

Safety Investigation Report

Ref. AAIU-2012-05

Classification: Accident

Level of investigation: Standard

Date and hour: 15 March 2012 at 12:45 UTC

Aircraft: PIPER PA-28-181 SN: 28-7690296. The aircraft was registered in Belgium and held a Certificate of Airworthiness and a valid Airworthiness Review Certificate (ARC)

Total flight time: 7796:16 FH

Type of engine: One Lycoming O-360-A4M SN: L-21884-36A Power: 180 HP

Accident location: On EBGB, Grimbergen Airfield

Type of flight: Cross-country

Phase: Landing

Persons on board: The pilot was alone on board.

Injuries: None

Abstract

After the initial touch down, the airplane bounced twice. Upon the second impact, the nose landing gear broke and the propeller ploughed into the ground.

Cause

The probable cause of the accident is the pilot inability to adequately flare the airplane at touch down followed by inappropriate elevator inputs to control the airplane's rebounds and a late decision to reject the landing.

Contributing factors:

The low experience of the pilot, especially flying PIPER PA-28 airplanes.

Recommendations:

AAIU(Be) has no recommendation.

Hazard identified during the investigation ¹:

- The late decision of the pilot to reject the landing.
- A too rapid engine throttle opening causing a delayed engine response.

Consequence ²:

Loss of control - Ground (LOC-G)

¹ Hazard – Condition or object with the potential of causing injuries to personnel, damage to equipment or structures, loss of material, or reduction of ability to perform a prescribed function.

² Consequence – Potential outcome(s) of the hazard

Factual Information

History of the flight

The pilot wanted to fly from EBGB to EBST for a couple of touch and goes, then on to EBKH for a full stop landing before going back to EBGB. After the flight preparation, the airplane took off and flew to EBST. At EBST the airplane made 2 touch and goes, as planned, and made a full stop landing. The airplane took off from EBST and went to EBKH for a second full stop landing. Thereafter, the airplane took off from EBKH at 12:10 UTC, and flew back to EBGB for a landing on Runway 19 of EBGB. When the airplane landed at EBGB, the Estimated Time of Arrival was already exceeded. The pilot stated: When flying overhead EBGB at 900ft, the engine power was reduced to 2000 RPM, and IAS of 85kts. In downwind, flaps 1 was selected, and the speed was kept at 85 kts. In base flaps 2 was selected, the power was further reduced to 1700 RPM and IAS 75 kts. In final, the power was reduced to 1500 RPM, IAS was 65 kts, and full flaps was selected. Above the threshold, speed was 60 kts. The pilot further stated the airplane attitude was rather 'flat' during the final approach. After the initial touch down, the airplane bounced twice. After the second bounce, the pilot applied full power but the engine did not respond immediately and the airplane touched down on the nose wheel first. The nose landing gear broke upon impact and the propeller ploughed into the ground. The airplane came into a stop and the pilot climbed out without injury.



Airfield information

EBGB Grimbergen airfield is located 8 km NW of EBBR within the CTR of Brussels airport.

RWY N°	Dimensions(m)	Strength	Coordinates
01 and 19	614x30 - grass	3t AUW	N 50° 56' 55" - E 004° 23' 31"

Pilot information

Age: 40 years old. Private Pilot Licence, first issued 10 February 2011, valid until 10 February 2016. Rating: SEP (land), valid until 30 November 2013. Medical Certificate: Class 2, valid until 26 March 2013. Total Flight Experience: 85:08. PIC: 35:17 FH, among which 7:39 FH on PIPER PA-28, the remainder on Cessna 152.

Meteorological information

Temperature: 17°C, Wind: 200°/2 knots, Visibility +10 km and QNH: 1026 hPa.

