the significant disruption of the fuselage observed at the accident site, it was apparent that BGA 3445 was subjected to higher forces than those experienced during the TUV Rhineland Group tests and in view of this, it is considered that the crash of BGA 3445 was not survivable, regardless of whether or not the pilot had fastened his shoulder straps.

Conclusion

The glider was structurally intact; the control circuits appear to have been connected and without restriction or damage, and the ASI was functional prior to the accident.

During the launch the glider adopted a slightly steeper than expected climb angle and its airspeed reduced to the point at which it stalled. The load on the winch cable was such that the winch operator was unable to accelerate the winch and restore airspeed to the glider. As the glider stalled and yawed to the right, the load on the cable reduced and the winch engine accelerated but slack in the cable probably allowed it to automatically 'back release' from the glider. The glider then entered a right hand spin with insufficient height for recovery and impact with the ground was not survivable.

It is possible that the harness shoulder straps were not securely fastened. However, it is also possible that the shoulder straps unlocked during ground impact due to an ill-defined and very unusual sequence of applied forces and possibly fuselage deformations.

If the shoulder straps had been insecurely fastened, the pilot could have slipped rearwards in the seat during the initial acceleration and climb, and thereby applied additional and unwanted aft movement to the control column. The inadvertent pitch input would have resulted in an excessive nose-high attitude and a significant increase in the load on the winch. This in turn would result in the winch being unable to provide adequate power to maintain the launch. If immediate and correct recovery action could not be taken because of the rearward position of the pilot, the glider would decelerate rapidly, leading to it stalling and entering a spin.

Safety Recommendation

Evidence that the pilot's shoulder harness may not have been secured during the winch launch has given rise to the possibility that he may have slid rearwards and upwards relative to the seat pan and inadvertently moved the control column aft increasing the pitch angle of the glider. He may also have been restricted in his ability to move it forward again for recovery action. Because of these potential causal factors it was recommended by the BGA investigator that:

BGA Recommendation BGA 01/06

The BGA remind all glider pilots of the importance of ensuring that glider harnesses correctly fit the user of the glider and that that harness is fully secured before flight.

Safety action taken

The procedures and problems of winch launches have been adequately covered by the recent work conducted by a BGA Safety Initiative. Their conclusions and recommendations have been circulated to all BGA affiliated clubs and thence will be circulated to all BGA associated glider pilots within the United Kingdom. Therefore, it is not considered necessary for the AAIB to make any additional recommendations.