AAIB Bulletin No: 8/2005 **Ref: EW/C2004/08/02** **Category: 3**

Aircraft Type and Registration:	ASK13 Glider, FWN
No & Type of Engines:	N/A
Year of Manufacture:	1969
Date & Time (UTC):	6 August 2004 at 1645 hrs
Location:	Booker, Wycombe Air Park, Buckinghamshire
Type of Flight:	Trial lesson
Persons on Board:	Instructor - 1 Student - 1
Injuries:	Instructor - 1 (Minor) Student - 1 (Serious)
Nature of Damage:	Aircraft destroyed
Commander's Licence:	British Gliding Association Pilot's Certificate with Instructor Rating
Commander's Age:	58 years
Commander's Flying Experience:	577 hours (of which 85 were on type) Last 90 days - 74 hours Last 28 days - 25 hours
Information Source:	AAIB Field Investigation

History of the flight

The student and two other members of his party had been given trial gliding lessons as a gift. The party had arrived at the airfield at approximately 1400 hrs. The weather was fine, with a light south-westerly wind and a few clouds. While waiting for their trial lessons the party had a picnic and agreed the order in which the participants would undertake their flights. The first and third students in the agreed sequence had each started to drink a small glass of champagne but they changed these to non alcoholic drinks when an instructor at the gliding club advised the party that those who were having a trial lesson could not consume alcohol before flying. The instructor stated that he was told that those who were due to fly had not had any alcohol and that their drinks were non-alcoholic. He also stated that he had reiterated that this must be the case.

All three students were given temporary Club membership forms to complete, specifically designed for Trial Gliding Lessons, and after about an hour's wait the first student was briefed for and given his flight, which lasted 20 minutes. This was followed by a trial lesson for the second student with

the same instructor in the same glider. The first student had taken a camera with him but did not recall being briefed specifically on what to do with it. The design of his glider's cockpit probably encouraged him to hold the camera in his hands (see Figure 1). There was then a pause of about three quarters of an hour before the third student was paired up with another instructor who had just completed a solo 3½ hour cross country flight. This instructor had not been nominated as an instructor for the day's instructional programme but was asked to assist because the instructor who was due to carry out the flight was feeling tired. Apparently it was not unusual for an instructor who had not been rostered to be asked to step in at short notice. However, this instructor could not remember conducting many instructional flights at short notice after a lengthy solo cross country flight. He subsequently commented that he had conducted at least 174 trial lessons.

The instructor briefed his student on FWN, a tandem seat aircraft, which was of an older design than the K21 in which the first two students had flown. He explained the instruments and the flying controls, which are mechanically linked between the front and rear cockpits, and also covered the procedure for handing over control of the glider between the rear seat pilot (the instructor) and the front seat pilot (the student) when they were flying. The instructor advised the student that he would be invited to take control of the glider at some stage during the flight, after they had released themselves from the tug aircraft. He emphasised the need for the student to remain well clear of the controls when he was not flying the aircraft and instructed him that only he, the instructor, would operate the cable release handle, trim lever and airbrake lever. (The airbrakes are used to degrade the efficiency of the wings and increase drag when required, as on the approach to land. After landing the airbrakes are normally deployed fully.) The instructor briefed the student on the parachute that he would be wearing and helped him to strap it on. He also explained the procedure for exiting the glider should they need to abandon it in flight, and how to land after parachuting. The student stated that he had been holding a camera in his hand and, before strapping his parachute on, he placed the camera on the front seat of the glider.

The student then climbed into the front seat, giving the camera to one of the others in his party, and the instructor assisted him with his harness, also explaining how to release it. The student stated that while this was being done the camera, which had been returned to him, was on the cockpit floor in front of him, between his feet, where he had placed it. The instructor did not remember noticing the camera but had a vague recollection of something being passed to the student after he was strapped in. The instructor stated that he did not brief the student on the use of a camera but gave his standard brief covering the items already described. He later stated that he was not aware of any definite protocols or procedures relating to cameras or loose articles, other than when carrying out aerobatic manoeuvres. He recalled that on previous occasions when students had asked what they should do with a camera he had ensured that it was appropriately secured. Aerobatics were not included in the trial lesson.