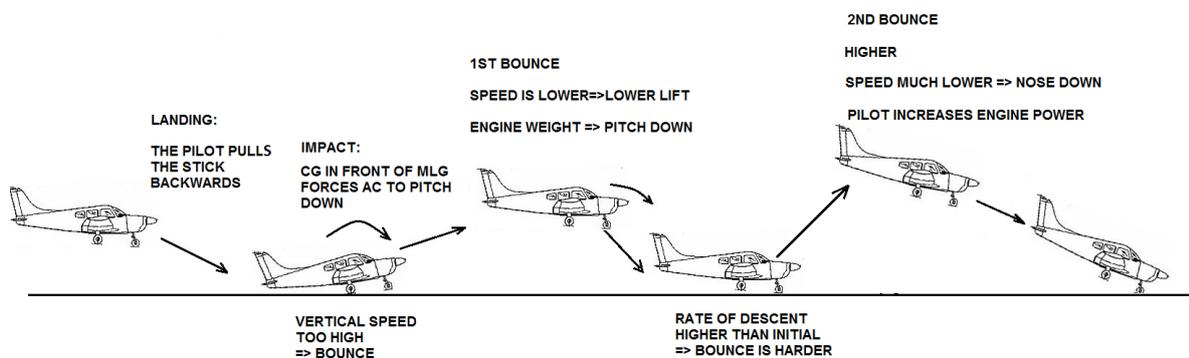
Damage

The nose gear leg broke upon impact causing the propeller to plough into the ground. The engine mount which is also the nose landing gear support was bent as well as the propeller. The engine cowling was damaged and the engine exhaust system was crushed. At first sight, there was no structural damage to the airframe structure. There was no visible damage to the engine, however a shock load inspection had to be performed as per the engine manufacturer instructions after a sudden stoppage of the engine.

Analysis

Loss of control at landing

The touch-down was probably performed with an excessive vertical speed. This could have been caused by an inadequate flare (either a late flare, not timely counteracting the inertia or an early flare causing the airplane to stall before touching down). The ground impact was taken either by the main landing gear or by the main and the nose landing gear at the same time. In both cases the airplane would tend to rebound with a nose pitch down attitude since the centre of gravity of the airplane is located in front of the main landing gear. The speed and the lift decreased during the 1st bounce causing subsequently a higher rate of descent than the initial touch down. This had for result to increase the effect of the 2nd bounce. The airplane bounced higher, loosed additional speed and the tendency to a pitch down attitude increased. The pilot did not report specific action on the elevator to control the phenomenon. However, he reported he selected full engine power during the second rebound in order to stabilize the airplane (generally, the aircraft will pitch up with full application of power), but the engine did not accelerate as expected.



Failure of the engine to accelerate from idle to full power.

No engine problem was reported by the pilot during the cross country flights and during the touch and goes performed the same day. Therefore, it is likely the engine failed to respond because the throttle was opened too rapidly (Note: No engine test could be performed after the accident to confirm this hypothesis).

Pilot's experience.

The low experience of the pilot (Total experience: 85:08 FH among which 7:39 FH on PIPER PA-28), probably prevented him to realize on time the landing parameters, as for example the final speed or the height of the flare were not adequate to properly land the airplane. The pilot did not describe how he managed the elevator control in order to mitigate the rebounds nor if he did try to control the airplane rebounds by means of the elevator. Finally, it is likely the pilot was surprised by the amplifying movement of the rebounds and decided to go around too late, causing the engine to be suffocated by a brutal movement of the throttle.

Analysis of the previous landings performed this day.

The day of the accident, the pilot flew from EBGB to EBST and to EBKH to perform a few touch and goes and/or full stops. EBST airfield (St Truiden) features a 06/24 bi-directional runway's length of 1199 meter long while EBKH airfield has a 1100 meter long strip which is (artificially) reduced to a 690 meter long runway 07/25. The EBGB (Grimbergen) airfield runway's length is 614 meter long which is significantly shorter than that of EBST but comparable to EBKH. Therefore the touch and goes and/or landing performed the same day at EBST and EBKH were not significantly different than the one of the crash landing at EBGB. Additionally, the meteorological conditions of this day were very good to land on EBGB runway 19. (Wind 200° - 2KTS). Finally, the length and the direction of the EBGB runway is not considered as a contributing factor of the accident.

Psychological factors.

The accident occurred when the pilot performed the last landing of the day, at his home base, after having made a few uneventful landings during his cross country flight. Additionally, the Estimated Time of Arrival was already exceeded when the airplane was in circuit to land.

Therefore the following psychological factors may have influenced the pilot during the landing:

- Overconfidence: The pilot was very confident to succeed a routine landing at his home base, as the other landings of the day elsewhere were uneventful.
- Haste: The pilot was focused to land as soon as possible to minimize his late arrival.

Conclusion

The probable cause of the accident is the pilot inability to adequately flare the airplane at touch down followed by inappropriate elevator inputs to control the airplane's rebounds and a late decision to reject the landing.

The low experience of the pilot, especially flying PIPER PA-28 airplanes could be considered as a contributing factor of this accident.