ACCIDENTS INVESTIGATION BRANCH
Department of Trade and Industry

Cessna FA. 150 L Aerobat G-AYKM Report on the accident at Chevening Park, Kent on 25th August 1972

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17/73	Cessna FA.150 L Aerobat G–AYKM at Chevening Park, Kent. August 1972	December 1973

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Department of Trade and Industry
Accidents Investigation Branch
Shell Mex House
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15 October 1973

The Rt Honourable Peter Walker MBE MP
Secretary of State for Trade and Industry

Sir,

I have the honour to submit the report by Mr N S Head, an Inspector of Accidents, on the circumstances of the accident to Cessna FA.150 L Aerobat G–AYKM which occurred at Chevening Park, Kent on 25 August 1972.

I have the honour to be
Sir
Your obedient Servant

V A M Hunt
Chief Inspector of Accidents

Accidents Investigation Branch
Civil Aircraft Accident Report No 17/73
(EW/C420)

Aircraft:	Cessna FA.150 L Aerobat G–AYKM
Engine:	Continental 0-200-A
Registered Owner:	Mr J Butler
Operator:	The South London Aero Club
Pilot:	Mr I A M De-Taranto – Killed
Passengers:	One – Killed
Place of Accident:	Chevening Park, Kent
Date and time:	25 August 1972 at 1741 hrs
	All times in this report are GMT

Summary

During a flight, on which the pilot had expressed the intention of carrying out aerobatics, the aircraft stalled and spun from a steep turn at a low height. It is believed that the stall and spin were unintentional. The aircraft did not recover from the spin and the pilot and his passenger were killed when it struck the ground. The reason for the failure to recover from the spin has not been determined but in the absence of evidence of failure or malfunction of the aircraft or its controls, it is concluded that in the hazy weather conditions, the pilot may have become disorientated and taken incorrect control movements to effect recovery.

1. Investigation

1.1 History of the flight

At about 1700 hrs on the day of the accident the pilot who was undergoing instruction in air traffic control duties, reported at Biggin Hill Control Tower and asked the duty air traffic controller if he could have some time off as he wished to take a friend for a half hour aerobatic flight. The controller agreed to the request but pointed out that the weather conditions were rather hazy for aerobatics.

Shortly afterwards the pilot went to the flight office of the South London Aero Club and booked out on G–AYKM. According to the secretary of the club he did not mention that he was taking a passenger. The aircraft took-off on Runway 11 at 1733 hrs and made a right turn out. Normal radio procedures were followed and after the pilot reported he was clearing the circuit no further communication was received from him.

A few minutes later the aircraft was seen flying over the Chevening area making steep turns. Only one witness, of a number that saw the aircraft at this time, could give an estimate of its height; this witness believed it was about 1,000 feet. During a very steep turn to the left through approximately 180° the nose was seen to drop. The aircraft became almost inverted and then went into a left hand spin. After about four turns this became a left hand spiral dive with the nose about 60° below the horizon. Approximately four more complete turns of the spiral were made before the aircraft struck the ground. Apart from a short burst of power just before impact no engine noise was heard during the spin or the spiral.

1.2 Injuries to persons

Injuries	*Crew*	*Passenger*	*Others*
Fatal	1	1	–
Non-fatal	–	–	–
None	–	–	–

1.3 Damage to aircraft

The aircraft was destroyed by impact and fire.

1.4 Other damage

Nil.

1.5 Crew information

The pilot, Mr Ian Alexander MacDonald De-Taranto, aged 26, was the holder of a Private Pilot's Licence. He was assessed fit at a medical examination on 29 July 1972. He had flown a total of 690 hours of which about 21 were in command on Cessna 150 aircraft; he had last flown this aircraft type on 22 April 1972.

