BEA
Bureau d'Enquêtes et d'Analyses
pour la sécurité de l'aviation civile

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REPORT
ACCIDENT

Loss of pitch control, collision with the ground on entering the aerodrome traffic pattern

Aircraft	Cessna C152 registered F-GLPO
Date and time	Sunday 8 January 2012 at 17 h 13[1]
Operator	Club
Place	Moisselles (95)
Consequences and damage	Pilot and female passenger killed, aircraft destroyed

[1] All the times given are in local time.

This is a courtesy translation by the BEA of the Final Report on the Safety Investigation. As accurate as the translation may be, the original text in French is the work of reference.

HISTORY OF FLIGHT

The pilot, accompanied by a female passenger, took off at 17h04 for a local flight of about ten minutes from unsurfaced runway 25 of Moiselles aerodrome. Radar data showed that he followed the mandatory route as far as the CTR limit (see figure 1), then turned back and returned by the same route. The pilot was flying at an altitude of about 1,400 ft. He then began to enter the pattern for the right hand downwind leg to runway 25. The last recorded position at 17 h 13 was in crosswind at a height of about 700 ft. The wreckage was found close to this position in a field with no obstacles, about 1 NM west of the aerodrome.

Several witnesses located at various sites explained that they saw the aeroplane, flying straight with wings level, suddenly pitch nose down. They stated that the aeroplane's descent was fast.

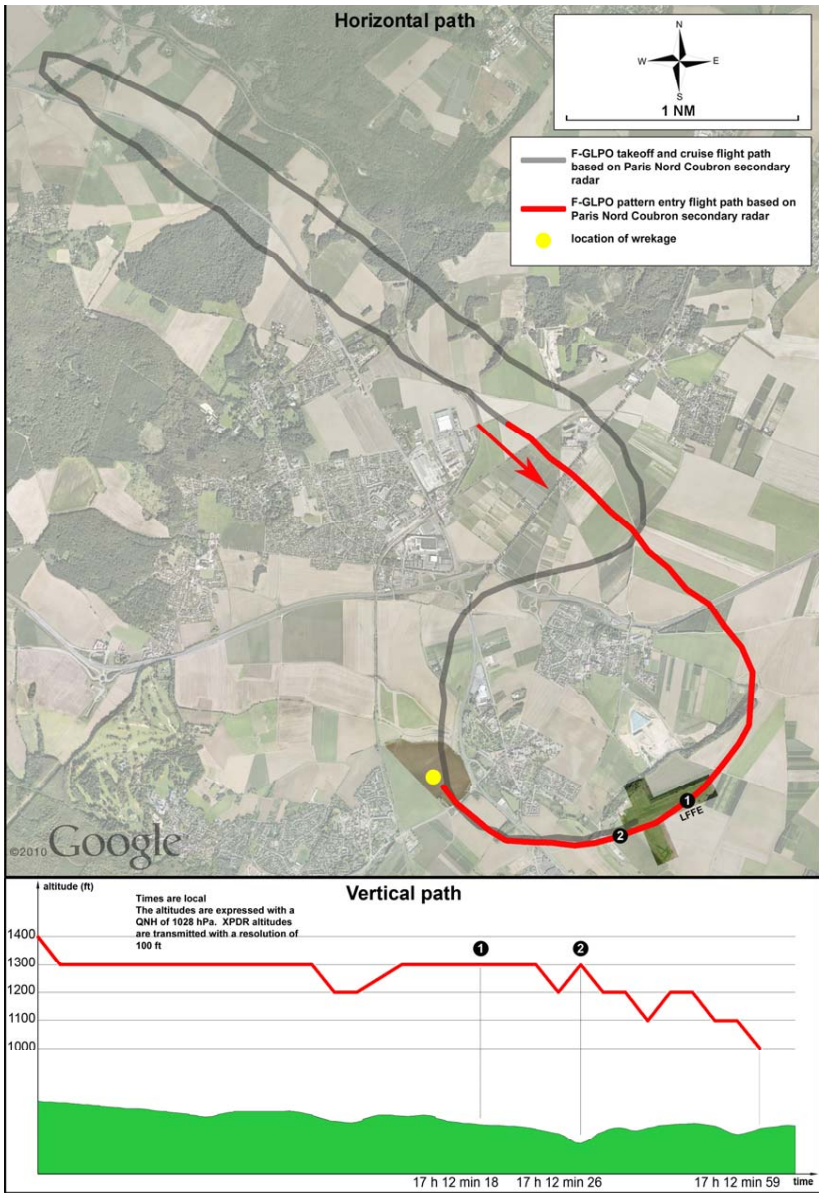

Figure 1: Flight path plotted from radar data

WRECKAGE AND IMPACT INFORMATION

The entire wreckage was grouped over a small area. Site and wreckage observations showed that the aeroplane hit the ground with high energy and a high pitch-down attitude.

