No: 7/92 **Ref: EW/C92/4/2** **Category: 1c**

Aircraft Type and Registration:	Piper PA-28-140 Cherokee, G-AYIO	
No & Type of Engines:	1 Lycoming 0-320-E2A piston engine	
Year of Manufacture:	1970	
Date & Time (UTC):	7 April 1992 at 1554 hrs	
Location:	Horseshoe Hill, near Consett, County Durham	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - None
Injuries:	Crew - Fatal	Passengers - N/A
Nature of Damage:	Aircraft destroyed	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	52 years	
Commander's Flying Experience:	74 hours (of which 20 were on type) Last 90 days - 11 hours Last 28 days - 4 hours	
Information Source:	AAIB Field Investigation	

History of the Flight

The pilot started flying training in July 1989 and by February 1991 had flown a total of 48 hours. His Private Pilots' Licence (PPL) was issued in April of that year. Between March 1991 and March 1992 he flew a further 26 hours consolidating his experience in general handling and training for his IMC rating. By the end of March 1992 he had 17 hours simulated instrument flying but had not yet qualified for his IMC rating.

On 7 April 1992 the pilot had booked an IMC dual training flight for 1430 hrs. He arrived at Teesside Aero Club at approximately 1330 hrs to prepare for his flight. He had to wait for his instructor, however, who was airborne with another student. When his instructor landed the pilot was asked if he would prefer to ferry a Piper PA 28 to Carlisle to collect the instructor who was to fly another aircraft to Carlisle for maintenance. The IMC training, that had been booked, would take place on the dual return flight from Carlisle to Teesside. The pilot chose to fly the usual club cross-country route, that he had flown several times before, which goes from Teesside direct to Hexham, keeping clear of the high ground of the Pennines, then turning westwards along the South Tyne valley to Carlisle. When

his planning was complete, the instructor, who had been debriefing another student, returned to the pilot to discuss the route, winds and weather. The pilot had obtained the en-route weather from the airport briefing facility and during the discussion had remarked that some hill fog was reported in the area. The instructor re-emphasised that without an IMC rating the pilot must remain in VMC, returning to Teesside if the weather conditions precluded this. The actual weather at Carlisle (Wind 090°/14 kt, visibility more than 10 km, recent showers, 1 octa at 3000 feet and 7 octas at 4000 feet) was obtained by club staff and passed to the pilot during his pre-flight preparation.

Having left the pilot in flight planning, the instructor set off to deliver his aircraft to Carlisle before a deadline of 1600 hrs, departing Teesside at approximately 1515 hrs and flying direct to Carlisle. Cruising at 3000 feet he noted that he was clear of cloud but he could see that the cloud base to the north was considerably lower with areas of low stratus evident.

An aftercast obtained from the Meteorological Office at Bracknell confirmed the general weather situation in the area as troughs of low pressure circulating a depression of some 987 mb centred near Strumble, South Wales. The visibility was generally 12 km but deteriorating to 5000 metres in showers. Cloud base was broken stratus between 600 feet and 1000 feet, with broken cumulus and stratocumulus based between 2500 feet and 3000 feet. Mean sea level pressure was 995 mb. Surface winds were 130°/14 kt with a temperature of +8°C and the wind at 2000 feet was 140°/35 kt with a temperature of +3°C. On higher ground patches of fog were likely, associated with showers lowering the cloud base to the surface.

G-AYIO departed Teesside at 1532 hrs for the VFR flight to Carlisle and set course initially for Hexham. The weather at Teesside was surface wind 150°/15 kt, visibility 7 km, recent rain, 1 octa at 1200 feet, 7 octas at 2000 feet, temperature 9°C, QNH 995 mb. After take-off the aircraft climbed to its planned en-route cruising altitude of 2000 feet. Eleven nautical miles northwest of Teesside the aircraft was assigned a transponder code and handed over, at 1539 hrs, to Newcastle Approach Control.

At 1540 hrs the pilot made contact with Newcastle Approach Control who told him to "MAINTAIN VFR REPORT AT HEXHAM". At 1545 hrs several witnesses in the village of Castleside, 3 nm southwest of Consett, saw the aircraft flying just below cloud, at a height estimated to be between 200 feet and 300 feet above ground, northwest towards Hexham. Three minutes later, at 1548 hrs, in the vicinity of Derwent Reservoir, 5 nm west of Consett, the pilot transmitted to Newcastle Approach "REQUESTING FURTHER DESCENT WEATHER CLOSING IN...REQUEST DESCENT TO ONE THOUSAND FEET". Newcastle Approach replied "DESCEND AT YOUR DISCRETION THE TYNE REGIONAL (QNH) IS NINE NINE TWO". At 1553 hrs the pilot transmitted that he was

