



**Federal Public Service
Mobility and Transport**
Belgian Civil Aviation Authority

Air Accident Investigation Unit

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CCN
*Rue du Progrès 80 Bte 5
1030 Brussels*

FINAL REPORT ON THE ACCIDENT TO HELICOPTER BELL TEXTRON B206 REGISTERED N678LW IN MERCHTEM ON 26 DECEMBER 2007

Ref. AAIU-2007-20
Issue date: 17 JAN 2009
Status: Final

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FOREWORD

This report is a technical document that reflects the views of the investigation team on the circumstances that led to the accident,

In accordance with Annex 13 of the Convention on International Civil Aviation, it is not the purpose of aircraft accident investigation to apportion blame or liability. The sole objective of the investigation and the Final Report is the determination of the causes, and define recommendations in order to prevent future accidents and incidents.

In particular, Article 13 of the King's Decree of 9 December 1998 stipulates that the safety recommendations made in this report do not constitute any suspicion of guilt or responsibility in the accident.

Unless otherwise indicated, recommendations in this report are addressed to the Regulatory Authorities of the State having responsibility for the matters with which the recommendation is concerned. It is for those Authorities to decide what action is taken.

The investigation was conducted by L. Blendeman, Chief Investigator. Bell Helicopter and Rolls Royce sent MM Harold R. Barrantine and Michael A. Weber in assistance. The investigation team got also the support from the Federal Police Air Support Division.

NOTE: For the purpose of this report, time will be indicated in UTC, unless otherwise specified.

Synopsis

Date and hour of the accident

26 December 2007, at 14.42 UTC

Helicopter

Type: Bell Textron B206 B 3

Registration: N678LW

Accident Location:

In a field in Merchtem, Flemish Brabant; 15 km W of EBBR
N 50 56,482 E 4 14,363

Aircraft Owner:

APM USA inc 10500 Rockville Pike MD20852

Type of flight:

Private

Persons on board:

1 Pilot, 4 Passengers – all killed upon impact

Abstract.

The helicopter was en-route from Maaseik to its base Wevelgem (EBKT).

There were 5 persons on board; the pilot and 4 passengers.

The meteorological conditions changed rapidly, and mist came from the West to the East.

At the level of Brussegem, the helicopter had to cross a high voltage electrical line. Upon reaching the high voltage line, the helicopter performed an evasive action, and went up into the cloud layer.

When the helicopter recovered, it was too low and it crashed at high speed into a neighboring field.

All occupants were killed.

1. Factual Information

1.1. Chronology of the events

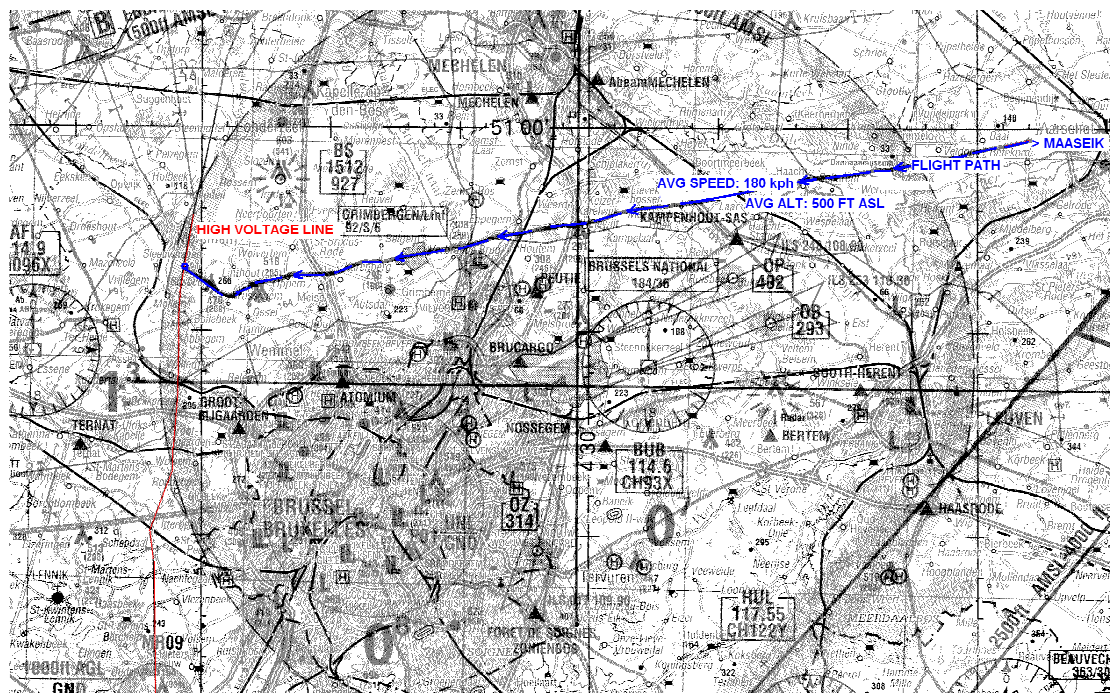
The pilot and his family went to visit parents in Maaseik on Christmas day. They returned the following day, the 26th December 2007.

