



AIR ACCIDENTS INVESTIGATION  
INSTITUTE  
Beranových 130  
199 01 PRAHA 99

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**CZ-597-08**  
Copy N° 5

# **FINAL REPORT**

**The investigation into Air Accident  
Cessna 510 aircraft, registration mark OE-FMZ, at LKPR  
On December 11, 2008**

**Praha  
July 2009**

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The Final Report, its findings and conclusions contained therein and regarding air accidents and incidents or systems failures compromising operational safety are only informative nature and can be used in no other way than recommendations to avoid other similar incidents and accidents. The author of the Final Report states explicitly it cannot be used to stipulate who is guilty or whom to blame in connection with the incident or accident or to claim compensation in the case of an insurance event.

The sole objective of the investigation of an accident or incident under these Regulations shall be the prevention of accidents and incidents. It shall not be the purpose of such an investigation to apportion blame or liability. The present document is the translation of the Czech Investigation Report. Although efforts are made to translate it as accurate as possible, discrepancies may occur. In this case the Czech version is authentic.

## List of abbreviations

ATC	Air Traffic Control (in general)
ATCo	Air Traffic Controller
ATIS	Automatic Terminal Information Service
ATC GND	Air Traffic Control Ground
CPL	Commercial Pilot License
GPS	Global Positioning System
HPa	Hecto Pascal (pressure unit)
ILS	Instrument Landing System
Kt	knot, unit of speed
LKPR	ICAO designation of Prague-Ruzyně airport
OPJ	Apron South
OLZ	Certificate of Airworthiness
RWY	Runway
T	Temperature
TWY	Taxiway
UTC	Coordinated Universal Time
UZPLN	Air Accident Investigation Institute (of The Czech Republic, AAI)

## A) Introduction

Operator: Wings For Us LTD, Austria  
Manufacturer and aircraft model: Cessna Wichita Kansas Texas, type Cessna 510  
Registration mark: OE-FMZ  
Place of event: LKPR  
Date: 11/12/2008  
Time: 19:34 UTC (hereafter, all times are indicated in UTC)

## B) Information survey

On 11/12/2008, ÚZPLN was notified by Airport Prague PLC operation dispatcher of an accident involving a Cessna 510, registry OE-FMZ. The plane ran off the hard surface when taxiing and as it was coming back onto the asphalt the main undercarriage's left-hand wheel broke off. The crew and passengers were not injured. Based on the notification an investigation into the air incident was launched.

The ÚZPLN's investigation commission consisted of:

Chairman: Ing Josef Procházka  
Member: Ing Lubomír Střihavka

The final report was issued by  
Ústav pro odborné zjišťování příčin leteckých nehod (Air Accident Investigation Institute)  
Beranových 130  
199 01 Prague 99  
On 10<sup>th</sup> July, 2009