trying to see Hexham and requested a QDM for Carlisle. The approach controller, seeing the aircraft on radar south of Hexham flying in the opposite direction, replied that the "QDM FOR HEXHAM IS ABOUT THREE SIX ZERO". Some 30 seconds later the controller asked the pilot if he had contact with the ground. The pilot replied "YES JUST VISIBLE BUT DETERIORATING". At this point the controller suggested to the pilot "PERHAPS YOU OUGHT TO THINK ABOUT RETURNING BACK TO TEESSIDE". Immediately the pilot requested a QDM for Teesside which was passed by the controller. At 1553 hrs and 50 seconds, during the readback of the information, the transmission terminated. At 1605 hrs, with no further RTF contact, the Newcastle controller contacted a police helicopter in the area and requested a search for the missing aircraft which he believed had crashed 18 nm southwest of Newcastle. The London Air Traffic Control Centre (LATCC) was also informed of the missing aircraft and they alerted their Distress and Diversion cell.

Rescue teams from RAF Leeming, RAF Leuchars and Stafford were dispatched, under the control of the Rescue Coordination Centre (RCC) at RAF Pitreavie Castle, Edinburgh, to the last known radar position as supplied by Newcastle Approach Control. Weather conditions by this time had deteriorated. Extensive cloud and hill fog covered the area reducing visibility on the ground to 25 metres. At 2150 hrs rescue teams located the wreckage of the aircraft some 250 metres west of Muggleswick radio mast and 8 nm south west of Consett. The aircraft had been destroyed and the pilot had sustained fatal injuries.

Wreckage Examination

Wreckage and site examination showed that the aircraft had collided with the support cables of a radio mast, Muggleswick Radio Station Tower. The tower is 1702 feet amsl on undulating moorland and stands 230 feet agl. It is supported by twelve guy cables, in four orthogonal sets of three cables, with each set anchored in the ground approximately 100 feet from the base of the tower (Figure 1). Each cable is of multistrand braided steel of 7/8 inch overall diameter.

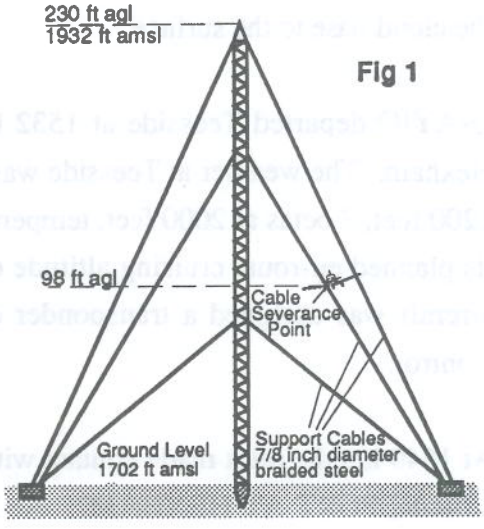

Fig 1

Three regions of the aircraft sustained cable strikes. This had caused detachment of the glass reinforced plastic tip of the left wing, the left aileron and the outboard four feet of the left wing; minor damage to the propeller; disruption of the right side of the forward fuselage; and gross damage at the right wing root that almost detached the right wing. Inaccessibility of the cables prevented full

identification of the details and sequencing of the strikes, but it was clear that the major impact had been near the centre of the mid cable in the westerly set, from the propeller, the right side of the forward fuselage and the right wing root, causing severance of the cable. Geometric considerations suggested that the left wing had probably collided with the upper cable in the westerly set. The evidence suggested that at initial impact the aircraft had been erect, banked to the right and tracking between 290-340°T and had been approximately 100 feet above ground level (*ie* at 1800 feet amsl). The pitch angle and the direction of the flight path in the vertical plane could not be determined, but the subsequent travel of the aircraft suggested that it had probably been level or climbing and had been flying at a relatively high airspeed.

The aircraft subsequently struck the ground 230 metres west of the point of major cable impact and approximately 150 feet below the level of this impact (Figure 2). The ground was of wet peat with a covering of heather. At ground impact the aircraft was heading approximately 080°T, *ie* almost towards the mast and was pitched nose down and descending at around 70° to the horizontal. Ground impact caused severe damage to the engine and forward fuselage, including the forward cabin area, gross longitudinal crushing of the leading edges of the wings and buckling of the rear fuselage. There was no fire.

Few signs were available to indicate the level of engine power being delivered when the aircraft struck the mast and at ground impact, but the evidence clearly indicated that both fuel tanks had contained appreciable quantities and was not consistent with low speed at impact. The altimeter subscale was found set to 992 mb, the QNH for the area at the time. Examination revealed no evidence of failure or malfunction of the aircraft or its components prior to collision with the mast.

Survival aspects

The pilot was found restrained by his lap strap. His diagonal upper torso restraint strap, which can be clipped to a spigot on the lap strap by a keyhole type fitting, was reportedly found unattached and no evidence was found that it had been fastened at the time of ground impact. However, the degree of deformation of the aircraft structure due to ground impact indicated that deceleration forces were such that the accident was not survivable and that the wearing of the upper torso restraint strap would have had no effect on this.

