

Investigation Report

CX008-0/04
January 2009

Identification

Type of Event:	Accident
Date:	24 September 2004
Location:	near Nordhorn-Lingen
Aircraft:	Fixed-Wing Single Engine Power
Manufacturer / Type:	Piper / PA 28-181
Injuries/Fatalities:	Fatal injuries to flying instructor, student pilot and passenger
Material Damage:	Aircraft destroyed
Third party damage:	Damage to forest
Information source:	Investigation by BFU

transmission from the Piper, and transmitted a request for a position report, to which there was no answer.

An airfield witness observed that, after the last landing with touch-and-go on Runway 24, an aircraft made an early turn into the crosswind departure leg into the airfield south circuit pattern.

Bremen Radar recorded the last primary radar contact with the aircraft at 20:41 in the southeast part of the circuit.

The aircraft wreck was located at about 23:00 using a signal from its Emergency Location Transmitter (ELT), in a forest south west of the airfield. The three occupants were dead.

Factual Information

History of the flight

The aircraft took off at 19:24¹ on 24 September 2004 in Twente (Netherlands) for a flight to Nordhorn-Lingen (Germany), with the intention of training for night flying qualification. The aircraft landed in Nordhorn-Lingen at 19:45 and was refuelled, following which it made three aerodrome traffic circuits with touch-and-go landings. The aircraft then came to a stop on a taxiway for a pre-arranged change of pilot. The aircraft then took off from Runway 24 for another aerodrome traffic circuit at 20:39 with the flying instructor, a second student pilot, and the previous pilot as passenger. The Air Inspection Officer (Flugleiter) recorded the last touch-and-go landing at 20:47. About eight minutes later the Air Inspection Officer had not heard any radio

Personal Information

Flight instructor:

The 49 year-old flight instructor (dutch nationality) had held a Private Pilot's Licence (Group A landplanes and self-launching motor gliders) since 1988. He was a qualified flight instructor for both single-engined aircraft and motor gliders, with a night rating.

Student pilot:

The student pilot (dutch nationality), aged 46, was in possession of a current Private Pilot's Licence (PPL) (Group A). His total flight time was 193 hours, of which 102 hours were on the Piper PA 28. This was his first night flying training.

¹ All times local, unless otherwise stated.

Aircraft information

The Piper PA 28-181 is a single-engined four-seat low wing monoplane of all-metal construction. It has fixed tricycle gear and is powered by a Lycoming O-360-A4A piston engine.

The aircraft was properly registered and with a current Certificate of Airworthiness. It had flown a total of 7187 hours. The maintenance and repair records gave no indication of any deficiency that could have an effect upon its airworthiness.

As part of the investigation, the take-off weight was calculated as being about 200 lb under the Maximum Take-Off Weight (MTOW). The centre of gravity was within the defined limits.

Meteorological Information

The Air Inspection Officer at Nordhorn-Lingen described the weather at the time as follows:

8/8 cloud cover at 1000 ft
 Visibility 10 km (night)
 Intermittent rain
 Wind 270° - 310°
 Air pressure 1014 hPa
 Sunset 19:26

The official German Meteorological Service (DWD) described the weather for Nordhorn-Lingen at the time of the accident as follows:

Several cloud layers; main cloud base at 1000 ft; scattered at 400 to 700 ft; dew point difference 1 - 1.5°C; in the vicinity of the accident before 20:00, occasional moderate rain sometimes with embedded thunderstorm; at the time of the accident, shower activity south of a line from Enschede to Osnabrück.

A witness said that at the time of the accident there was a heavy rain shower in progress between Nordhorn and the airfield, with greatly reduced horizontal visibility at surface level.

Navigation Aids

No surface navigation aids were available.

Radio Communications

Radio communications took place during the landing, touch-and-go phases of flight. After the last touch-and-go, no transmissions were received from the Piper.

The radio communications were not recorded at Nordhorn-Lingen airfield.

Aerodrome information

The hard runway at Nordhorn-Lingen airfield is 900 m long and 20 m wide and is oriented in the directions 060°/240°. The airfield reference point is 85 ft above mean sea level and is licensed for night operations for aircraft equipped with radiotelephony (R/T).

Flight Data Recording

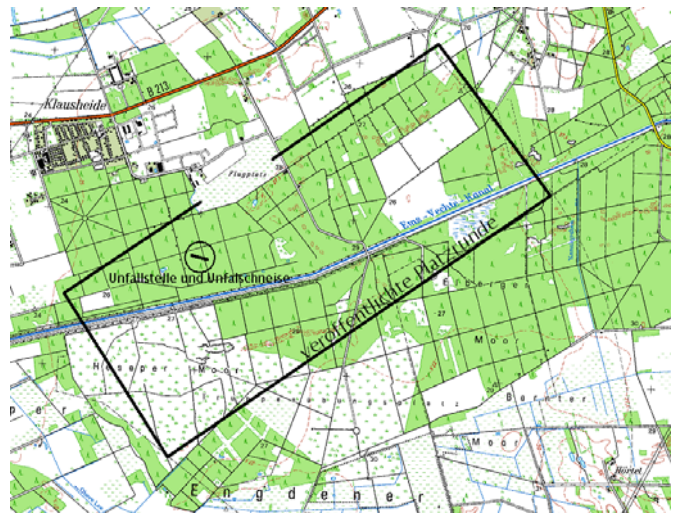
The aircraft was not fitted with a Flight Data Recorder (FDR) or a Cockpit Voice Recorder (CVR); nor was such equipment required under the regulations.