The helicopter took off after lunch, at 14.00 in the direction of Wevelgem airport (EBKT). The pilot had drawn a straight route from Maaseik to its final destination. He flew VFR, and had 2 GPS on board.

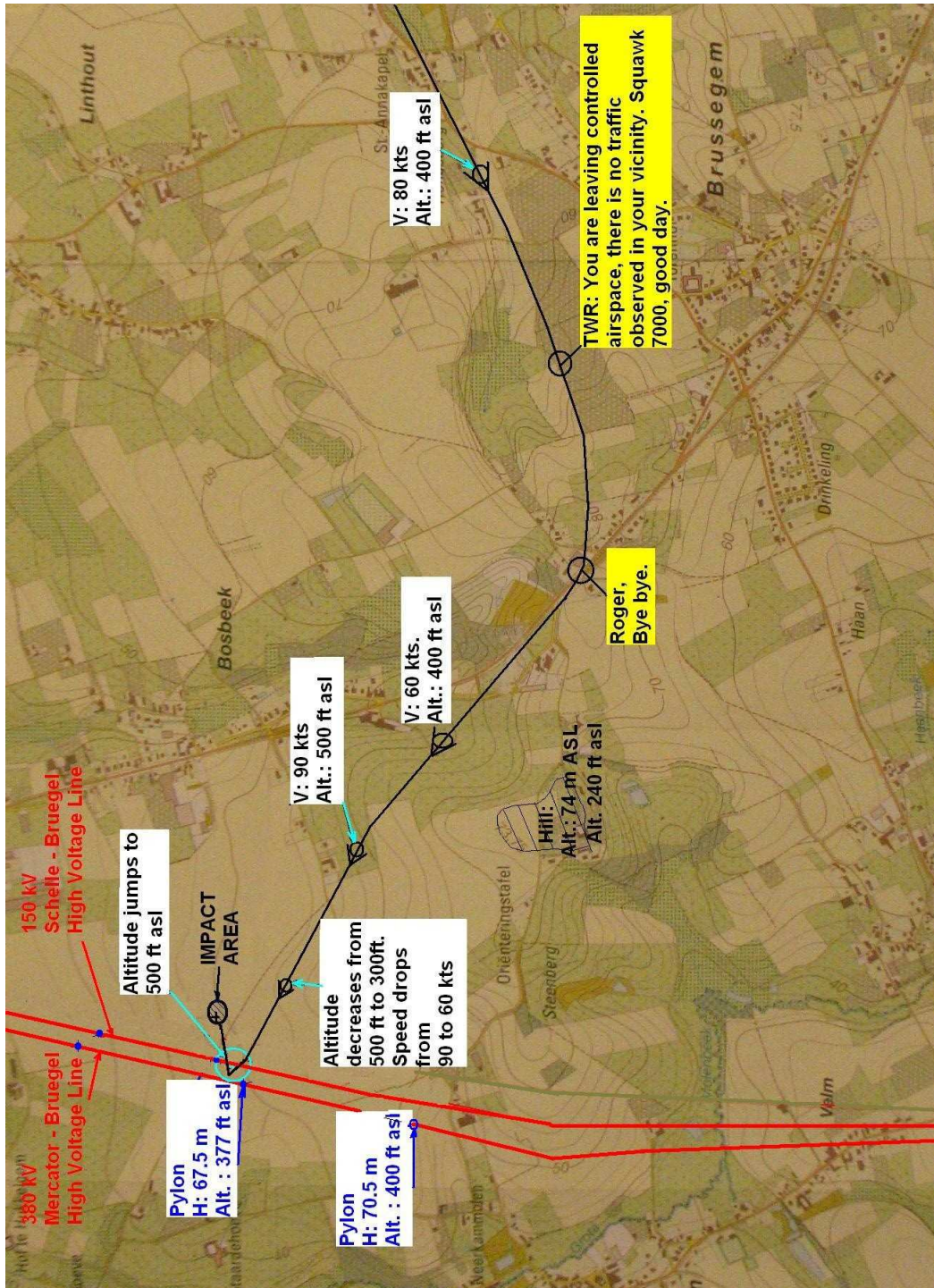
Most of the flight occurred at an altitude of 500 ft and a speed of 100 knots. The normal flight time is 1 hour.