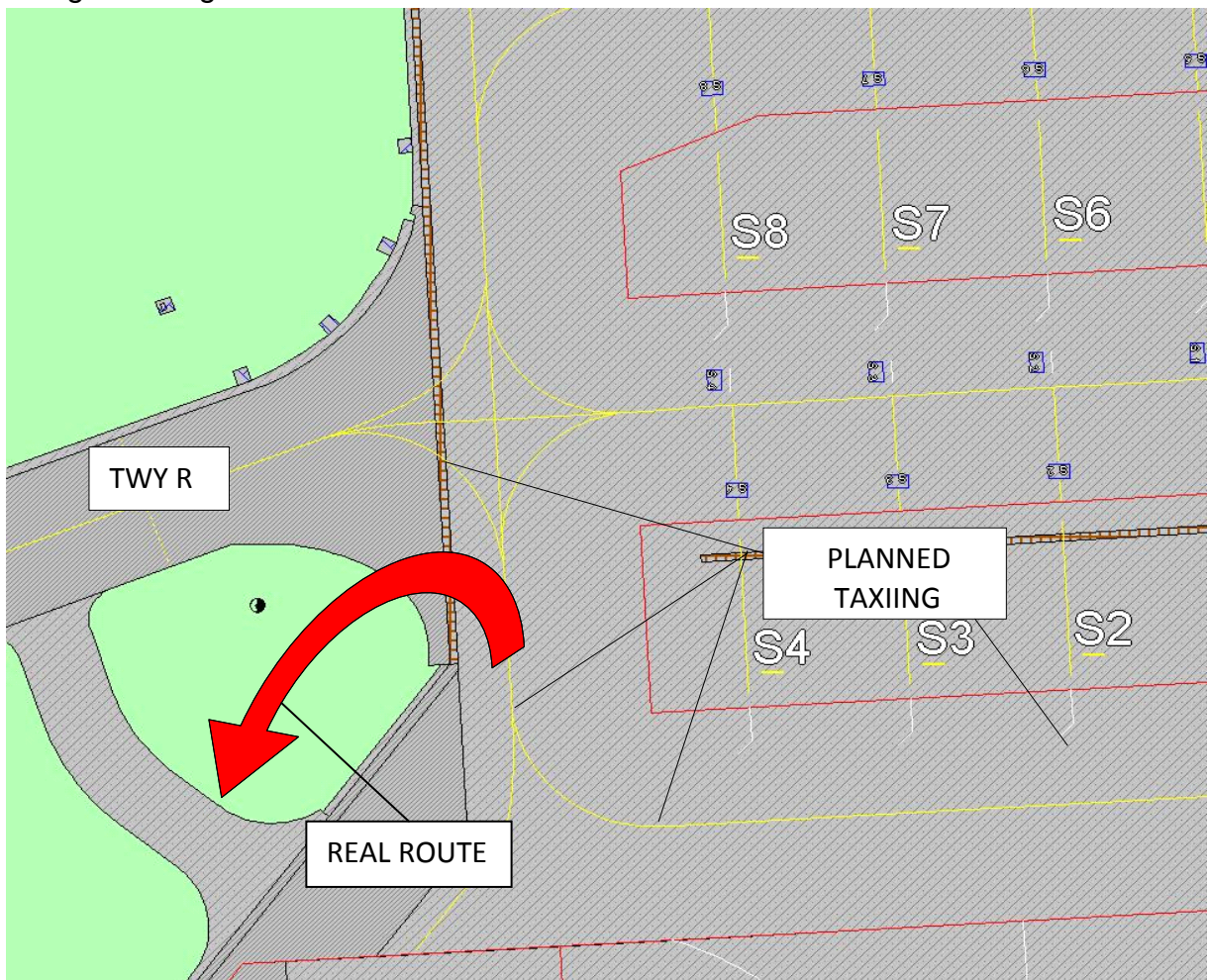
## C) The body of the report includes:

1. Factual information
2. Analyses
3. Conclusions
4. Safety recommendations
5. Annexes (archived with no. 1 copy at ÚZPLN)

## 1) Factual information

### 1.1 Taxiing

The aircraft parked on OPJ LKPR stand S2. The pilot received instructions to taxiing onto TWY R to the RWY 31 waiting point. A pilot and two passengers were on board the plane. After the plane's turn around had finished, the pilot drove from the stand S2 to the right and continued making a turn towards the TWY R exit which lay some 190 m away. After turning ca 150 deg to the right and traveling about 130 m, the pilot swerved left to take the plane to the unpaved surface adjoining the parking area. The pilot continued taxiing 40 to 45 meters and got to another paved surface. As the plane's nose wheel and main undercarriage right-hand wheel were crossing the border between the unpaved and the paved surfaces, the main undercarriage left wheel broke off. The pilot reported on LKPR GND frequency that he "hit something". Asked by ATCo if he needs assistance he said yes. After this announcement the pilot did not communicate on this frequency any longer. The LKPR's technical team was sent to the aircraft. After arriving at the scene, the team confirmed the aircraft had run off the OPJ (apron south) and been damaged – left wheel of main undercarriage had been broken off. The passengers had got off the plane using onboard stairs and left the airport. The pilot stayed at the incident scene to wait for technical assistance. He gave the explanation that when running from the stand S2 he navigated by yellow lines horizontal marking which he lost past the first turn to the right and so went on taxiing following the onboard GPS.