A mobile GPS navigation system was on board the aircraft and recorded the aircraft track. This information was examined as part of the investigation. However, the recording terminated at 20:22.

The local ATC provider recorded a number of individual primary radar targets in the south east sector of the airfield circuit. The last target was registered at 20:41.

Accident location and impact information

The impact took place within a large area of woodland about 700 m southwest from the threshold of runway 24.



The aircraft right outer wing section made first contact with the trees, following which wreckage was scattered on a track of 150°. About 50 metres further forward the aircraft hit a large tree. The right wing and the right landing gear were arrested by the tree at a height of 8 - 10 m; the remaining wreckage then changed the scatter path track to 100°. The fuselage and nose gear came to rest about 75 m from the point of first tree contact.

Wreckage information

- All parts of the wreck were found at the site of the accident. All the main parts of the aircraft necessary for operation were found at the site, including aerodynamic control surfaces.
- Some of the fuel pipes to the motor were destroyed. Fuel was found in the pipe to the carburettor.
- The power lever was found set to 'Full Throttle'. The associated Bowden cable was intact, though immovable. The throttle setting on the carburettor was found at the 'full power' setting.
- The mixture lever was set at 'Rich'. The associated Bowden cable was connected, but immovable because of damage in the engine compartment. Likewise, the mixture setting at the carburettor was 'Rich'.
- The carburettor heat was found selected in the position 'On'.
- Examination of the tachometer scale detected an impact mark, indicating the needle had been showing 2300 rpm.
- The propeller had been torn from the crankshaft flange.
- A number of light bulbs were removed from the wreck for microscopic inspection. The stretch or changes in filament wires can be ascribed to the flow of electrical current at the moment of impact.
- The flap lever was found engaged at the 40° setting. The lever could be moved to all the normal settings without any shift in the flap drive shaft. In this part of the fuselage the flap drive shaft could no longer rotate because both wings had been torn away. The flap drive shaft lever links to the flaps were found secured to the shaft, both strikingly in the same position. The Piper Maintenance Manual gives the position for the flaps as 40°.

Fire

There was no fire.

Survival Aspects

The accident happened at about 20:50 and activated the ELT. In spite of the fact that the wreck was close to the airfield, the aircraft was first located by direction finding equipment at about 23:00. In the meantime, a search in both German and Netherlands airspaces made at about 21:00 was not successful.

Although the cockpit part of the fuselage remained virtually intact and the safety belts held, all the occupants suffered fatal injuries as a consequence of the high impact energy.

Organisations and their procedures

Night VFR flight is not permitted in the Netherlands. It is nevertheless possible to add a VFR Night Rating to a Netherlands pilot's licence by undergoing training in another country in accordance with JAR-FCL 1.125c.

The Netherlands flying club concerned stated it was regular practice to organise night flying introductory flights for interested members. Suitably qualified pilot members were joined on night flights by unqualified pilots for an introduction to the spatial and navigational aspects of night flying. To this end, the aircraft would be ferried to Germany by day for night flying. The aircraft would return to the Netherlands the next day.

Additional Information

The following minimum values were required for VFR flights:

- 1.5 km flight visibility
- permanent visual contact to the ground
- clear of clouds

Analysis

General

As seen by the BFU, the flight was a training for night flying qualification. The student pilot had no night rating and occupied the left seat. The flight instructor with night rating sat alongside him in the right seat.

Flight path

The aircraft flew short aerodrome traffic circuits to the south, inside the published circuit pattern. During the last circuit, the aircraft commenced its first turn from the initial climb, left into the first crosswind leg, very early and at a low height. The aircraft was flying at about cruise speed with commensurate engine power settings, and was flying in a south easterly direction, when it made contact with trees about 700 m from the airfield, and crashed.

The short distance from the point of impact to the airfield and the direction taken by wreckage, indicate an intention to fly a tight, low circuit, very probably to avoid flying into cloud and not to lose sight of the airfield lighting.

Meteorological Conditions

The weather was marginal for VFR flying at night with no possibility of seeing clouds early enough to avoid them. There were several cloud layers; it was dark and there was no visible horizon. In addition, the rainfall in the accident area and the small difference in dew point make it quite possible there was significant mist over the forest to the south of the airfield. In addition, the high level of air moisture and condensation on the windscreen would have been detrimental to forward visibility.

Aircraft

The aircraft was properly equipped for the intended night flight and for instrument flying, and there was no evidence of a technical malfunction. It is probable that the flap lever was shifted to its final 40° setting by the impact, because the high impact energy destroyed both the flap lever link and the wings, and the flaps were torn off.

Human Factors

On that evening, the first three circuits were flown by a first pilot, who subsequently became the passenger. He possessed both a Commercial Pilot's Licence and an Instrument Rating.

The student pilot had a private Pilot's Licence and no Instrument Rating. It was his first night familiarisation flight. Given the very marginal conditions, he would certainly have had to use maximum concentration in his control of the aircraft. These demands probably exceeded his capacity, particularly because flying tight circuits leaves little time for all the necessary actions, observations and corrections. Given the lack of a visible horizon, it would only have been able possible to maintain altitude by reference to instruments. It was not possible to determine whether the flying instructor was flying, or intervened at any stage.

Conclusion

The causes of the accident were:

- Night flying training in marginal weather
- Unintended loss of altitude followed by contact with trees
- Failure of the flying instructor to recognise the onset of the danger.

Investigator in charge	Johann Reuß
Assisted by	
Flight Operations	Axel Rokohl