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Accidents Investigation Branch

Department of Transport

AIB Bulletin 14/83

No: 14/83 Ref: EW/C 829/01

Aircraft type and registration:	Beech T 34C — 1 N 2067A (light single engined fixed wing aircraft)	
Year of manufacture:	1978	
Date and time (GMT):	29 May 1983 at 1049 hrs	
Location:	Mildenhall Aerodrome	
Type of flight:	Display	
Persons on board:	Crew — 2	Passengers — Nil
Injuries:	Crew — 2 (fatal)	Passengers — N/A
Nature of damage:	Aircraft destroyed	
Commander's Licence:	FAA Commercial Pilot's Licence	
Commander's Age:	59 years	
Commander's total flying experience:	18,980 hours (of which 448 were on type)	

The aircraft was being flown on the second day of a public display programme, having given with the same pilot at the controls, a safe and professional demonstration the previous morning in more limiting weather conditions. At the time of the accident the visibility was 5 kilometres with broken cloud based between 1600 and 2000 feet and with a light northerly wind. Having completed its programmed sequence of manoeuvres the aircraft landed on runway 29 and then turned through 180° in preparation for a second take-off. It was known that after completing his display the pilot intended to depart for Leavesden. However, because of cancellations there was at that moment a gap in the flying programme, with the result that ATC gave the pilot freedom to extend his display if he wished. The aircraft took off on runway 11 in what was believed to be its departure for Leavesden. The initial climb was steep without being excessive and most spectators turned their attention elsewhere. Near the aerodrome's eastern boundary the aircraft pulled up into a manoeuvre to the right. It was not possible to obtain a precise description of this manoeuvre, either from witnesses or film, but it was similar to a stall turn or a steep wing-over and as a result the aircraft reversed its direction of travel so that it was pointing back towards the airfield in a very steep nose-down attitude. Estimates of its height were variable but it was certainly no more

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than a few hundred feet above ground level. Most witnesses considered that there was sufficient height for recovery if action was taken immediately. However, there seemed to be no initial attempt to recover and when the pull-up was attempted it appeared to most observers to be too late to avoid an accident. The aircraft struck the ground to the left of runway 29, converging on it at an angle of 30°. Both occupants died immediately.

A detailed technical examination showed that on impact the descent path was 35°. The aircraft's attitude was rotated 15° nose-up from the descent path, it was banked slightly to the left, and had a slight left yaw. The structure was complete at impact and the engine was developing high power. There was no evidence of any malfunction of the flying control systems, or of a bird strike. The ATC tape recording gave no indication of the pilot's intentions at the time, and the pathological investigation did not reveal any medical cause for the accident.

No: 14/83 **Ref: EW/G 83/07/10**

Aircraft type and registration:	Piper PA30 Twin Commanche G-BKCL (light twin engined fixed wing)	
Year of manufacture:	1968	
Date and time (GMT):	19 July 1983 at 0830 hrs	
Location:	Wycombe Air Park	
Type of flight:	Private (business)	
Persons on board:	Crew — 1	Passengers — Nil
Injuries:	Crew — Nil	Passengers — N/A
Nature of damage:	Substantial damage to starboard wing and propeller	
Commander's Licence:	Commercial pilots licence (FAA) Private pilots licence (CAA) Instrument Rating (CAA + FAA) Night Rating (CAA) Assistant Instructors Rating (CAA)	
Commander's Age:	61 years	
Commander's total flying experience:	1400 hours (of which 600 were on type)	

Approximately 15 minutes after departure from Fairoaks, whilst en route to Conington, the cabin door opened. The pilot decided to divert to Wycombe Air Park, which was an airfield familiar to him. Because he was concerned that the door might become detached from its hinges, he flew the aircraft with one hand whilst holding the cabin door with the other. Upon arrival at Wycombe the controller was out of the tower changing the runway marker. The pilot noted one other aircraft in the circuit, but was unable to alert it to his difficulties because of the high noise level in the cockpit which made RTF communication difficult. The aircraft ahead made a slow circuit and landed, but took a long time to clear the runway. The pilot was reluctant to attempt an overshoot and because of the delay in clearing the runway by the preceding aircraft and the proximity of a helicopter hovering to one side of the runway an approach was made for a short field landing. During the approach, which was made with one notch of flap selected, the air speed indicator fluctuated considerably and appeared to be reading high relative to the pilot's expectations. At approximately 10 feet from the ground the stall warning sounded and the aircraft dropped, landing heavily and damaging the starboard wing and starboard propeller.

