

Interim Report

Identification

Type of Occurrence:	Accident
Date:	10 August 2013
Location:	Bienenfarm
Aircraft:	Airplane
Manufacturer / Model:	PZL-MIELEC / Antonov AN-2
Injuries to Persons:	Five persons suffered minor injuries
Damage:	Aircraft severely damaged
Other Damage:	Minor crop damage
Information Source:	Investigation by BFU
State File Number:	BFU 3X102-13
Published:	November 2013

Factual Information

History of the Flight

At 1810 hrs¹ the airplane took off for a flight to Heringsdorf from runway 30 of Bienenfarm Airfield with twelve persons aboard. The pilot stated that about 40 m above ground he realised that the airplane did no longer climb as expected and lost speed. He then pushed the airplane's nose down and initiated a left hand turn.

¹ All times local, unless otherwise stated.

The analysis of a GPS carried aboard showed that 18 seconds after take-off in 61 m MSL the airplane had reached a maximum ground speed of 113 km/h, and about 25 seconds after take-off in 83 m MSL its maximum flight altitude, and another 15 seconds later had descended again to terrain height.

The airplane flying in a southern direction with a forward velocity of about 80 km/h touched down on a field. After about 130 m the airplane flipped over and came to a stop lying upside down.

Personnel Information

The 33-year-old pilot held a Commercial Pilot's License (CPL(A)), issued on 15 July 2008 in accordance with JAR-FCL (German). His license carried the class rating SE piston (land) as Pilot in Command (PIC). The type rating was valid until 28 February 2014. In addition, the PIC held other ratings. He also held a class one medical certificate issued in accordance with Part-Med, valid until 21 August 2014. According to the documentation the pilot presented, he had a total flying experience of 2,162 hours and 3,676 take-offs. His flying experience on the type was about 13 hours by 27 take-offs. All these flights had been conducted within 90 days prior to the accident.

Aircraft Information

According to the data sheet No. 2069/SA the Antonov AN-2 was a single engine, strutted bi-plane in all-metal semi-monocoque construction and fixed tail dragger. The airplane is partially covered with fabric and is equipped with ailerons governed by the flaps and automatic slats. Maximum take-off mass is 5,500 kg. The allowable centre of gravity is stated as 19 to 32% of the Mean Aerodynamic Chord (MAC).

The airplane is equipped with a piston engine Asch-62 IR with variable pitch propeller. According to the flight manual, the fuel tanks have a maximum tank capacity of 1,200 litres.

The type was certified in Germany in the scope of the Unification Treaty on 3 October 1990.

The accident airplane was manufactured in 1968 and had the manufacturer's serial number 1G8650 and was operated by an air operator.

The last Airworthiness Review Certificate (ARC) was issued on 6 May 2013. According to the mass report of 23 August 2011 the aircraft had an empty mass of 3,478 kg.

For the maintenance of the aircraft the Commission Regulation (EC) No 2042/2003 Annex I (Part M) had to be applied. The last release to service was issued on 2 May 2013; a 100-hours check and an annual inspection had been conducted. According to the aircraft log book 48 flights with a flight time of 15 hours and 50 minutes had been carried out since.

The technical flight log showed entries of the respective amount of fuel prior to and after each flight. The calculated mean fuel consumption was therefore 200 l/h. According to the technical flight log, on the morning of 10 August 2013 410 l of fuel were aboard the airplane. After a flight of 27 minutes, 924.5 l of fuel were re-fuelled. Therefore, after re-fuelling arithmetically 1,244 l fuel were in the tanks. According to the flight manual, the maximum tank capacity was 1,200 l. Until the accident five flights with a total of one hour and 56 minutes were conducted. The amount of fuel still aboard was therefore arithmetically about 900 l. After the salvage operation the fuel indicators indicated 750 l fuel in the tanks. The pilot stated that there were about 80 litres oil in the reservoir.

The operator's Operations Manual, Part A states that for the mass and centre of gravity calculations the masses should be calculated as follows: flight crew members 85 kg, male passengers 96 kg and female passengers 76 kg each including carry-on luggage. At the site the police determined five female and six male persons who all said they had been occupants in the airplane; in addition to the pilot.

After the accident, the BFU determined a total mass of 116 kg of luggage found distributed within the airplane. Using the determined data and by means of the Load and Trimsheet contained in the flight manual a take-off mass of 5,165 kg and a centre of gravity of 31,5% MAC was calculated. It was assumed that the male occupants were seated in the aft part of the airplane because this was the least favourable mass distribution and the actual mass distribution could not be determined.