The instructor strapped himself into the rear seat and completed the pre-takeoff checks out loud. During the full and free check of the aileron and elevator controls he noticed a restriction when moving the control column to the right as the front seat control contacted the student's right leg. The student was asked to keep his leg clear and the instructor satisfied himself that he had the normal full range of control movement. The student's rudder pedals had been adjusted well forward so that he could not reach them, since there would be no requirement for him to use them during the flight.

The canopy was closed, the tow rope was connected between the tug aircraft and the glider and, after the appropriate hand signals had been given by the wing man, the tug aircraft began the takeoff. The instructor followed the usual procedure for an aero-tow in this type of glider. At the beginning of the take-off roll he held the control column against its back stop until the nose of the glider had lifted off the ground and the aircraft was balancing on its wheel. The control column should then be moved forward progressively as the glider takes off and remains just above and behind the tug aircraft.

The take-off roll proceeded normally and the student recalled it being bumpy as the glider accelerated over the grass runway surface. Once the glider was airborne the motion was smooth and the instructor stated that, as FWN started to climb above its normal position behind the tug aircraft, he found that he was unable to move the control column forward when he tried to correct this. The instructor asked the student to take his hand off the controls and the student responded that he was not touching them. The instructor continued to apply forward pressure on the control column while the glider climbed at an increasingly steep angle as the tug continued to accelerate along the runway.

The tug pilot stated that he felt the glider become airborne at the normal point and that, just as his aircraft was leaving the ground, he noticed a progressive 'heave' on the tug, as if the airbrakes on the glider had opened. The force intensified and he needed to apply an increasing back pressure on his control column to maintain the tug aircraft's climb attitude. With the end of the airfield approaching and the tail of the tug aircraft beginning to rise the tug pilot released the tow rope and turned sharply to the right to give the glider the maximum number of options for landing.

At about the same time the instructor seems to have released the tow rope at the glider's end although he has no recollection of doing so. Nor, at this stage, did he recall what control inputs he made, although he did regain some control movement and the student observed his control column moving. However, the instructor had concluded that there was something seriously wrong with the elevator and that a crash was inevitable. The glider was seen to climb steeply to a height of about 100 feet, whereupon it stalled, dropped its left wing and entered a descending turn to the left. As the glider picked up speed the wings levelled and it pitched back up. The glider then struck the ground on its wheel in a level attitude and bounced back into the air. Again it climbed steeply, reaching a height of about 40 feet. FWN stalled a second time, the left wing dropped once more and the glider pitched

nose down. The glider struck the ground in an almost vertical attitude left wing first, then on to its nose and finally settled back on the ground the right way up. The instructor later stated that at no stage had he deployed the airbrakes.

The nose of the glider had been crushed and the student suffered severe injuries to both his legs, while the instructor sustained chest and back injuries. Many onlookers went to the glider to render assistance and the local emergency services were called. The airfield's control tower staff and fire and rescue service had stood down at 1630 hrs, as normal, when the airfield had closed and ceased to operate as a licensed airfield. The emergency services arrived at 1655, 10 minutes after the accident, and the student was airlifted to hospital.

Glider Examination

An examination of the glider revealed that, in the accident, the student's camera had been damaged. Initial indications suggested that the camera might have become lodged in the aperture for the front seat control column, between the column and its forward control stop; this is located at the aft end of the cockpit floor. This was possible because the space behind the floor around the control column, which allowed the control to be moved through its full range, was unguarded (see example in Figure 2). Further examination revealed that there was a small piece of black material in the edge of the floor in front of the control column, which looked similar to the material on the camera case (see Figure 3). Also the dents in the camera and witness marks on the camera case appeared to be consistent with the camera being jammed between the floor edge and control column at this point. Consequently, the material that was wedged in the edge of the floor and the camera case were sent for analysis.

The results of that analysis indicated that there were no discernable visual or chemical differences between the two materials and it was concluded that it was likely that the fragment extracted from the edge of the floor came from the camera case.

No evidence was found of any pre-existing deficiencies in the airframe and flying controls.