The pilot was of the opinion that the abnormal airspeed indicator readings during the approach were caused by turbulence created by the open door.

There is a considerable amount of anecdotal evidence which indicates that doors coming open during flight on light twin and single engined aircraft can give rise to handling problems which can, particularly on some low wing types, be severe.

It appears that, even though the aircraft remains controllable during cruising flight, difficulties may arise during the approach and landing because of changes in aircraft attitude and configuration, the possibility of erroneous ASI readings and possible reductions in tailplane and elevator effectiveness. Loss of elevator authority may not become fully apparent until an attempt is made to flare the aircraft.

The pilot of this aircraft had experienced a door opening on a (different) PA 30 some years previously. On that occasion he had been able to keep his airspeed high during his approach and did not experience any significant problems.

No: 14/83 **Ref: EW/C 842**

Aircraft type and registration:	Westland Bell Soloy 47G-3B-1 G-BHKD (light single engined helicopter)
Date and time (GMT):	30 July 1983 at 0915 hrs
Location:	Newfield Farm, Ledston, Yorkshire
Type of flight:	Aerial application
Persons on board:	Crew — 1 Passengers — Nil
Injuries:	Crew — 1 (fatal) Passengers — Nil
Nature of damage:	Aircraft destroyed, substantial damage to farm buildings
Commander's Licence:	Commercial Pilot's Licence (New Zealand) with CAA Certificate of Validation
Commander's Age:	31 years
Commander's total flying experience:	4930 hours, fixed wing 1193 hours, rotary wing (168 hours on type)

The pilot's day had started at 0400 hrs and he found, on starting the helicopter's engine that the transmission oil pressure was low. He recalled his tanker driver to the company base by radio and then telephoned the General Manager of the company responsible for the helicopter maintenance to report the fault. The General Manager agreed to contact his engineer stationed in the Yorkshire area as soon as practicable and suggested that there was probably an obstruction in the pressure reducing valve of the transmission oil system. The pilot, assisted by his tanker driver, then removed the valve and found that it was contaminated by small pieces of plastic. Between them they cleaned then refitted the valve and, it is believed, replaced the locking wire. After a 15 minute ground run the pilot declared the aircraft to be serviceable and the tanker driver departed for the rendezvous point for the morning spraying operations. The pilot then telephoned again to the maintenance organisation to report that the fault had been rectified and further remarked that there were two other faults that would need rectification when the engineers arrived for a planned routine maintenance check in two day's time. These were that the damper frame on the rotor head was continuously coming loose so that he was having to tighten the nuts every day and that the collective lever was occasionally becoming stiff as if it was reverting to manual operations. The pilot was advised that he should not be flying the aircraft but he replied that "I can handle it". Both the tightening of the damper frame bolts and the removal of the pressure reducing valve are operations outside of the items of maintenance listed in both the company's operation manual and in the Air Navigation (General) Regulations that may be performed by a pilot under the priveleges of his licence.

At about 0900 hrs the pilot made a rendezvous with his tanker and loaded 80 gals of 'Fubol', a potato fungicide. He was then seen to fly to a nearby farm and to commence spraying. Shortly afterwards the helicopter crashed through the roofs of two barns. There were no witnesses to the accident but the nature of the damage to the barns and to the helicopter showed that it had been descending with a bank angle of about 90°. The evidence of the spray pattern on the crop showed that the pilot had completed one run down the length of the field from north to south and had completed a half of the run in the opposite direction before the spray pattern ceased. From this point the farm buildings lay at 70° to his right hand side at about 250 yards. It is probable that the aircraft had turned to the right and climbed before crashing through the barns in a steep right turn. There was no fire but the pilot died instantly from head injuries.