Radar and RT Information

Computerised radar information, obtained from the radar transmitter situated on Great Dun Fell, and supplied by the Scottish Air Traffic Control Centre (SCATCC), was used to plot the aircraft's ground

track. This information was not available during the initial emergency phase. The information is accurate to within one eighth of a nautical mile and one tenth of a degree. The radar head rotates eight times a minute producing a return approximately every eight seconds. The radar plot confirmed the aircraft's route as having overflown Castleside on a heading of 290°. The aircraft then skirted the north of Derwent reservoir before turning left onto a heading of 130°. Radar returns were then lost but reappeared in the vicinity of Horseshoe Hill. The final six plots then showed the aircraft turning rapidly right onto a heading of 290°. The penultimate radar return coincided with the Muggleswick radio mast position and the final return coincided with the crash site. An RT transcript of Newcastle Approach Control frequency was used in conjunction with the radar information to determine the interrelation of events.

Navigation

The pilot had planned and plotted his route using a current 1: 250,000 Topographical Air Chart of North East England. Muggleswick Radio Mast stands 1932 feet above mean sea level and 230 feet above ground level. Land sited obstacles less than 300 feet above local ground level are not shown, and are not required to be shown, on this chart.

Safety Recommendations

As a result of this accident, the following safety recommendation has been made:

92-45 The CAA (National Air Traffic Services (NATS)), through their field engineering departments at Scottish Air traffic Control Centre (SCATCC) and London Air Traffic Control Centre (LATCC), in liaison with the Assistant Chief of Air Staff Operations (ACAS Ops), MOD (RAF), should investigate means to provide the timely transfer of radar information to the Rescue Coordination Centres (RCC) in the event of Search and Rescue Operations.

G-AYIO ACCIDENT SITE

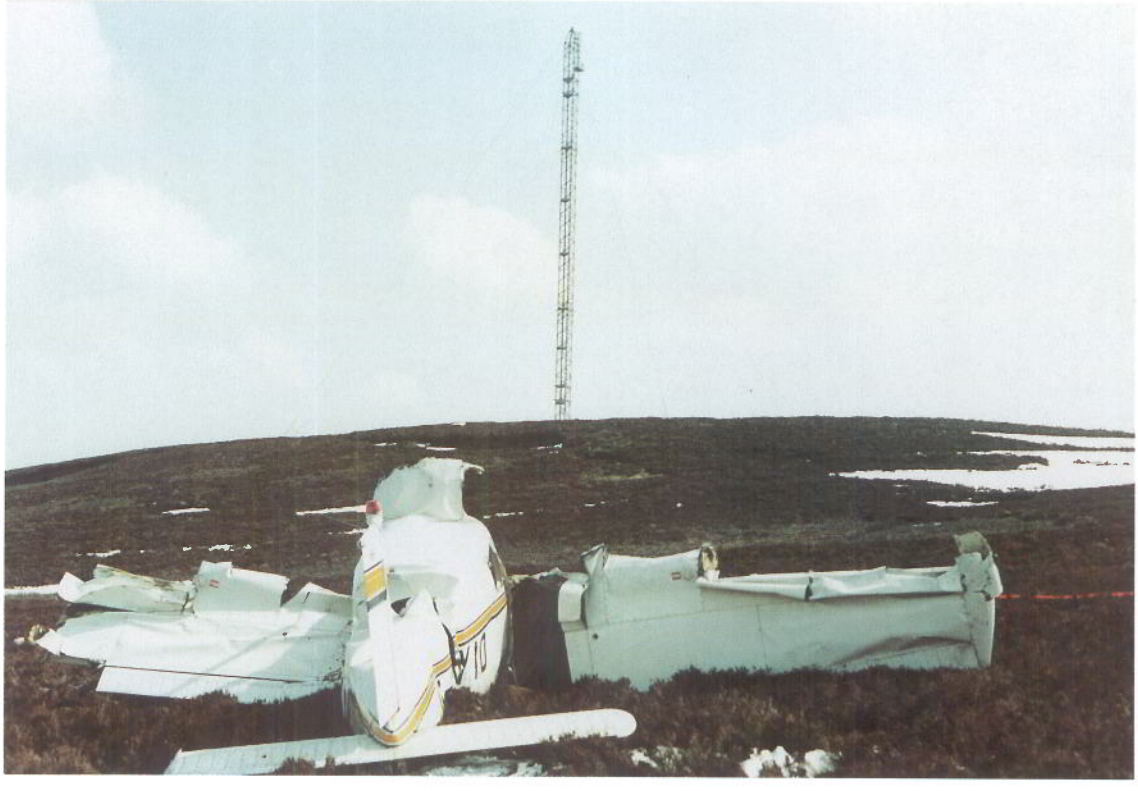

FIG 2