Procedures

The British Gliding Association (BGA) state in their publication entitled Laws and Rules that *all flying instruction shall be given in accordance with the BGA regulations and syllabus*. This is further amplified by a Code of Practice for Gliding Lessons, also included in the BGA Laws and Rules, which includes the statement that *the flight shall be conducted in accordance with the instructional procedures laid down within the British Gliding Association Instructors Manual.* In the chapter on Airmanship in the Instructors' Manual there is a section entitled *Pre-flight*. This lists a series of checks amongst which is the question, *are all loose articles stowed correctly?*

In advance of the trial lessons for this party, the Gliding Club had sent them some reading material when issuing their tickets. This material included some marketing literature which emphasised the high quality of the instruction given at the club, cautionary *NOTES FOR VISITORS*, which dealt with safety procedures on the airfield, and a more detailed pamphlet, published by the BGA, entitled SOARING. IT'S THE ONLY WAY TO FLY. *Gliding simply explained.* This pamphlet, of which there was one sent for each student, gave a comprehensive explanation of what to expect during a flight, particularly a student's first, and some of the procedures used. Included under the heading *Inside the cockpit* was an explanation of the importance of avoiding loose articles. It stated:

> *As a first time passenger/pupil you should ensure that you have no loose objects that could pose a problem in flight; if you have a camera, put its strap around your neck and hold it tightly to your chest so that it cannot foul the joystick.*
>
> *Drop nothing in the cockpit during flight. Should you inadvertently do so, immediately tell your instructor. Loose objects such as chocolate are best left on the ground but should you have any, they should be stowed securely in the pocket on the cockpit wall.*

Fire and Rescue Services

An agreement existed between the airfield owners and the gliding club that after the airfield closed the gliding club could continue to operate but the airfield was effectively an unlicensed facility. This meant that there were no Fire and Rescue Services available on the airfield and that, in the event of an accident, the Gliding Club would turn to the local emergency services for assistance, as detailed in their Club Accident and Incident Procedures Manual. Many gliding operations take place at unlicensed airfields, so this would be the normal situation at many gliding sites.

Analysis

The results of the investigation indicate that the student's camera, which he had placed on the floor in front of his control column, moved rearwards and became lodged in the gap between the aft edge of the cockpit floor and the front seat control column as the glider accelerated and bounced over the runway surface during the take-off run. This gap had been widened when the instructor had moved the control column to its fully aft position, as usual for this type of glider, at the beginning of the takeoff. Thus, when the instructor attempted to move the control column forward, as the glider started to pitch up, he was prevented from doing so by the presence of the camera. The increase in the glider's nose-up pitch angle and movement of the controls to try and overcome the restriction may have resulted in the camera becoming even more firmly wedged.

After stalling and dropping its left wing, the glider then seemed to regain sufficient airspeed for the flying control surfaces to return the glider to a straight and level attitude at the same time as it struck the ground, before bouncing into the air again.

Briefing material, produced by the Gliding Club and the BGA, was provided for each of the students in the party to advise them of the need to avoid loose articles in the cockpit and what they should do if they wished to take a camera on the flight. The potential hazard presented by a camera is spelled out in the pamphlet entitled 'Soaring', issued by the BGA, which is specifically aimed at the first time student and those on a trial lesson. However, there was no requirement to read this information, comprehensive though it was, before the trial lesson.

The instructor stated that he was not aware that the student had a loose article – a camera - and did not brief him accordingly, nor was he aware of any protocols or procedures for doing so. It seems that a tendency to overlook the BGA guidance relating to loose articles may not have been unique to this instructor. However, on previous occasions when students had asked him what they should do with a camera he had ensured that it was appropriately secured. In this case the student had placed the camera on the floor, in front of the control column, between his feet and it may well have been out of the instructor's field of vision. The instructor did not recall seeing the camera being passed to the student.

The requirement for a check for loose articles is covered in the Instructor's Manual, which is the standard for all instructional flights, and trial lessons are deemed to be instructional flights in which the student is part of the crew. By its nature, the flight may be the student's first in a small aircraft and little knowledge can be assumed. Also, as a possible one-off experience the student is more likely to take a camera aloft then than if it was one of a series of instructional flights with a view to a longer term future in gliding. The BGA seem to recognise the implications of this difference.

The small amount of alcohol that the student had consumed was not considered to be a factor in this accident. However, the Gliding Club has introduced a new form which students sign to confirm that they have not consumed alcohol recently. The form explains what levels of abstinence, in terms of quantities of alcohol and timescales, are considered appropriate.

Information on the need to avoid loose articles when flying in a glider is included in publications published by the BGA and available to instructors and trial lesson students. Despite that, all the indications are that a loose article caused this accident.

Safety Recommendation 2005-077

It is recommended that the British Gliding Association reinforce the message that there must be no loose articles in aircraft when they are being flown.

Figure 1

Figure 2

Figure 3