The pilot contacted the Brussels ATC and requested permission to enter the CTR area of Brussels at 14:26. The clearance was given at 14:28.

ATC contacted the helicopter at 14:41 when it reached the point of leaving the CTR of Brussels. The message was acknowledged by the pilot.



The helicopter turned to the North-West, following the terrain. The visibility conditions worsened, as mist was coming towards the helicopter flight path. the pilot lowered the altitude and reduced speed.



Upon reaching the high voltage line running from North to South (380kV – “Mercator – Bruegel” and 150 kV “Schelle – Bruegel”), the helicopter flew at an altitude of 300 ft and a speed of 60 kts. The electricity pylons of the 380 kV line culminates at 400 ft asl

The radar trace and the GPS data record show that the helicopter suddenly went up and turned around. This evasive maneuver was most probably induced by the pilot, surprised by the close vicinity of the high voltage line.

The helicopter went into the cloud layer, the pilot lost situational awareness, and when recovering, the helicopter was diving to the ground at an angle of 50-60 degrees and a speed of 50-60 knots.

The helicopter crashed into the ground, and all 5 persons on-board were killed on impact.

Around 15:05, a helicopter of the Federal police was called in support of the police officers on site. The helicopter took off, but had to turn around before reaching the crash zone; the ceiling was reduced to 200 ft.

1.2. Injuries to persons

Injuries	Pilot	Passenger	Others	Total
Fatal	1	4	0	5
Serious	0	0	0	0
Minor	0	0	0	0
None	0	0	0	0
Total	1	4	0	5

1.3. Damage to helicopter

The helicopter is totally destroyed by impact force.



1.4. Other damage

Slight pollution of the soil due to fuel spillage

1.5. Personnel information

Pilot.

Sex: male

Age: 56 years-old

Nationality: Belgian

Licence: US, issued 21 March 2004.

Rating: Rotorcraft - Helicopter

Medical: Class 3, issued 12 October 2007.

Limitation: corrective lenses for distant vision.

Experience:

Fixed Wing, from ? to 1990.

Belgian PPL Licence (no longer valid)

Single engine

157 FH double controls

357 FH PIC

Night flying: 1,12 FH double controls + 12,26 PIC

Multi-engine

49,23 FH double controls

341,02 FH PIC

13,2 FH 2nd Pilot

Night Flying: 6,2 FH PIC + 111,4 1st Pilot

including 148,17 FH IFR Flight, double and 315,54 FH PIC.

Total 1061,48 FH

Aircraft type flown included:

Cessna 401

Gulfstream American GA 7 Cougar

Grumman American AA 5A Cheetah

Piper PA-34 Seneca

Cessna 421.

Rotating Wing from 2004 to 2007

US Licence.