## 1.2 Injuries to persons

Injury	Crew	Passengers	Other persons
Fatal	0	0	0
Serious	0	0	0
Light / No	0 / 1	0 / 2	0

## 1.3 Damage to aircraft

It was found out by external examination that the left-hand wheel of the main undercarriage had been broken off. Also damaged was the skin on the lower part of the left half-wing where the broken-off wheel touched the wing. Further damage parts were subsequently described by a foreign maintenance team as part of the aircraft repair work, which is not part of our investigation.

The whole damage is given in annex 1 Workorder No. DOFMZ 001 of 09/01/2009



View of the accident scene on the following day in the morning

#### 1.4 Other damage

NIL

#### 1.5 Information on persons

Pilot: man, 48 years old, valid CPL certificate, qualification C510(IR,FI), SEP(IR,FI), MEP (IR,FI), and TMG (FI). Valid medical. Before duty he had a rest of 48 hours.

Hours flown	In the latest 24 hours	In the latest 90 days	Total
Total	-	100	1600
As CPT	-	-	1280
On C510	-	-	150

#### 1.6 Information on aircraft

Type: Cessna 510  
Year of Manufacture: 2008  
Serial No.: 0116  
Hours flown as of 11/12/2008: 46:47 hrs and 27 landings

The aircraft had a valid OLZ (airworthiness certificate). During the whole time of aircraft operation, no case had been experienced that could have been taken as loss of control of the plane when moving on the ground. During the previous flight the crew did not notice any anomalies in the work of the brake system or undercarriage. The headlamps were on as the plane taxied and the taxi speed was not higher than 10 km/h, the pilot said.

The plane's weight limit was not exceeded. The plane was filled with 1,200 l air fuel.

*Note: A foreign technical maintenance staff changed the leg of the left-hand main undercarriage at the LKPR Airport. Then the aircraft was cleared to a technical ferry flight.*

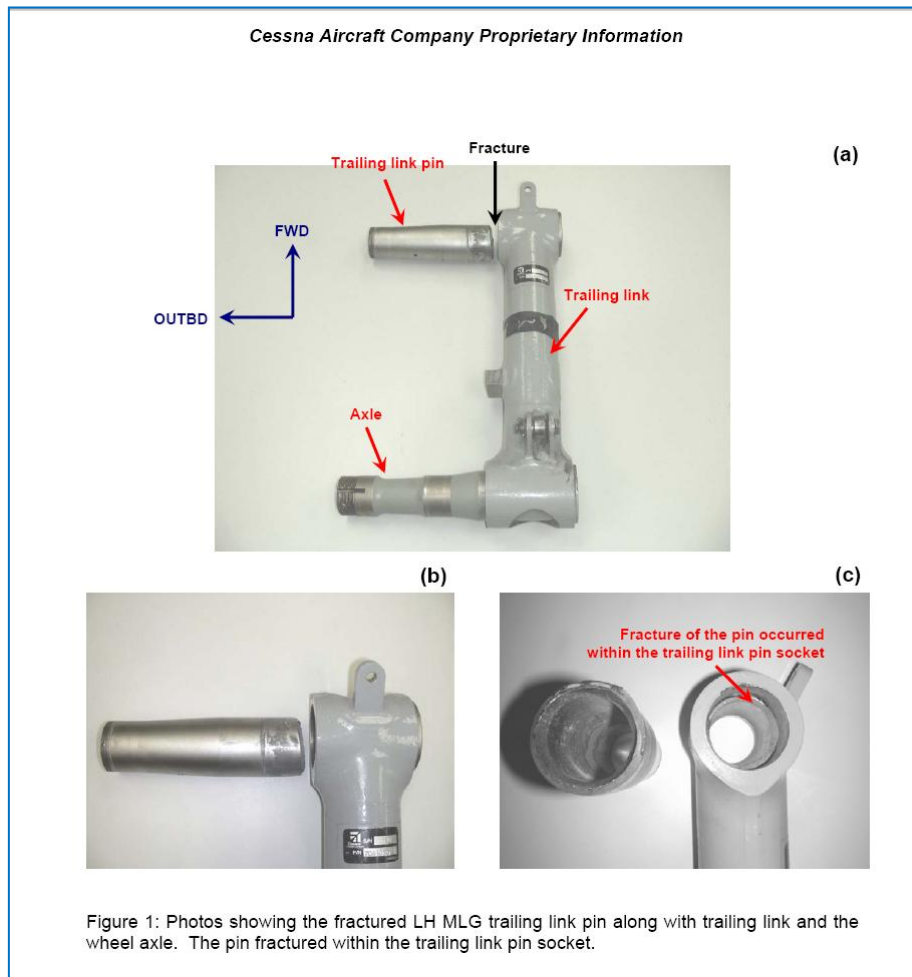
##### 1.6.1 Examination of fracture surface

