

ACCIDENT

Aircraft Type and Registration:	Druine D.31 Turbulent, G-APTZ	
No & Type of Engines:	1 Volkswagen 1600 (Peacock) piston engine	
Year of Manufacture:	1959	
Date & Time (UTC):	15 March 2008 at 1534 hrs	
Location:	Headcorn Airfield, Kent	
Type of Flight:	Private	
Persons on Board:	Crew - 1	Passengers - N/A
Injuries:	Crew - 1 (Minor)	Passengers - None
Nature of Damage:	Aircraft destroyed	
Commander's Licence:	Private Pilot's Licence	
Commander's Age:	44 years	
Commander's Flying Experience:	152 hours (of which 32 were on type) Last 90 days - 5 hours Last 28 days - 2 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot and witness observations	

Synopsis

During a display practice which involved flying at approximately 5 ft above the ground under a line of bunting, the aircraft probably encountered a disturbed air mass that resulted in an uncommanded change of flight path. The pilot was unable to recover the aircraft before it impacted the ground.

History of the flight

The accident occurred during practice for an air display in which three aircraft would fly the team's 'standard' routine. This involved the aircraft flying in procession to conduct a series of passes at a height of approximately 5 ft under a string of bunting held between two 'limbo poles'. The practice was conducted in an area north of

the active runway, with the closer of the two limbo poles located approximately 50 ft north of the runway edge. The licensed grass Runway 11 was in use and at least one other aircraft, a Cessna 172, continued to operate in the circuit during the display practice. There was a light south-easterly wind with good visibility and no cloud below 5,000 ft.

Prior to the flight, the pilots of all three aircraft discussed and 'walked through' the routine. The accident aircraft then took off and followed the leader, flying as number two in the procession of three aircraft. Having made the first pass parallel to Runway 11 each aircraft turned north, perpendicular to the runway, before executing a right turn

through 270° at approximately 200 ft agl to position for a second pass, this time heading in a westerly direction parallel to the active runway. The pilot of G-APTZ stated that during this manoeuvre, he turned slightly inside the leader to avoid flying “unnecessarily in any wake turbulence” and also to “fractionally close the gap between these two aircraft”. He positioned the aircraft for a straight descending approach to the limbo poles and after levelling out, applied full power approximately 50 m before the poles, intending to “maximise control authority during the limbo manoeuvre”. He judged that his position relative to the leader and to the poles was correct and nothing at that stage caused him to consider flying over, rather than under, the bunting.

His recollection of subsequent events was less clear, but he remembered that immediately prior to passing under the bunting, the aircraft made an uncommanded climb and change of direction. He estimated that the aircraft was travelling at 100 kt at a height of 5 ft agl. Shortly afterwards the aircraft impacted the ground. It came to rest upright, facing 180° to the original flight path with both wings detached and considerable disruption to the cockpit and forward fuselage. The pilot was attended at the scene and taken to hospital by air ambulance, but was subsequently discharged with what he described as minor injuries.

Accident site

Marks on the ground leading from the point of initial impact to the final resting position of the aircraft indicated that it had impacted the ground in an essentially level attitude, probably touching down first on the right main wheel. There was evidence, from regularly spaced cut marks in the ground beyond the initial impact point, that the engine had been producing power when the propeller blades struck the ground. There was no evidence that the aircraft had fouled the bunting.

CAA Display Authorisation Evaluator

There were several witnesses, including a CAA Display Authorisation Evaluator (DAE) who was a former member of the team and an experienced pilot of this type of aircraft. Aware that the team was conducting a pre-season practice, he “took a keen interest” in the activity commenting that, in his role as a DAE, he would almost certainly have been asked to renew the team’s Display Authorisations for the coming season, either on that day or at a later date. He stated that at least one display practice had been conducted that day prior to the accident and that the ‘limbo routine’ appeared normal.

Immediately before the accident flight, the DAE witnessed a formal briefing by the leader which included a ‘walk through’ of the planned sequence. The limbo poles were being held by ground crew members who the DAE understood had been briefed and were familiar with the display sequence. The bunting was made of cord and fixed to the poles with thread so as to be frangible if struck by an aircraft. Describing the force required to break the thread, he stated that in his experience it would break on a windy day if held too tightly between the limbo poles.

The DAE did not see the aircraft impact the ground but did see it breaking up as it slid across the ground. He also took photographs of the aircraft and accident site. In a written statement to the AAIB he noted that the Turbulent had sensitive controls, adding that relaxed control inputs were required to avoid pilot-induced oscillations of the aircraft. He concluded that the aircraft may have encountered the wake of the preceding aircraft in the formation and that the pilot may have over-compensated for the resulting flight path deviation, causing the aircraft to descend and impact the ground.

