RAAD VOOR DE
TRANSPORT
VEILIGHEID

FINAL REPORT

94-02

G-ZIPP, Cessna 310 Q

26 January 1994, Rotterdam Airport

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FINAL REPORT

The Dutch Transport Safety Board is an independent governmental organisation established by law to investigate and determine the cause or probable cause of accidents and incidents that occurred in the transportation sectors pertaining to shipping, civil aviation, rail transport and road transport as well as underground logistic systems. The sole purpose of such investigation is to prevent accidents and incidents and if the Board finds it appropriate, to make safety recommendations. The organisation consists of the Transport Safety Board and a subdivision in Chambers for every transportation sector which are supported by a staff of investigators and a secretariat.

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Final report of the investigation of the accident with the aircraft G-ZIPP, a Cessna 310Q, which occurred on 26 January 1994 at Rotterdam Airport, The Netherlands.

In accordance with Annex 13 of the Convention of Chicago as well as the Directive 94/56/EC of 21 November 1994 establishing the fundamental principles governing the investigation of civil aviation accidents and incidents of the Council of the European Union, the purpose of an investigation conducted under the responsibility of the Dutch Transportation Safety Board is not to apportion blame or liability.

Chairman of the Board

Chairman of the Aviation Chamber

The Hague, May 2000

De Eindrapporten van de Raad voor de Transportveiligheid zijn openbaar.
Een ieder kan daarvan gratis een afschrift verkrijgen door bestelling bij SDU Grafisch Bedrijf bv, Christoffel Plantijnstraat 2, Den Haag, via telefax nr. 070 378 9744.

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APPENDICES

1. GENERAL INFORMATION OF THE ACCIDENT

Place :	Rotterdam Airport
Date and time:	26-01-1994, 12:48
Aircraft:	G-ZIPP, type Cessna 310Q, severely damaged
Engines:	Two Teledyne IO-470-VO s.n. 455344 and 148476-8-VO
Propellers:	McCauly D2AF34C71 s.n. 728610 and 726653
Flight Crew:	Two, no injuries.
Passengers:	Three, no injuries
Type of Flight:	Private.(General Aviation)
Stage of Flight:	Landing
Type of Accident:	Hard and traversing landing in strong crosswind resulting in landing gear collapse
Pilot:	British, male, 43
Licence:	Private Pilot's Licence with ratings ME, SE – for aircraft not exceeding 5700 kg – Instrument Flight and RT (restricted)
Experience:	Total: approximately 700 hrs On Cessna 310: 250 hrs
Meteorological information:	Received from the Royal Netherlands Meteorological Institute: Wind 30028 kt, gusts 40 kt, temperature 7° C, visibility more then 10 km, clouds 2/8 at 2300 ft and 5/8 at 4000 ft. TAF: EHRD 260900: 1019 30022g37kt 9999 sct022 sct 030 tempo 1019 32033g48kt 6000 shrags sct 015cb bkn020

Actuals EHRD:	261125	29023kt 9999 sct023 bkn 040 07/02 q1011 nosig
	261155	30022ktg37kt 9999 sct023 bkn 040 06/02 q1012 nosig
	261225	30025kt 9999 sct023 bkn040 07/03 q1013 nosig
	261255	30028ktg40kt 270v330 9999 sct023 bkn 040 07/02 q1013 nosig
Special EHRD:	261156	30023g34kt 270v330 9999 sct023 bkn040 06/02 q1012 nosig
	261245	30028g38kt 270v330 9999 sct023 bkn040 07/02 q1013 nosig

NOTE: All times in this report, except those regarding the meteorological information in Chapter 1, are Local Time (UTC + 1)

2. SYNOPSIS

After a hard and traversing landing in a strong crosswind the pilot made a go around and selected flaps and gear up. In the subsequent approach the undercarriage showed down and locked.

During the roll out of the second landing the left main landing gear collapsed.
The aircraft skidded off the runway, made a ground loop and came to rest off the left side of the runway with a collapsed undercarriage.

3. HISTORY OF THE FLIGHT

On 26 of January 1994 the pilot carried out a private VFR flight from Blackpool to Rotterdam with a Cessna 310Q, G-ZIPP, with another pilot and three passengers on board.

According to the weight and balance report, the aircraft departed from Blackpool with 575 lbs of fuel, 5 adult POB's weighing total 800 lbs and 30 lbs of luggage.
With this loading Weight and Balance were within limits.

The pilot made a normal approach for runway 24 at Rotterdam Airport, with 15° flaps and gear down. He recalled having received a windinformation of 310° with 20 kt.
Over the threshold of the runway, severe turbulence was encountered and the aircraft made a hard, traversing landing. The pilot decided to make a go around, applied full power and selected gear up and flaps in.

The pilot stated that during the climb-out the gear motor was heard to 'labour' somewhat and that the red landing gear transit light illuminated longer than usual. His estimate was twice as long as normal.
At the moment the light disappeared he heard a loud 'bang' from the left side underneath the fuselage.

He flew the second approach for runway 24 similar to the previous one with 15° flaps and gear down (three green lights). The tower controller cleared the pilot to land and reported the wind 310° with 24 kt gusting up to 34 kt.
The pilot landed the aircraft on the right main wheel first. During the roll out the left wing dropped and the aircraft skidded to the left into the grass making a 180° ground loop.
The aircraft came to rest on its belly with a collapsed gear.