From evidence available it has been established that Mr De-Taranto had carried out aerobatics, mainly stalls and spins, on various types of light aircraft but it is not known whether this included the Cessna FA 150. On no occasion was a spin started from a sustained steep turn or at a lower

height than 4,000 feet. Recovery action was always taken after about two turns. It was the pilot's custom to use full safety harness and to see that his passenger did likewise.

1.6 Aircraft information

1.6.1 *General*

The aircraft was built in France by Reims Aviation in 1970. It had a current certificate of airworthiness in the Transport Category (Passenger).

The Continental type 0-200-A engine was built by Rolls Royce Limited and was new when it was installed in G–AYKM. A McCauley fixed pitch metal propeller was fitted. Both airframe and engine had completed 202 hours and they had been maintained in accordance with an approved maintenance schedule. The weight and centre of gravity of the aircraft were within the prescribed limits and before the departure from Biggin Hill the tanks were filled to capacity (19 gallons) of 80/87 Avgas.

Shoulder harnesses were fitted to both the front seats. These consisted of webbing straps anchored by a steel cable to the aircraft structure at the rear of the cabin. They are fastened over the buckle of the seat belt.

1.6.2 *Spinning Tests*

In 1968 an extensive programme of stalling and spinning tests was carried out on a Cessna F 150.H. Information from the test report, of importance in the circumstances of this accident, shows that when a spin was entered from a level left turn the aircraft adopted an almost vertical nose down attitude and when about half way round the first turn the nose started to pitch up. Subsequent turns of the spin were similar to the first but less oscillatory and after four to six turns the spin changed to a spiral dive. Height loss per turn was between 200 and 300 feet. After the spin, approximately 400 feet was lost before the aircraft was settled in level flight.

Normal recovery action from the spin was always effective and if the controls were released the spin stopped immediately.

Because of a tendency for the pilot to be thrown about in the cockpit during the spin, the test report recommended full safety harness as essential, and that spins should not be practised below 3,000 feet above ground level.

1.7 Meteorological information

A weather observation taken at Biggin Hill at 1740 hrs was as follows:

Surface wind:	110°/5 knots
Cloud:	No low cloud
Visibility:	6 kilometres
Temperature:	+24° centigrade
QNH:	1024 millibars

An appreciation of the weather in the area at the time of the accident made by the Meteorological Office included the information that the weather was fine but hazy, the haze extending from ground level to 4,500 feet.

It is considered that below 4,500 feet there would be no clearly defined horizon.

1.8 **Aids to navigation.**

Not applicable.

1.9 **Communications**

The VHF radio contacts between the aircraft and Biggin Hill Tower were normal. The last communication with the aircraft was when it cleared the Biggin Hill circuit.

1.10 **Aerodrome and ground facilities**

Not applicable.

1.11 **Flight recorder**

No flight recorder was required or fitted.

1.12 **Wreckage**

The aircraft had crashed on sloping ground at the edge of a wood. At the moment of impact it was at fairly high speed in a steep nose down attitude and was turning to the left. The attitude and speed appeared to be consistent with a spiral dive. The aircraft was complete with all control surfaces attached and with the flaps retracted. Fire broke out at impact and this consumed most of the forward fuselage, cabin structure and inner mainplane. The engine and propeller were severely damaged by fire but the condition of the remains of the propeller indicated that the engine was not developing power at impact. Examination of the engine revealed no evidence of any mechanical failure but the condition of the fuel and ignition systems could not be checked because of extreme damage by impact and fire. The flying controls and their associated circuits were examined; no evidence was found of any pre-impact failure. The wreckage was sifted and a general search made of the area. No extraneous article, which might have jammed or impeded the controls of the aircraft, was found.

The remains of both seats were recovered. There was no evidence that either seat structure had collapsed prior to impact. The seat belts and associated shoulder harnesses had been destroyed by fire but the remains of the buckles were found in the fastened position.

1.13 **Medical and pathological information**

A full post mortem examination revealed no medical cause for the accident. A slightly raised carbon monoxide level that was found in the pilot's blood was compatible with normal function and attributable to smoking habits. The accident was non-survivable; both occupants were killed instantly on impact.