The examination of the wreckage revealed that there had been a failure in the hydraulic power unit for the lateral cyclic control. The 'wire drive' that positioned the shuttle valve to control the flow of hydraulic fluid to the control jack, in accordance with the pilot's control demands, had fractured. The nature of this failure was such that the fracture faces could butt together to transmit a roll-right demand to the control jack but there was no possibility of transmitting a roll-left demand, nor could a roll-right demand, once initiated, be stopped or reversed. In this situation, it would have been impossible for the pilot to have exerted sufficient sideways force on the cyclic control column to have overridden the power controls. The switch for the hydraulic pump to the power controls is not included with those controls mounted on the pilot's collective or cyclic pitch levers but is on the central instrument panel. This switch was found to be in the 'On' position but it is not known whether the pilot tried to switch it off in an attempt to regain control of the helicopter. It would have been very difficult for him to do so since he was occupying the left hand seat and it would mean that he had to release the collective lever and change the cyclic lever to his left hand before reaching across to the switch with his right hand. However it was later demonstrated when the failure was simulated on an identical aircraft, that with the shuttle

valve failed in the incorrect position, hydraulic fluid would be trapped in the jack thus preventing any movement of the cyclic control to the left.

When the failed unit was examined in greater detail it was found that a plain bearing on the linkage to the wire drive had seized due to overtightening and corrosion. The effect of the seized bearing was to cause the wire drive to bend with each input from the pilot to the lateral cyclic control. Expert metallurgical examination of the fracture face confirmed that the failure was as a result of fatigue caused by bending stresses. It also revealed that neither the material itself nor the surface finish conformed to the specification laid down by the aircraft manufacturer. A recommendation was made to the CAA calling for an immediate examination of similar flying controls. The CAA has issued an Emergency Airworthiness Directive no. 001-09-83. The manufacturer has issued a Service Bulletin no. 47-83-9.

The pilot had been wearing a light shirt, shorts and 'flip-flop' sandals but no protective helmet. While it is recognised that the cockpit of a helicopter can become uncomfortably hot in summer due to the 'greenhouse' effect, this standard of clothing is totally inadequate to provide protection in the event of accident or fire, nor can it protect the skin from the effects of the chemicals used in crop spraying. The lethal injuries sustained by the pilot were a fractured skull with associated brain damage. It is possible that had he worn a protective helmet his injuries might have been less severe and his chances of survival improved.

No: 14/83 **Ref: EW/G 83/07/17**

Aircraft type and registration:	Westland Bell 47G-4A, G-AXKL (light single engine helicopter)
Year of manufacture:	Appx 1967
Date and time (GMT):	30 July 1983 at 10.30 hrs
Location:	Manor Farm, South Kinsey, Cheshire
Type of flight:	Aerial Application
Persons on board:	Crew — one Passengers — Nil
Injuries:	Crew — minor Passengers — N/A
Nature of damage:	Aircraft substantially damaged
Commander's Licence:	Airline transport Pilot's Licence
Commander's Age:	34 years
Commander's total flying experience:	2350 hours (of which 1400 were on type)

The aircraft was operating from Manor Farm on a fine day with a westerly wind estimated at 5 knots. The pilot lifted the aircraft into the hover at a high all up weight and carried out the normal hovering checks. With normal indications the aircraft took off in a west-north-west direction and initiated a climbing turn towards downwind. At an estimated height and speed of 50 ft and 35 knots the pilot experienced a "massive power loss" and the aircraft began to descend. The ground in front of the aircraft was sloping away and contained obstructions in the form of power lines and trees. The pilot turned the aircraft to the right and landed it into wind on more level ground. However, the rotor rpm had by now decayed to the extent that the pilot was unable to prevent a heavy landing.

A subsequent investigation of the fuel system and engine failed to find a cause for the power loss. Following a shock loading inspection, the engine was run in a test cell and performed satisfactorily.

No: 14/83 **Ref: EW/G 83/08/22**

Aircraft type and registration:	Druine D31 Turbulent G-AWMR (light, single engined fixed wing aircraft)
Year of manufacture:	1970
Date and time (GMT):	14 August 1983 at 1150 hrs
Location:	Farm field 2 m North of Hemel Hempstead
Type of flight:	Private (pleasure)
Persons on board:	Crew — 1 Passengers — Nil
Injuries:	Crew — None Passengers — N/A
Nature of damage:	Damage to propeller and engine cowlings; fin post broken and winscreen smashed; rear cockpit bulkhead dislocated
Commander's Licence:	Private Pilot's Licence
Commander's Age:	29 years
Commander's total flying experience:	116 hours (of which 29 were on type)

Whilst in cruising flight between Booker and a private airstrip near Stevenage a loud banging noise was heard from the engine, followed by a significant loss of power. Although the engine continued to run, the pilot found he could not maintain height and so he selected a grass field for a forced landing. During the approach to the field, a series of single strand electric fences running across the line of flight became apparent. The remaining engine power was sufficient to enable the aircraft to reach the overshoot area, which was a ploughed field, but, after a smooth touchdown, the aircraft settled into the earth and nosed over onto its back.