Technical examinations conducted on the airframe, elevator trim and the flight control systems did not bring to light any anomaly that could have contributed to the accident.

There were no marks of a bird strike on the windscreen debris.

MEDICAL AND PATHOLOGICAL INFORMATION

The blood samples taken and the autopsy carried out on the bodies of the pilot and the female passenger did not reveal any element likely to explain the event.

The pilot's injuries suggested that he was in piloting position with his heels on the floor. His right hand, in a gripping position, was compatible with clenching the elevator control.

ADDITIONAL INFORMATION

The aerodrome has an air-to-air information system. At the time of the accident, several people from the flying club were near a radio tuned to the air-to-air frequency[2]. They did not hear any specific message.

[2]Moisselles aerodrome air-to-air information frequency is not recorded.

Roissy Charles de Gaulle (95) airport's primary radar data indicated that there was no aeroplane flying close to F-GLPO at the time of the accident.

The meteorological conditions were compatible with visual flight by day and did not contribute to the event.

The aeroplane had flown about 20 hours since the last scheduled inspection (200 hours type).

The pilot[3] totalled about 95 flying hours including 34 on Cessna 152. He had flown for 2 h 30 in this aeroplane on the day of the accident. It was the female passenger's first flight in a light aircraft.

[3]He also held a glider pilot's licence issued in September 2010.

TESTS AND RESEARCH

Cessna and Reims Aviation 150/152 are equipped with two wheels enabling pitch and roll attitude to be controlled. The wheels are linked behind the instrument panel by a set of tubes forming a "Y". In the cockpit, the vertical branch of the "Y" goes behind the instrument panel, between the rudder pedals. There is a system of chains and transmissions on the "Y" in order to transmit the roll inputs.

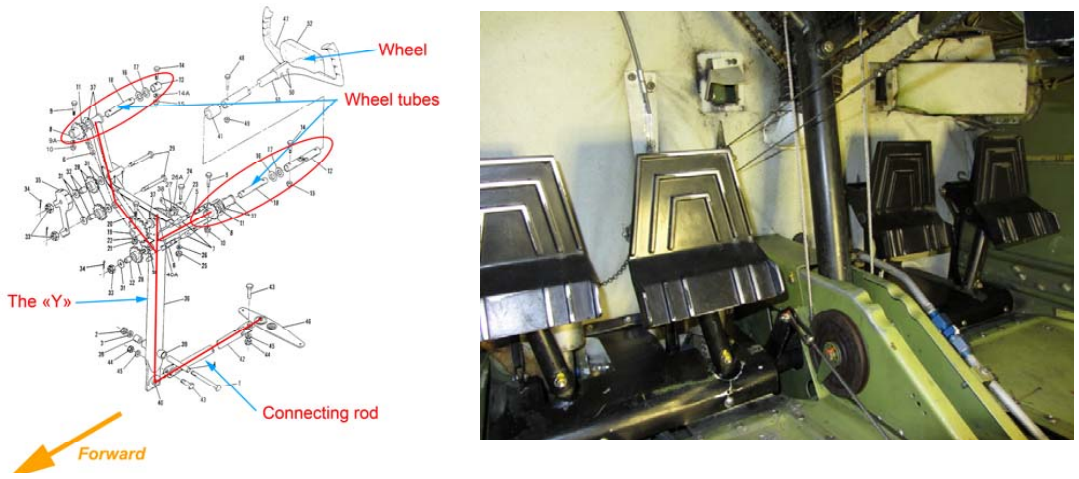

Figure 2: Overview of the pitch control system in the cockpit

A simulation on the ground was carried out with a person of similar weight to the female passenger in the accident. The tests showed that it is possible when sitting on the right seat to put the tip of one's left foot on the elevator control transmission, while retaining a natural, comfortable posture (leg stretched out or slightly bent). This posture is consistent with the passive attitude that a passenger may have. Without exerting great pressure with the left foot, a passenger may easily put the elevator control transmission in full pitch-down position, without disrupting roll attitude. Under test conditions it was not possible to counter this action with inputs on the wheel.