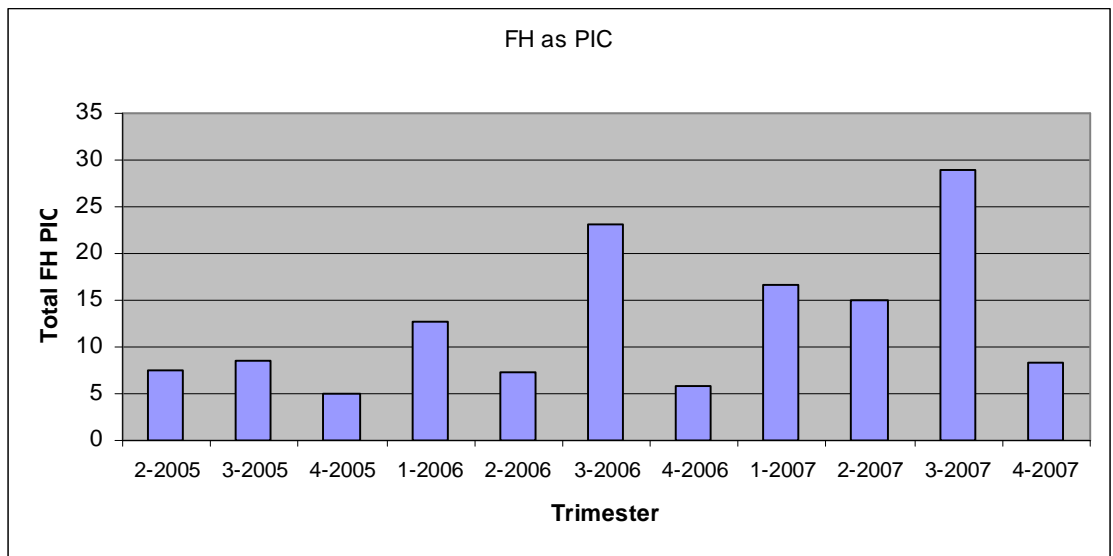
Total: 208,5 FH

On R-22 (training): 64,5 FH, with 10 as PIC

On B206. 144 FH, with 139 FH as PIC

These included at least 9 flights similar to the Maaseik – Wevelgem flight. (May 2006 –Maaseik; February 2007 – Limburg; April 2007 – Maaseik; July 2007 – Kiewit; and the EBKT-Maaseik flight of December 2007).

As illustrated on the diagram hereunder and typical for private pilot, the peak activity is observed during the summer months, and the 4th trimester of the year shows the lowest flight activity.

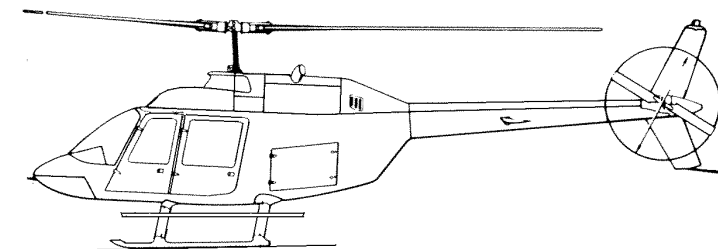
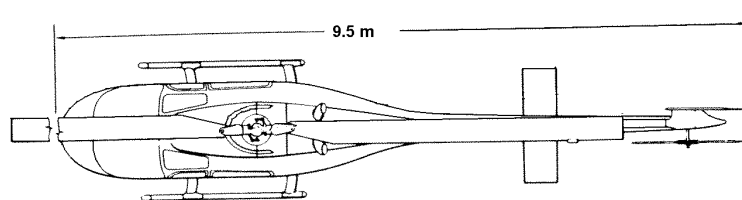
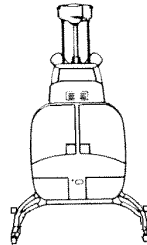


1.6. Helicopter information

The **Bell 206** is a two-bladed, single- engine helicopter, manufactured by Bell Helicopter Textron (Canada).

The first Model 206A flew on 10 January 1966. On 20 October 1966, the JetRanger received full certification by the US FAA and delivery of the JetRanger to customers began on 13 January 1967.

The basic shape and design of the JetRanger remained unchanged since 1967, but the 206B "JetRanger II" entered the market in 1971 and the 206B-3 "JetRanger III", with its modified tail rotor and more powerful engine, in 1977. The 206 is flown by a single pilot, who sits in the front right seat. Some are equipped with double controls.



Airframe

Manufacturer: Bell Helicopter Textron
Type: B206 B3 Jet Ranger III
Serial Number: 3171
Built year: 4th trimester 1980
Registration: N678LW
Certificate of Registration issued on June 2, 2005
Certificate of Airworthiness issued on September 24, 2004
Total time: 13049 FH
The helicopter was shipped to Belgium in May 2005.

Engine

Manufacturer: Rolls / Allison
Type: 250-C20B
s/n: CAE834657
Total Engine Hours: 3922.7 FH
Time since installation: 790 FH

Maintenance

Maintenance was performed in accordance with the manufacturer's specifications by Air Technology Belgium, employing licensed FAA A&P Mechanics.