Applicable regulations

Rules of the Air Regulations 2007

Rule 5(3)b – ‘*The 500 feet rule*’ states that:

‘Except with the written permission of the CAA, an aircraft shall not be flown closer than 500 feet to any person, vessel, vehicle or structure.’

Rule 6 provides several exemptions from this rule, including:

‘(a) Landing and taking off

(i) Any aircraft shall be exempt from the low flying prohibitions in so far as it is flying in accordance with normal aviation practice for the purpose of—

(aa) taking off from, landing at or practising approaches to landing at; or

(bb) checking navigational aids or procedures at, a Government or licensed aerodrome.

(ii) Any aircraft shall be exempt from the 500 feet rule when landing and taking-off in accordance with normal aviation practice or air-taxiing’

And,

‘(f) Flying displays etc

An aircraft taking part in a flying display, air race or contest shall be exempt from the 500 feet rule if it is within a horizontal distance of 1,000 metres of the gathering of persons assembled to witness the event.’

The DAE stated that an exemption from Rule 5(3)b was in force for display practices at Headcorn.

Rules 8 and 12 refer to ‘*avoiding aerial collisions*’ and ‘*flight in the vicinity of an aerodrome*’. These rules provide for air display activities to take place at an aerodrome providing authorisation is given by an Air Traffic Control Unit (ATSU).

Civil Aviation Publication (CAP) 403 – ‘Flying Displays and Special Events’

CAP 403, published by the CAA, is a guide to safety and administrative arrangements for flying displays and special events. It states in its introduction that it is intended as a code of practice to provide guidance to ensure that the safety of both the participants and the spectators is not compromised and that:

‘minima and standards quoted should be treated as almost absolute unless sound logic demands otherwise. They should be treated as applying equally to practice for, as well as participation in, Air Displays and Special Events.’

Pilot experience

The pilot gained his Private Pilot’s Licence on Tiger Moth aircraft, was current on the Turbulent and held a Display Authorisation valid for this type issued by the CAA. This was his first display season.

Other information provided by the pilot

The pilot was content that the briefing had prepared him adequately for the intended routine. There was, for example, “lots of emphasis put on not staying close to the ground for any longer than necessary”, “a discussion of the dive down, pull up under the poles” technique and an exploration of the options available to each pilot for exiting a given manoeuvre or terminating the whole

routine. He thought that adequate consideration had been given to his inexperience by the more experienced members of the team.

The pilot did not see the C172 during the accident because he was concentrating on following the aircraft ahead, but noted that turbulence from the 172 that was doing circuits might have been carried from the runway toward the practice area by the southerly component of the surface wind. He suggested that one way to improve the safety of the activity might be to practise at a location which provided more separation from non-participating aircraft. Indeed, the next team practice was at a different aerodrome, free from other traffic.

Discussion

The practice was similar to displays and practice sessions that had been carried out by the team at Headcorn for several years and the pilot appeared to have been briefed properly. The activity was conducted at an airfield where an appropriate exemption from Rule 5 was in force for such practices.

CAP 403 states that:

'minima and standards quoted should be treated as applying equally to practice for, as well as participation in, Air Displays and Special Events'.

The distance between the display practice and the edge of the active runway was less than the minimum

specified between a crowd and display line for this type of display. It could be argued that aircraft operating from the active runway that were not active participants in a practice should have been afforded the same protection as spectators at an air display. However, Rules 8 and 12 of the Air Regulations 2007 together provide for such activities to take place if they do so in accordance with an authorisation provided by an ATCU. It is therefore beholden upon the ATCU to determine whether such an authorisation is appropriate and, by extension, to ensure that other aircraft operating at the aerodrome are aware that such an activity is taking place.

The DAE commented that to curtail normal flying activities during display practice would adversely affect the operation of this busy aerodrome and would probably mean that no such practices would take place in the team's familiar 'home' surroundings. During several years of successful operations of this sort at Headcorn, there is no previous evidence that the activity itself has endangered the participants, nor is there any evidence that the sequence of this accident presented a danger to non-participants.

Conclusion

During a display practice conducted close to the ground but in accordance with applicable regulations, the aircraft probably encountered a disturbed air mass that resulted in an uncommanded change of flight path. The pilot was unable to recover the aircraft before it impacted the ground.