Subsequent investigation revealed that the input shaft of the port magneto had sheared. The duplex chain, which drives both magnetos from the crankshaft, had whipped violently, causing it to jump to the outer of the dual cogs driving the starboard magneto. At the same time, it had evidently jumped one or more teeth on the magneto cog, thereby altering the ignition timing of the engine.

The port magneto was fitted with an impulse device, which resulted in the input shaft being longer than that of the basic magneto. Thus the shaft would suffer increased bending stresses in the event of overtightening the duplex chain. It is understood that a forthcoming issue of the PFA Magazine will carry an article on the dangers of overtightening timing chains, together with a recommendation as to the inadvisability of fitting an impulse device to the Lucas SR4 magneto.

No: 14/83 **Ref: EW/G 83/08/08**

Aircraft type and registration:	Cessna 175B G-AROD (light, single engine fixed wing aircraft)	
Year of manufacture:	1960	
Date and time (GMT):	16 August 1983 at 1030 hrs	
Location:	Near Nantwich	
Type of flight:	Private (pleasure)	
Persons on board:	Crew — 1	Passengers — 1
Injuries:	Crew — Nil	Passengers — Nil
Nature of damage:	Serious mechanical damage to engine, damage to both wings, propeller and firewall	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	29 years	
Commander's total flying experience:	123 hours (of which 31 were on type)	

The aircraft was on a flight from Barton, Manchester to Cranfield when at an altitude of 1250 feet the pilot noticed a sudden drop in the indicated oil pressure. This was quickly followed by a loud bang and total loss of power. During the ensuing forced landing the aircraft was damaged by collision with a tennis court fence.

Subsequent strip examination of the engine revealed the centre right big end bearing had suffered a catastrophic failure which had allowed the connecting rod to become detached from the crankshaft. This in turn had caused major damage to the crankcase, centre cylinders and pistons. The big end journal exhibited signs of overheating and its surface finish had been destroyed. Other big end assemblies in the engine, although free to rotate, showed signs of excessive wear. During the engine strip it was discovered that one piston had a piston ring broken in 3 places, and one exhaust stub was loose, with evidence of exhaust gas leakage around the cylinder.

The general appearance of the engine's interior reflected fairly accurately the logged engine time of 574 hours, but the excessive bearing wear was consistent with a lack of, or insufficient cooling of the oil at some time prior to the failure. It was apparent that the intake screen to the oil pump was distorted in a fashion that suggested it may have been blocked at some time. The screen was clean at the time of the AIB examination, the oil pump was found to be in a serviceable condition and oil passageways throughout the engine were free from obstruction.

A sample of oil was sent for analysis the result of which indicated it was consistent with used OM-270. 1% AVgas was present in the oil but there was no evidence of it having been excessively heated.

No: 14/83 **Ref: EW/G 83/08/12**

Aircraft type and registration:	Westland Lysander III (vintage aircraft) G-BCWL
Year of manufacture:	Rebuild completed 1978
Date and time (GMT):	21 August 1983 at approximately 1437 hrs
Location:	Near Chipping Norton, Oxon
Type of flight:	Demonstration
Persons on board:	Crew — 2 Passengers — None
Injuries:	Crew — 2 (minor) Passengers — N/A
Nature of damage:	Propeller, fin rudder and rear fuselage, main wheel spats and mainplane surfaces all damaged
Commander's Licence:	Commercial Pilot's Licence, plus Instrument Rating
Commander's Age:	55 years
Commander's total flying experience:	4041 hours (of which 15 were on type)