Last 50-hours inspection: TT: 13017 FH on 27 Aug 2007.
Last Annual, 100-hours inspection, 600-hours/12 months, 1200-hours/24 months: TT: 12972.3 on 11 Jan 2007

Last Engine 100-hours inspection performed at engine TT 3846 FH.

All FAA Airworthiness Directives were complied with at the time of the accident.

Weight and Balance

The weight and balance was checked, and found well within limits.

Owner

APM Inc

1.7. Meteorological information

The conditions at the place and time of departure (EHBK, close to Maaseik)

Time: 13.55

Wind: 220 Degrees 10 kts

Visibility: 4800m

Mist.

Overcast clouds: 500ft

Temperature: 4°C

Dew point: 4°C

QNH: 1027

Becoming: visibility 6000m Broken clouds 700ft.

Weather conditions in EBBR, at 14:50 (time of the crash)

Wind: 220°5Knots

Visibility: 3500 m

Mist

Scattered clouds: 300ft

Broken clouds: 400ft

Temperature: 4°C

Dew point: 3°C

QNH: 1029

TREND: Visibility may drop to 1500m; broken clouds at 300ft.

The visibility dropped to a few hundred meters at the time of the crash in Brussegem and vicinity, due to the mist.

Around 15:05, a helicopter of the Federal police was called in support of the police officers on site. The helicopter took off, but had to turn around before reaching the crash zone; the ceiling was reduced to 200 ft.



Picture taken from the crash scene (120 from the first HV line), shortly after the accident, showing the high Voltage line.

1.8. Aids to Navigation

The helicopter was equipped with 2 GPS;

- Garmin GPSmap 496.
- Garmin GPSmap 296.

1.9. Communication

The helicopter was routine communicating with the Brussels Tower (frequency 120.775) when entering the Brussels CTR zone; and was last heard when leaving the zone, 30 seconds after the spot disappeared from the radar screen.

The relevant communication is given hereunder:

Upon entering the Brussels CTR, N678LW is flying above Aarschot;

Time	Call	Communication
14:26:21	N678LW	Brussels, Jet Ranger N678LW good afternoon
14:26:25	TWR	N678LW, go ahead
14:26:30	N678LW	8LW, departure Maaseik destination Wevelgem, we are maintaining 500ft, request crossing clearance of your area from East to West.
14:26:42	TWR	N678LW, Roger, check Brussels QNH 1028, be advised you will be special VFR, we have a visibility of three thousand three hundred meter and cloud base is 400 ft.
14:25:58	N678LW	That's copied, 8LW
14:28:05	TWR	N678LW is identified 13 NM northeast of the airfield, enter CTR, special VFR, five hundred feet above ground level, on QNH 1028 and routing is Peutie – Groot-Bijgaarden.
14:28:21	N678LW	Roger, Peutie – Groot-Bijgaarden and we are identified, 8LW

N678LW flew in a straight line, and eventually after 13 minutes, reached the end of the controlled airspace, in the neighborhood of Brussegem;

Time	Call	Communication
14:41:18	TWR	N678LW you are leaving controlled airspace, there is no traffic in your vicinity, Flight information is available on 126 decimal 9, and squawk 7000, good day
14:41:28	N678LW	Roger, bye bye

The impact occurred 30 seconds later.

1.10. Airport information

Not applicable.

1.11. Flight Recorders

The GPS were sent to the BEA France for analysis. The read-out of the parameters gave the position of the helicopter.

1.12. Wreckage and Impact information

The impact occurred at a speed above 100kph. The helicopter contacted the ground with an angle of 30-45°.

1.13. Medical and Pathological information

All persons on board die from the impact force.

1.14. Fire

There was no fire.

1.15. Survival Aspects

The speed of impact was above 60 kts. This accident was not survivable.

1.16. Test and Research.

The wreckage was transported to the hangar of the Federal Police Air Support Department where it was kept in quarantine.

The wreckage was inspected by a team of experts constituted of;

- AAIU(Belgium)
- An aircraft maintenance engineer of the Federal Police.
- Representative of Bell helicopters.
- Representative of Rolls Royce.

Airframe.

All the remaining elements of the airframe were scrutinized. The continuity of the flight controls was checked, as far as practicable. There was no sign of a structural failure prior to the impact.