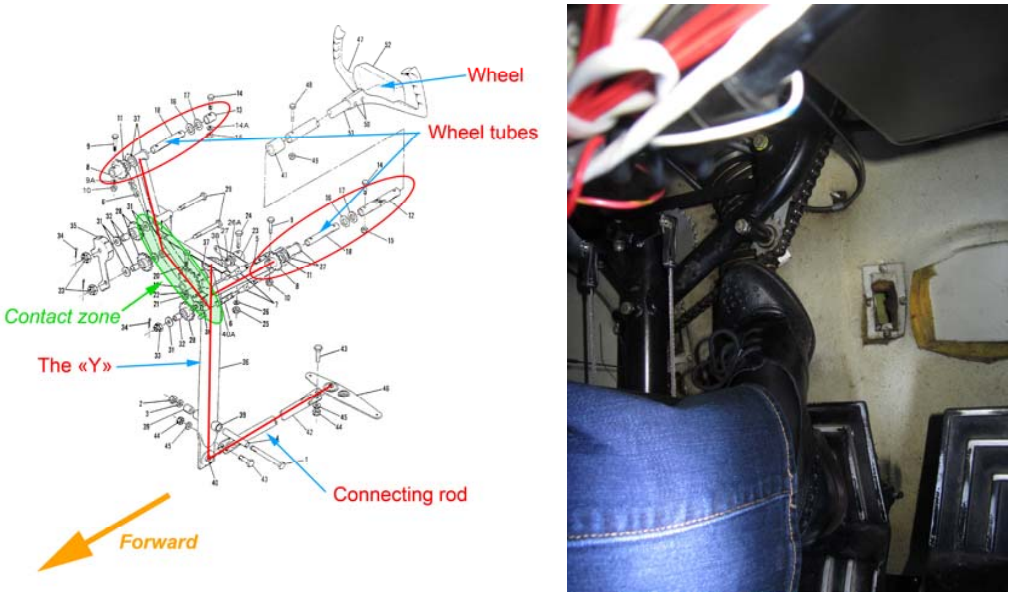

Fig. 3 – Interference with the foot on the elevator control transmission (at the level of the chain)

Fig. 4 – Posture with seat pushed back

Fig. 5 – Posture with seat pulled forward

Interviews with several instructors showed that most of them were not aware of the presence of this elevator control transmission close to the rudder pedals.

Cessna Aircraft Company, type rating holder, informed the BEA that no cases of passenger interference in control transmission had been reported.

CONCLUSION AND LESSONS LEARNED

Loss of pitch control occurred suddenly during the crosswind leg at a height of about 700 ft, yet the flight had been under control until then. No technical anomaly was highlighted.

The investigation showed that it was possible for a passenger in the right side seat to push the elevator control transmission with their left foot, causing the aeroplane to pitch nose down. Such an action is compatible with a natural, comfortable posture for a person the size of the female passenger. The observations made suggest that the pilot was probably making an input on the elevator control wheel with two hands at the time of the accident. This attitude is consistent with that of a pilot trying to counter a pitch-down input.

It is thus possible that the accident was due to the female passenger's involuntary and undetected action on the elevator control system. The aeroplane's low height, in the aerodrome traffic pattern did not enable the pilot to recover control of the aeroplane.

The investigation did not establish if the pilot had given a briefing to the passenger before the flight. A briefing allows passengers to be made aware of the specific environment of an aeroplane and reminds them of the importance of not interfering with the controls. The report of the accident to the multi-axis micro-light, identified as 88-LB, highlighted a case of a passenger's inadvertent input on the aircraft controls. This report is available on the BEA website: http://www.bea.aero/docspa/2011/88-b110821/pdf/88-b110821.pdf.

SAFETY RECOMMENDATION

Note: In accordance with Article 17.3 of European Regulation (EU) 996/2010 of the European Parliament and Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation, a safety recommendation shall in no case create a presumption of blame or liability for an accident, a serious incident or an incident. The addressee of a safety recommendation shall inform the safety investigation authority which issued the recommendation of the actions taken or under consideration, under the conditions described in Article 18 of the aforementioned Regulation.

The investigation brought to light the fact that it is possible for a passenger in the right seat to interfere with the elevator control system, and in this way cause a loss of control in flight. The instructors encountered during the investigation were not aware of the proximity of this system to the rudder pedals and of the possibility for the passenger to inadvertently operate the pitch-down elevator control.

Consequently, the BEA recommends that

- **The Federal Aviation Administration ensure that Cessna Aircraft Company informs the owners of Cessna and Reims Aviation 150/152 of the possibility of a passenger making a pitch-down input by inadvertently operating the elevator control system located close to the rudder pedals; [Recommandation FRAN.2013.015]**

- **EASA inform the European national civil aviation authorities of the potential risks on Cessna and Reims Aviation 150/152 of a passenger causing a pitch-down input, by inadvertently operating the elevator control system located close to the rudder pedals. [Recommandation FRAN.2013.016]**