The aircraft had positioned at Halfpenny Green during the morning to participate in an Air Show later in the day. As the aircraft engine, a Bristol Mercury XX, had been troublesome in the past the owner's engineer accompanied the pilot on this occasion. The aircraft was refuelled at Halfpenny Green and following some difficulty with engine starting completed its display during which air traffic control reported 'flashes of flame' from the aircraft when the throttle was pumped during one landing. The pilot decided to cruise back to the aircraft's base at Blackbushe following the display without shutting down. During the return flight whilst flying at 2000 ft just below an unbroken cloud layer there were a series of backfires and associated reduction of power. The engine briefly recovered to normal running before a total loss of power. The pilot successfully completed a forced landing in a recently harrowed field but during the ground roll the aircraft turned over onto its back. In their haste to evacuate the aircraft with fuel spilling around them both occupants were slightly injured.

Subsequent examination of the aircraft has revealed that during extensive refurbishment some years ago the fuel tank vent system had been modified. The external vent pipe had been removed and three $^1/_8$" diameter holes drilled in the fuel filler cap. A rectangular hole was cut in the filler cap cork gasket to allow the tank to breathe through the filler cap holes. However, the gasket was free to rotate relative to the cap and could turn to blank off the holes. It is believed that this happened after refuelling at Halfpenny Green and therefore the tank was sealed allowing the engine to run normally for a time after which it suffered fuel starvation. This mechanism could explain some of the previous engine problems experienced.

No: 14/83 **Ref: EW/G 83/09/16**

Aircraft type and registration:	Rollason Beta G-AWHX (light single engine fixed wing aircraft)
Year of manufacture:	1972
Date and time (GMT):	25 September 1982 at 1030 hrs
Location:	Stoke Bardolph, Nottinghamshire
Type of flight:	Private (pleasure)
Persons on board:	Crew — 1 Passengers — Nil
Injuries:	Crew — Nil Passengers — Nil
Nature of damage:	Cockpit screen and canopy shattered, starboard tailplane leading edge substantially damaged
Commander's Licence:	Private Pilot's Licence
Commander's Age:	56 years
Commander's total flying experience:	3970 hours (of which 20 were on type)

After about 20 minutes of flight and whilst in a shallow dive and medium banked turn to port, the combined windscreen and canopy split open, initially from the centre front, and disintegrated in the airstream. One part of the canopy struck the leading edge of the starboard tailplane at about $^2/_3$ of the semi-span outboard cutting through the leading edge and skins back to the spar.

After a momentary loss of control the aircraft was successfully forced landed sustaining no further damage.

The pilot was not injured.

An occurrence report has been sent to the Civil Aviation Authority Safety Data and Analysis Unit.

No: 14/83 **Ref: EW/G 83/09/09**

Aircraft type and registration:	Cessna 180 G-AXZO (light single engine fixed wing aircraft)	
Year of manufacture:	1953 (approximately)	
Date and time (GMT):	25 September 1983 at 1500 hrs	
Location:	Brunton Airfield, Northumberland	
Type of flight:	Parachuting	
Persons on board:	Crew — 1	Passengers — Nil
Injuries:	Crew — None	Passengers — N/A
Nature of damage:	Damaged propeller and wing tips	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	42 years	
Commander's total flying experience:	407 hours (of which 11 were on type)	

During the approach to runway 27 the pilot found that the stabilizer trim was jammed at a point mid-way between full nose down and the take-off position. The pilot decided to continue the approach and landing. At this point in time he noticed that the wind direction had veered since taking off from 270° to 315° and was at 10-15 knots. During the flare the pilot experienced difficulty in holding the aircraft in the correct landing position. When the wheels touched the left wing began to drop and came into contact with the runway surface and at the same time the nose tried to swing right into the wind. The pilot attempted to lift the wing with ailerons and at the same time apply left rudder to stop the right swing, with the control column fully back. The aircraft rocked left to right, then pitched nose down on to the runway and came to rest on its nose. Examination of the stabilizer trim system did not reveal a jam but it was found that it required more effort than normal to operate. Further examination revealed that the sprocket retainer sleeve of the left hand stabilizer trim screw jack had been fitted upside down which resulted in the left and right hand screw jack's drive being out of alignment.