Elements of the fuel system were checked; the fuel pump were tested and at least one was still functioning.

Engine.

The engine was not disassembled.

The N1 shafting system was free and continuous from the compressor to the accessory gearbox as observed with the rotation of the starter generator fan.

The N2 shafting system was free and continuous from the power turbine rotor thru the power take-of gear.

The accessory gearbox was not opened, but was turned by hand. Both the N1 and N2 Drive Trains showed no unusual noise and rotated freely. There was noted continuity to all accessory drive pads and the power turbine output drive.

The fuel pump assembly was in place, and 30-40cc of clean fuel was drained from the fuel pump filter bowl.

The engine-driven fuel pump filter was clean, and residual fuel was found in the fuel feed line.

The examination of the engine and its components did not reveal any evidence of any pre-impact failed or failing parts.

Lubrication

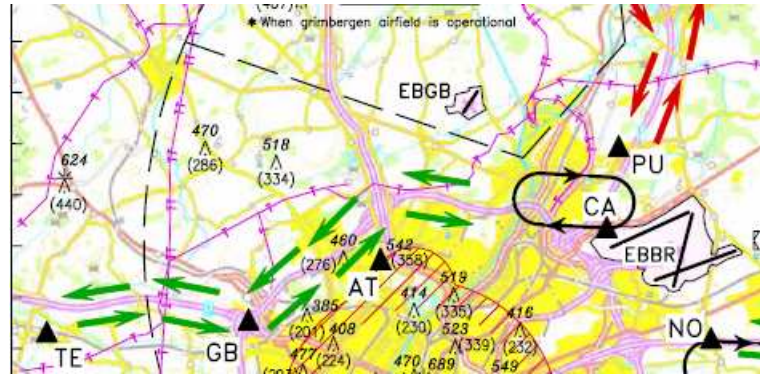
Oil sample was taken from the engine lubricating system, as well as from the Main gearbox. The engine oil filter and the Magnetic chip detectors were also taken out.

All these elements were sent to a qualified laboratory in order to detect a possible abnormal presence of metal. No metallic particle was found.

2. Analysis.

Routing.

ATC instructed the pilot of the “routing is Peutie – Groot-Bijgaarden.”, as published in the AIP. This was acknowledged by the pilot, but not performed.



Standard routes inside the CTR of EBBR

This routing would have led the helicopter around Brussels, in the vicinity of the Ring Road. The helicopter would then exit the controlled airspace at the height of the Brussel-Ostend highway, 7 km South of the crash area.

Noteworthy is that the high voltage line would be well indicated when crossing the highway.

The intention of the pilot, as seen on the map carried on board, was to fly straight ahead.

As there was no traffic flying in the vicinity of the helicopter, ATC had no reason to re-direct the helicopter.

Pilot's awareness.

The decision of the pilot to fly home that day, and to continue flying when the meteorological conditions worsened was undoubtedly questionable.

Several other seasoned helicopter pilots decided not to fly that day, owing to the meteorological conditions.

The pilot was familiar with the route, since he used it several times. He was aware of the presence of the High Voltage line he had to cross to get to Kortrijk.

The helicopter was seen by a witness on the ground in Grimbergen, flying in-and-out of clouds. The helicopter was maintaining 500 ft while there were scattered clouds at

300 ft. This would have indicated the pilot that the meteorological conditions were locally beyond the conditions of "special VFR".

The decision of the pilot to continue flying was most probably due to the phenomenon of "get home-itis" known to all pilots and car drivers.

3. Conclusions.

3.1. Findings

- The pilot had a valid Pilot licence, and medical fitness certificate.
- The helicopter was airworthy.
- The airplane was loaded within its limits for weight and balance.
- There was no sign of in-flight structural failure, or engine failure prior to the crash.

3.2. Cause and contributing factors.

The loss of control in flight, initiated by an evasive maneuver was most probably induced by the pilot, surprised by the close vicinity of the high voltage line.

The helicopter went into the cloud layer, the pilot lost situational awareness, and when recovering, the helicopter was diving to the ground at an angle of 50-60 degrees and a speed of 50-60 knots.

The contributing factors were:

- meteorological conditions.
- pilot had a low experience on this helicopter; in particular in this type of meteorological conditions.
- get home-itis.

4. Safety recommendations.

There are no safety recommendations issued for this accident.