There were no injuries and there was no fire. The aircraft was severely damaged.

4. FINDINGS

The aircraft G-ZIPP had a valid Certificate of Airworthiness and of Registration.
The maintenance records and last annual inspection gave no evidence of previous landing gear malfunctions. There were no indications for gear problems during the previous flight, nor were indications found for pre existing defects likely to have contributed to the accident.
Weight and Balance were within limits.

The pilot was licenced and qualified to operate the aircraft.

Meteorological conditions at the moment of arrival were generally as forecasted: Wind 300° 28 kt gusting 38 kt variable between 270° and 330°.

The Cessna 310Q Aircraft Operating Manual does not state the maximum demonstrated crosswind. In other Cessna 300 series manuals this is given as 20 kt.
The pilot stated that he did not know of any published crosswind limitations for this type of aircraft.

The landing gear motor and switches were undamaged and in normal working order.
The microswitch at the gear downstop and the left and right proximity switches were both undamaged and showed no indication of any malfunction.

The left main landing gear showed a broken attachment of the bellcrank and sidebrace lock-link, the torque tube had sheared off its mounting bracket. The uplock push-pull tube was broken, the door actuator arm was broken.

The aircrafts damage was consistent with the exposure to excessive loads on the left main landing gear during the first hard traversing crosswind landing and the effects of the subsequent left main landing gear retraction, followed by the collapse of the right main landing gear and nose gear during the ensuing ground loop.

5. ANALYSIS

Prior to his departure from Blackpool the pilot was in the possession of the weather forecast for Rotterdam, indicating a strong crosswind at the time of his estimated arrival, i.e. 300° with 22 kt, gusting to 37 kt with tempo 320§ with 33kt, gusting to 48kt.

The adverse landing conditions due to the strong crosswind resulted in a hard and traversing landing on the left main gear, damaging its actuating system.

Because of the already damaged actuating system the gear up selection after the go around resulted in breaking the attachement of the uplock push-pull tube.

During the go around manoeuvre the pilot was not aware that the landing gear was damaged.
Although the pilot stated that he heard noises, three greens appeared after the landing gear was selected down the second time, and he therefore found no reason to investigate.

During the second landing the damaged actuating system could not support the left main gear and it collapsed. In the subsequent groundloop the right main gear and nose gear collapsed.

6. PROPABLE CAUSE

The accident was initiated when during a landing in strong crosswind conditions a hard and traversing landing was made, damaging the left main landing gear. Gear up selection after the go around resulted in further damage to the gear actuating system.

The accident became inevitable when during the subsequent landing the damaged main landing gear collapsed.

7. RECOMMENDATIONS

None

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APPENDIX 1

Photographs


G-ZIPP

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APPENDIX 2

Report of the technical investigation

REPORT OF THE TECHNICAL INVESTIGATION

Accident Site Description

The accident site was located at Rotterdam Airport runway 24. After the landing the aircraft skidded of the runway, collided with a runway edge light, made a ground loop and came to rest on its belly in the grass 35 meter left of the runway 24 oriented in a North-Easterly direction. The aircraft made a 75 meter long skidmark from runway centerline to the left edge of runway 24 and continued in the grass over about 50 meters.

Damage to the aircraft

RH stabilizer bent down and backwards due to the back- and sidewards movement during the groundloop.
RH side fuselage showed grass and earth smudges due to side movement. The tailfin was bent to the left.
Antennes were ripped off from the fuselage belly.
RH wing inner- and outer flap were bent due to the backwards movement over the grass.
RH engine, both propellor blades bent forward.
LH engine, both propellor blades bent backwards.
LH wing wing tip light broken and wing tip heavely damaged due to ground contact with runway and grass.
Dirt entered the LH wing, reaching the fuel tank.
LH inner and outer split flaps partly extended.
Several skin plates were ripped from the fuselage.
Both inner wheelbay doors were pushed by the main landing gear into the wheelbay.
LH wingside wheelbay door was ripped from the LH main landing gear.
The tailcone was ripped from the fuselage.
Estimated fuel remaining in each fuel tank was approximately 150 lbs.

Technical Examination of the Wreckage

A technical investigation was conducted with the assistance of specialists for aircraft systems, fuselage and engine.

The estimated damage sequence was evaluated and is described below:
During the first landing, when the aircraft touched down yawing to the right – traversing – the LH main landing gear suffered a heavy impact resulting in an inward force on the bellcranck.
The bellcranck is attached to the side bracelock which is in an overcentered position when the landing gear is extended. The overload suffered during the first landing resulted in deblocking the overcentered position, conveying the total inward force via the side bracelock link and the bellcranck to the attachment.
The attachment is the weakest link and unable to absorb the force and consequently broke.
After the first landing when the pilot went around and selected gear up, the bellcranck was pulled backwards by the outboard push-pull tube, driven by the landing gear motor

actuator. At the end of the gear up transition the bellcranck got stuck with the broken side bracelock link breaking the attachment of the uplock push-pull tube.
This explains the ‘clunk’ noise mentioned by the pilot. The red transition light was now off as the gear motor stopswitch was actuated by the motor actuator.

After gear down selection for the final landing the pilot got three green lights because, despite the damage to the left main landing gear, the proximity switches made contact with the bellcranck.
During the landing the LH landing gear was not locked – not overcentered – and moved inwards pulling the outboard push-pull tube, thus extending the distance and shearing the torque tube from its mounting bracket.