Following an agreement with a representative of the European manufacturer of the aircraft, the fracture surface of the remaining pin of the main landing gear left wheel axle was examined in the manufacturer's plant. The fracture surface character responded to the load from bending and shear forces acting on the critical cross section of the wheel axle.

The manufacturer issued a report on the fracture surface analysis "Examination of a MLG trailing link pin from Model 510 aircraft 510-0116", no. 09-352-152 of 5th May 2009.



Fractured pin of left hand landing gear wheel axle



Direction of forces acting on critical cross-section

## 1.7 Meteorological situation

From ATIS information as of 19:00

*“ILS approach with reduce visibility procedures. Wet runways. Wind 320o / 2 kt. Visibility 700 m. Runway visual range on RWY 24 varying from 900 m and 1,800 m with lowering tendency. Runway visual range on RWY 31 2,000 m with no tendency to vary. Light rain, fog, almost clear 200ft, cloudy to almost overcast 500 ft, overcast 800 ft, temperature 1°, dew point 0. Without remarkable changes”.*

From weather forecast for manoeuvring areas maintenance, validity 18:00 – 24:00.

*“Wind: north directions 1 – 2 m/s, overcast with light showers probable that might freeze. Temperatures -1°C to +1°C. Without remarkable changes, later on light precipitation, gradually also mixed precipitations”.*

Just before the aircraft getting taxi clearance, the airport experienced a rain shower. The shower over, there were rests of rain water left on the areas. There were night light conditions at the time of the accident. On the following day, the accident site was covered with snow. The runway visual range at the time of taxiing was 800 – 1,000 m, according to the pilot.

## 1.8 Radio navigational and visual aids

TWY R was marked by a row of side blue lights to the right of the supposed taxi direction. The taxi route from the S2 stand toward the TWY R entry was marked with horizontal full yellow line.

## 1.9 Communication service

The radio communications transcript between the pilot and LKPR's ATC GND station on 121,9 MHz was comprehensible and legible.

## 1.10 Information about airport

LKPR is a public international airport. OPJ is used for the parking of small aircraft of general aviation. The S2 stand is marked as passable according to no. 007/2008 Airport Prague Regulation. The space of the parking area is illuminated with overhead halogen lamps of medium intensity. The overhead illumination was ca 80 m ahead of the S2 stand and ca 100 m from the left, or if measured from the unpaved entry point, 120 m from the left and ca 140 m from the rear. Exit from S2 stand and the route towards TWY R is marked with horizontal yellow lines. TWY R entry into OPJ is marked with day markings “TWY R”.