No: 14/83 **Ref: EW/C 850/01**

Aircraft type and registration:	Cessna 152, G-BFRN (light single engine fixed wing aircraft)	
Year of manufacture:	1978	
Date and time (GMT):	23 October 1983 at 1615 hrs	
Location:	Near Wycombe Air Park	
Type of flight:	Private (training)	
Persons on board:	Crew — 1	Passengers — None
Injuries:	Crew — 1	Passengers — N/A
Nature of damage:	Aircraft destroyed. House seriously damaged	
Commander's Licence:	None	
Commander's Age:	57 years	
Commander's total flying experience:	44 hours (all on type)	

The aircraft was being flown by a student pilot on his third solo. Earlier in the afternoon he had flown with his instructor in the circuit to practice full flap landings. Although he had shown a tendancy to be high on finals his landings were good. The instructor re-demonstrated the correct angle of approach and the student flew another circuit and landing to the satisfaction of his instructor. After a short break the instructor briefed his student for the solo exercise.

The student started up and took off on runway 25 and flew a normal right-hand circuit with a slightly extended downwind leg to give himself more separation from other aircraft ahead. He remembers that he was at 850 ft before he started the final turn, and he also remembers calling finals and looking for a Tomahawk reported to be ahead of him. The next event that the pilot remembers was waking up embedded in the roof of a house. There was no fire.

Eyewitnesses had seen the aircraft flying very low on finals and they also heard the engine running normally, just before the Cessna hit the top wire of a power line. It tumbled over the power line and penetrated the roof of a house. The pilot was rescued by the local authority fire service.

Examination of the wreckage revealed no pre-existing defects in the aircraft or the engine, and the fuel tanks contained fuel of sufficient quantity and quality for the flight.

No: 14/83 **Ref: EW/C 854/01**

Aircraft type and registration:	Cessna 310Q G-AZYI (light twin-engined fixed wing aircraft)	
Year of manufacture:	1971	
Date and time (GMT):	11 November 1983 at approximately 1948 hrs	
Location:	8 nm west of Dundee airport	
Type of flight:	not yet determined	
Persons on board:	Crew — 1	Passengers — 5
Injuries:	Crew — 1 (serious)	Passengers — 2 (fatal) and 3 (serious)
Nature of damage:	Aircraft destroyed	
Commander's Licence:	Senior Commercial Pilot's Licence (Instrument Rating expired)	
Commander's Age:	33 years	
Commander's total flying experience:	2300 hours (of which approximately 60 were on type)	

The flight had originally been planned from Gatwick to Aberdeen. Approximately one hour before take-off the destination was changed to Dundee because, due to industrial action by certain ATC personnel at Aberdeen, no aircraft could be accepted there without a previously booked landing time, and no booking was available for G-AZYI. The aircraft accordingly took off from Gatwick at 1743 hrs to fly to Dundee on an IFR flight plan via Ottringham and St Abbs. At 1924 hrs the pilot changed frequency from RAF Leuchars radar advisory service to Dundee and received the 1920 hrs Dundee weather observation, which gave a surface wind of 100°/6 knots, visibility 15 kms, 4/8 Sc at 1000 ft, 8/8 Sc at 2000 ft and QNH/QFE 1026 mbs. Shortly afterwards, the pilot reported to Dundee that he was having difficulty in receiving the Dundee NDB and asked for confirmation of the frequency.

At 1930 hrs, which was the pilot's notified estimate for Dundee, the approach controller at RAF Leuchars saw the aircraft on radar some 10 to 12 miles south-west of Dundee, tracking north-west. After co-ordination by telephone between the controllers at Dundee and RAF Leuchars, the aircraft was given a heading of 090°M to bring it overhead the Dundee beacon. The pilot then reported that he had a good ADF bearing on Dundee but was receiving no identification signal. At this time, the coding unit of the Dundee NDB was unserviceable, and a NOTAM was in force to this effect. At approximately 1938 hrs the pilot reported over the beacon and carried out a procedure turn in the overhead to establish the outbound track of 262°M. He reported OVERHEAD OUTBOUND at 1941 hrs. The Dundee controller expected to receive a BASE TURN COMPLETE call from the aircraft approximately 3½ minutes after the outbound call. When he did not receive this call, he waited for what he described as a reasonable interval and then called the aircraft to ask if the base turn was complete. The pilot replied that he was 'half-way round', and within one minute of this transmission, further reported BASE TURN COMPLETE. This last call was of low received signal strength, as if the aircraft was either at a considerable range or was shielded by high ground. The controller, thinking that the aircraft had possibly gone too far outbound, made a further call but received no reply. He then recorded the time, which was 1949 hrs. Unfortunately these times cannot be verified because the air traffic recording equipment at Dundee was out of service. It is noted that there is no formal requirement for ATC transmissions at Dundee to be recorded.