Meteorological Information

At the time of the accident, the wind at Berlin-Tegel Airport, located about 21 Nautical Miles (NM) east of Bienenfarm Airfield, came from west-northwest with 5 kt. Visibility was more than 10 km and in 2,500 ft there were few clouds. Air temperature was 20°C, dewpoint was 14°C and the barometric air pressure (QNH) was 1,017 hPa.

For the time of the accident the following METARs were available:

METAR EDDT 101620Z 29005KT 9999 FEW025 SCT090 20/14 Q1017 NOSIG=

METAR EDDT 101550Z 30005KT 9999 FEW025 SCT060 20/14 Q1017 NOSIG=

Aids to Navigation

There was a Garmin GPSmap 495 aboard the aircraft. The memory was read out. The data recording ended on 10 August 2013 at 1610:49 hrs (GPS) at the position N 52°39,6053' E 012°44,4837'. At that time an altitude of 34.7 m MSL, a ground speed of 80 km/h, a rate of descent of 1.6 m/s and a flight direction of 185° was recorded.

Aerodrome Information

Bienenfarm Airfield has one grass strip with a length of 850 m, a width of 40 m and is oriented 117°/297°. Aerodrome elevation is 120 ft AMSL.

Flight Recorder

The aircraft was not equipped with a Flight Data Recorder (FDR) or a Cockpit Voice Recorder (CVR). Neither recorder was required by relevant aviation regulations.

Wreckage and Impact Information

The accident site was located about 20 m east of the position N 52°39'35,1" and E 012°44'28,6" in an altitude of 33 m AMSL (GPS).

The aircraft was lying upside down in a grain field. The aircraft's longitudinal axis pointed towards 010°.



Accident site

Photo: BFU

Viewed from the airplane, tyre tracks were visible in the grain field which were 130 m long and pointing in about 010°. They matched the tail wheel and the main landing gear wheels.

The upper part of the vertical tail was heavily deformed. The upper mounting of the right wing strut was damaged and the strut had perforated the upper wing.



Damages on the wing structure and position of the flaps



Photo (2): BFU

The flaps of the upper and lower wings were deflected by approximately 10°.

Elevator and aileron were connected with the controls in the cockpit and could be moved.

The trim tab of the elevator was deflected by approximately 5° in the nose-down direction.

The trim tab on the left upper aileron was in alignment with the aileron profile.

The trim tab of the rudder was in alignment with the rudder profile.



Positions of the trim tabs

Photo (3): BFU

Tail and main landing gear did not show any damages.

On the outside the engine showed very little traces of oil. The lateral air intake flaps were open.

The fuel filter was full. The sample smelled of AVGAS.

The spark plugs were checked as far as they were accessible. Their appearance was inconspicuous. All sparks and plugs were properly mounted. The ignition cables, as far as they were accessible, did not show any visually identifiable damages. The bottom cylinders were filled with oil, as could be expected. The connections of the power lever, the propeller pitch control, the emergency stop and the mixture control including the respective components were functional. The hand fuel pump (Ahrweiler pump) was functioning.

After the airplane had been put back on its landing gear the fuel indicator in the cockpit indicated a total fuel quantity of 750 l.

All luggage remaining in the aircraft after the evacuation and loose equipment was weighted. (Refer to chapter Aircraft Information)

Each of the foremost mountings of the seat tracks of the left seats were torn from the fuselage structure and the seat tracks were bent upward.



Damages on the mounting of the first left seat



Photos (2): BFU

In the area of the aft three rows, the seat tracks of the right seats were torn from the fuselage structure and the seat tracks were bent upward. The front left mounting of the seat in the fifth row had been torn from the seat track.



Damages of the mountings of the third, fourth and fifth right seats

Photos (2): BFU

Fire

There was no evidence of in-flight fire or fire after the impact.

Investigator in charge: Kostrzewa

Field investigation: Kostrzewa

Maser

This investigation is conducted in accordance with the regulation (EU) No. 996/2010 of the European Parliament and of the Council of 20 October 2010 on the investigation and prevention of accidents and incidents in civil aviation and the Federal German Law relating to the investigation of accidents and incidents associated with the operation of civil aircraft (*Flugunfall-Untersuchungs-Gesetz - FIUUG*) of 26 August 1998.

The sole objective of the investigation is to prevent future accidents and incidents. The investigation does not seek to ascertain blame or apportion legal liability for any claims that may arise.

This document is a translation of the German Investigation Report. Although every effort was made for the translation to be accurate, in the event of any discrepancies the original German document is the authentic version.

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