1.14 **Fire**

A fierce ground fire, caused by ignition of the fuel following disruption of the aircraft's tanks, ensued after impact. The fire consumed a major part of the aircraft structure.

The Sevenoaks Station of the Kent Fire Brigade was informed of the accident at 1746 hrs and appliances arrived at the scene at 1757 hrs:

40lbs of dry powder extinguishant plus water from a hose reel jet were used to deal with the fire which was brought under control by 1803 hrs. 24 fire brigade personnel were in attendance.

1.15 Survival aspects

The Sevenoaks Station of the Kent County Constabulary received a 999 call at 1741 hrs informing them of the accident. The wreckage was located at approximately 1800 hrs; the police arrived at the scene about the same time as the fire brigade and ambulance services. Examination of the remains of both aircraft seats showed that under impact forces they had failed at the rail mountings. The two seat belt buckles were found; both were in the fastened position.

2. Analysis and Conclusions

2.1 Analysis

The investigation into the accident revealed no evidence of pre-crash failure of the aircraft or of pilot incapacity. It was established that the pilot's practice was for full safety harness to be used both for himself and his passenger, consequently, interference with the controls by the passenger falling on them during the spin is unlikely. It was also established that on no occasion was the pilot known to have entered a spin from a sustained steep turn or from a height lower than 4,000 feet. In this instance, as the spin was started from a turn and from a comparatively low height, it was almost certainly inadvertent. The spinning tests, referred to in para 1.6.2 show that spin recovery with this aircraft type is normal and immediately effective following the appropriate control movements. It is of particular interest in this investigation that recovery follows automatically if the controls are released. Consequently, in broad terms, it can be deduced that in this accident, pro-spin instead of anti-spin control was applied and maintained for too long and in the absence of evidence of aircraft malfunction, this could have been the result of the pilot becoming disorientated and mistaking the direction of rotation in the spin.

On this aspect advice was sought from aviation medical sources. It is known from the reports of pilots and other studies that spinning manoeuvres can give rise to spatial disorientation. Pilots normally obtain information about the attitude and motion of their aircraft from visual cues and do not attend to sensations engendered by inner ear (vestibular) and other receptors, stimulated by the angular and linear accelerations of the flight environment. However, when deprived of visual cues, or when highly stressed, even the experienced pilot may attend to his vestibular sensations and allow his control of the aircraft to be based on these cues which are frequently false or inadequate.

With deliberate spinning the pilot decides the direction of the spin and therefore the appropriate recovery action is known beforehand. On this occasion it is likely that the pilot was surprised by the stall and spin and also confused by the almost inverted attitude of the aircraft when it entered the spin. The weather conditions were hazy; without a clearly defined horizon external visual cues may have been inadequate to enable him to interpret correctly the direction of rotation. A further factor which would not have helped the pilot may have been the relatively small amount of height available for recovery. This could have led to a degree of stress which in turn could also have effected his analysis of the situation.

2.2 Conclusions

(a) *Findings*

(i) The pilot was properly licensed and had experience of spinning.

(ii) The documentation of the aircraft was in order; it had been properly maintained and its weight and centre of gravity were within authorised limits.

(iii) There was no evidence of pre-crash failure of the aircraft.

(iv) The spin was not intentional and followed a stall during a steep turn at a comparatively low height.

(v) Because of the manner of entry into the spin and the lack of external visual cues in hazy weather, the pilot could have become disorientated.

(vi) The raised carbon monoxide level in the pilot's blood is not significant in this accident.

(b) *Cause*

The accident resulted from a failure to recover from a spin. The reason for this has not been determined but it may have resulted from the pilot becoming disorientated and mistaking the direction of rotation.

N S Head
Inspector of Accidents

Accidents Investigation Branch
Department of Trade and Industry
October 1973

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