The pilot afterwards described how he saw a glow through the clouds from the lights of Dundee when close to the overhead. He then flew outbound for 2½ minutes at 120 mph, descending to the height on the approach plate (2240 ft) for the base turn. On completing the base turn he could not obtain a usable bearing from the ADF needle, which was hunting through ± 20°, but he could see ahead of the aircraft a line of lights which he thought were reflecting on water. He expected to be close to the Tay Estuary, and his impression of water reinforced this expectation. In fact, the inbound track on completion of the base turn lies approximately 6 nm north of the River Tay. He descended to 800 ft on the QFE to identify the lights, with the intention of then remaining in sight of the ground. After flying over the lights, he had no further visual contact and accordingly commenced a climb. Soon afterwards the aircraft struck high ground and caught fire.

The aircraft had crashed at 860 ft amsl on the north-west facing flank of a hill 8.3 nm west of the threshold of runway 10, almost directly beneath the extended centreline and some 200 metres from the impact point of a Partenavia P68B, which had struck the same hill on 8 September whilst carrying out an NDB approach to Dundee. AIB Bulletin 12/83 describes this earlier accident when, again, the air traffic recording equipment was out of service.

Examination of the Wreckage

Ground marks revealed that the aircraft had hit the hill obliquely whilst on a heading of 107°M, in a level pitch attitude and with approximately 18° of right bank. The right wing tip and right mainwheel had struck the ground almost simultaneously, followed by the right engine; the aircraft had then yawed violently to the right. The initial impact had been fairly flat and had been followed by two further impacts as the aircraft had continued along the slope and up the hill, coming to rest 60 metres from the point of initial impact. Propeller marks showed that both engines had been developing power at approximately symmetrical rpm, and that the aircraft's speed on impact had been between 98 and 109 knots. The cabin had been distorted during the impact sequence, causing all windows to either pop out or disintegrate. In addition, the cabin door had been forced out of its aperture. Fire appeared to have started after the aircraft had come to rest and to have burned fiercely for some time until the cabin was completely destroyed. Despite the fire damage, it was ascertained that both aircraft altimeters had been set on 1026 mbs; the flying control mechanisms were complete and had apparently been serviceable up to the time of impact.

Search, Rescue and Survival Aspects

At 2006 hrs, a rescue helicopter took off from RAF Leuchars to search for the aircraft but, by then, the cloudbase had lowered to 400 ft, the hills to the west of Dundee were covered in cloud, and the search could not be continued by helicopter. Mountain rescue searched throughout the night but were also hindered by hill fog and it was not until 0800 hrs the next day that the survivors were found by a search and rescue dog team.

The aircraft was fitted with shoulder restraint harnesses for the front seat occupants; the pilot and the front right rear seat passenger had only their lapstraps fastened and both had suffered head injuries, as well as severe injuries to their lower limbs. However they were able to drag themselves out of the aircraft through the door aperture. The passenger seated behind the pilot had not fastened his lap strap and had been thrown clear, probably on the second impact. The rear seat passenger has no recollection of how he escaped from the aircraft but recalls finding his clothes on fire. The remaining two passengers, on the right side, had been unable to escape from the aircraft.

Follow-Up Action

After the accident, the Dundee NDB and its associated fan marker were flight checked. Bearing information and radiated field strength from the NDB were found to be within correct tolerances and no spurious fan marker radiation was detected.

As a result of the two recent accidents in the same location, the CAA have been invited to review the instrument procedures at Dundee and to consider whether any changes or special warnings are necessary to improve safety.