## 1.11 Flight recorders

NIL

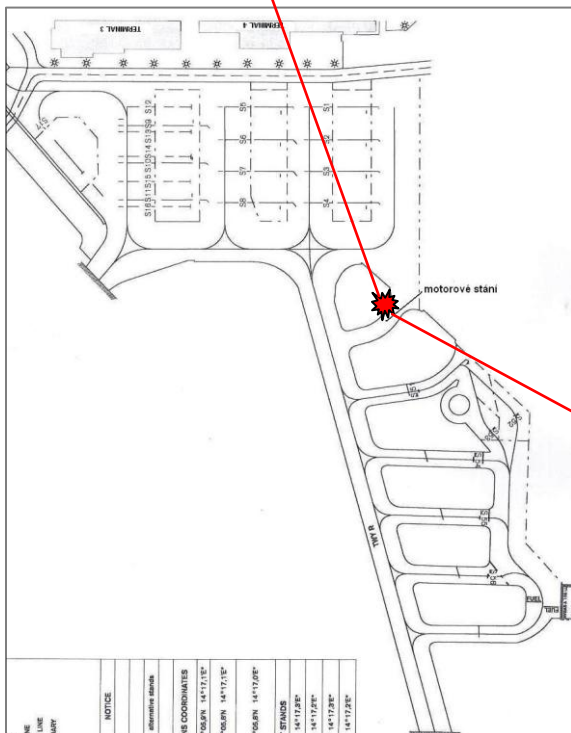


## 1.12 Accident scene description

The scene of accident was on the south-west edge of the parking area marked as OPJ in the Airport Scheme. The paved surface is made of asphalt, coloured dark grey to black. The unpaved surface is grass. The grassy surface was less load-bearing following the rain. The aircraft left its trail on the surface 0.05 m deep. The landing gear wheel broke off as the plane moved from grass to asphalt. The concrete edge height was 0.17 m.



View of OPJ from the scene of accident



OPJ scheme, S2 and TWY R stands



Transition from unpaved to paved surface

## Medical and pathological findings

NIL

### 1.14 Fire

NIL

### 1.16

NIL

### 1.17

## Information about operators

NIL

### 1.18 Supplementary information

NIL

### 1.19 Investigation methods

The accident has been investigated in accordance with L 13 Regulation

## 2. Analysis

### 2.1 Factual information analysis

- The pilot was properly qualified and trained for the flight, medically eligible;
- The plane had a valid airworthiness certificate
- The pilot did not notice any functioning anomalies as regard to plane's control on the ground during the previous flight;
- Breaking off the wheel was not caused by material fatigue of the wheel axle;

### 2.2 Crew taxiing activities

- The pilot was cleared to taxiing in a standard way, was connected to ATC GND and knew the way where to taxi;
- After losing visual contact with horizontal markings, the pilot went to onboard GPS navigation. He was taxiing towards TWY R, but a probable error in GPS display made the pilot turn off 40 m before the right place;
- The pilot reacted late to the situation, the plane stopped at the boundary between soft and hard surfaces, braking the landing gear wheel;
- The pilot used a head lamp when taxiing.

### 2.3 Effect of local conditions

Horizontal visibility was 800 to 1,000 m, according to pilot. The accident happened at night after rain. The horizontal markings were less easy to see since the wet taxi way was gleaming from the light reflection. At taxiing in this part of OPJ, the light conditions were varying from illumination of the whole area up to darkness at space where TWY R began, marked with side blue lamps on the right in the direction of the aircraft movement. The aircraft did not get in this place as it turned 40 m earlier. The pilot's view from the cabin was 1.9 m above the ground, which is rather low. That could have been the reason why the pilot had become disoriented on the large area with lots of disturbing reflections from the wet surface. The landing gear wheel got separated when crossing the border between the grassy land and asphalt surface.

### 3. Conclusions

The likely cause of the accident was the pilot becoming disoriented due to disturbing light reflections from the wet asphalt surface. On having lost his whereabouts, the pilot counted on his onboard GPS and a possible error of the latter got him to decide to turn to TWY R too early. Considering the extent of damage to the aircraft, the event has been classified as an air accident.

Ing. Josef Procházka  
Commission Chairman

### 4. Safety recommendations

To the operator of Prague Airport

- Owing to the fact that OPJ area is used for parking general aviation aircraft and small transports and since the crew of these airplanes uses the airport only occasionally, I recommend:
- That the exit marking from OPJ to TWY R should be made better visible in bad light conditions;
- Implementing supplementary markings to prevent planes from getting onto wrong areas.

Approved by:

Prague 20. July, 2009

Ing. Pavel Štrůbl  
Director