No: 14/83 **Ref: EW/G 83/11/03**

Aircraft type and registration:	Cessna 150 Aerobat G-BCKV (light single engine fixed wing aircraft)	
Year of manufacture:	1974	
Date and time (GMT):	11 November 1983 at 1130 hrs	
Location:	2 nm E.N.E. of Perth Aerodrome	
Type of flight:	Solo training	
Persons on board:	Crew — 1	Passengers — Nil
Injuries:	Crew — Nil	Passengers — N/A
Nature of damage:	Substantial	
Commander's Licence:	Student Pilot	
Commander's Age:	21 years	
Commander's total flying experience:	36 hours (all on type)	

At 300' after the first take-off of a solo training detail sudden vibration and noise associated with loss of engine power caused the student pilot to carry out a forced landing. The aircraft was successfully landed in ploughed field but after a ground roll of 60-70 yards, when the aircraft had almost stopped, the nose wheel entered a hole and the aircraft turned over onto it's back. The student evacuated the aircraft immediately without assistance and was uninjured.

Subsequent examination of the engine revealed a failure of number four cylinder around the circumference at the attachment flange.

No: 14/83 **Ref: EW/G 83/11/04**

Aircraft type and registration:	Piper PA 28R, G-AWBA (light single engine fixed wing aircraft)
Year of manufacture:	1968
Date and time (GMT):	16 November 1983 at 1115 hrs
Location:	White Waltham Aerodrome, Berkshire
Type of flight:	Private (pleasure)
Persons on board:	Crew — 1 Passengers — Nil
Injuries:	Crew — Nil Passengers — N/A
Nature of damage:	Damage to the nosewheel, propeller and engine
Commander's Licence:	Private Pilot's Licence
Commander's Age:	67 years
Commander's total flying experience:	1074 hours (of which 101 were on type)

Prior to the intended flight, the pilot was briefed on the work in progress on runway 03, the runway in use. He was shown a sketch map and instructed where to run up and on which side of the runway to take off and land. He did not however realise that the trenches had been left unmarked.

In order to reach the take-off point for runway 03, the pilot intended to cross runway 29 which, although marked with coloured flags to prevent landings, showed no indication that it should not be crossed. As the aircraft crossed the centreline the nosewheel dropped into an unmarked trench.

The pilot, who had been wearing an upper torso restraint harness, escaped without injury.

No: 14/83 **Ref: EW/G 83/11/07**

Aircraft type and registration:	Piper PA28R 140B Cherokee G-GCAT (light single engine fixed wing aircraft)	
Year of manufacture:	1969	
Date and time (GMT):	20 November 1983 at 1146 hrs	
Location:	Liverpool Airport	
Type of flight:	Training	
Persons on board:	Crew — 1	Passengers — Nil
Injuries:	Crew — Nil	Passengers — N/A
Nature of damage:	Minor, to propeller, nosewheel leg and engine mounting	
Commander's Licence:	Student	
Commander's Age:	55 years	
Commander's total flying experience:	52 hours (of which 24 were on type)	

After a dual circuit detail with his instructor, the student was authorised for a period of solo circuits on runway 27. The wind at this time was 330°M at 5 to 10 kt. During the detail, the wind veered to 360°M 5 to 10 kt. On the student's fourth circuit he intended to carry out a touch and go landing, but touchdown was heavy, and the aircraft bounced twice, so he continued with his landing run, and gently decelerated the aircraft. After informing ATC that the touch and go had been discontinued, the student also informed them that he had terminated his circuit detail. He then taxied back to the apron, where damage to the propeller and nose wheel assembly was discovered.

No: 14/83 **Ref: EW/G 83/11/10**

Aircraft type and registration:	Druine D31 Turbulent G-APOL (light single engine fixed wing aircraft)	
Year of manufacture:	1952	
Date and time (GMT):	27 November 1983 at 1520 hrs	
Location:	2 miles North East of Strathaven, Lanarkshire	
Type of flight:	Private	
Persons on board:	Crew — 1	Passengers — Nil
Injuries:	Crew — Nil	Passengers — N/A
Nature of damage:	Substantial	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	27 years	
Commander's total flying experience:	200 hours (of which 12 were on type)	

The aircraft was flying at 700 feet en route to Strathaven Gliding Site when the engine stopped. The pilot attempted to re-start it without success. During the subsequent forced landing across a field the aircraft struck a bank breaking off the undercarriage and port wing before coming to rest. The cause of the engine failure has not been determined.