

Aviation Occurrence Investigation Preliminary Report

INCID/01/2018

Aircraft Damage Caused by Hard Landing

Beijing Capital Airlines

Airbus A320-214, B-6952

Macau International Airport

28 August 2018

28 September 2018

Foreword

The report is based on the joint investigation carried out by the Civil Aviation Authority, Macao, China (AACM) and Civil Aviation Administration of China (CAAC).

The sole objective of the investigation of an aviation occurrence is the prevention of accidents and incidents. It is not the purpose of these activities to apportion blame or liability.

Sequence of events

On 28 August, 2018, an Airbus A320-214 aircraft, registered B-6952, departed from Beijing Capital International Airport (ZBAA) to Macau International Airport Macao, China (VMMC), operated by Beijing Capital Airlines as a schedule passenger flight, JD5759 / CBJ5759.

The flight was normal until final approach. As the aircraft was in final stages of the approach and descending from 50 to 30 feet above ground level, the indicated airspeed decreased from 134 to 122 knot and the rate of descent was about 688 feet/min. The airspeed decrease occurred within 1-2 seconds and by touchdown the aircraft was being affected by a 28 knot tailwind.

At 03:15:35, the aircraft touched down on the main landing gear with peak vertical acceleration 2.359G at about 300 meter after the threshold of runway 34 at Macau International Airport and bounced up in the air.

At 03:15:39, the aircraft touched down again on the nose landing gear with peak vertical acceleration 3.406G at about 600 meter after the threshold of runway 34. The nose landing gear was damage and debris were ingested into both engines, resulting both engines were damaged.

After the second touchdown, the captain conducted miss approach procedures with low climb rate.

At 03:16:21 Macau Air Traffic Control (ATC) informed the flight crews that fire was observed coming out from its left engine.

At around 03:20:00, a tire was found on the Macau runway and flight crews were informed.

The captain declared mayday and determined suitable airport to land the aircraft, navigation system was inoperative after the hard landing and backup navigation system was activated.

After evaluating the situation, flight crew decided to divert to Shenzhen and requested full emergency landing at Shenzhen Bao'an International Airport.

At 03:57:52, the aircraft landed in Shenzhen Bao'an International Airport. The Aircraft sustained substantial damage and there was no outbreak of fire.

The crews activated emergency evacuation procedures and all persons onboard were evacuated through evacuation slides from door 1 right and door 4 right.

Injuries to persons

There were a total of 166 persons on board, consisting of the 3 flight crews (1 as observer), 6 cabin crews and 157 passengers.

5 passengers suffered minor injuries during evacuation in Shenzhen Bao'an International Airport.

Aircraft and engine information

Table 1: Aircraft and engine information

Aircraft manufacturer	Airbus
Aircraft type	A320-214
Aircraft serial number	5331
Operator	Beijing Capital Airlines
Total hour	17,838:59
Total cycle	9,628
Year of manufacture	2012
Date of issue of certificate of registration	24 October 2012
Date of issue of certificate of airworthiness	24 October 2012
Maximum certificated take-off weight	75,500 kg
Actual take-off weight	72,200 kg
Maximum certificated landing weight	66,000 kg
Actual landing weight	63,340 kg
Engine manufacturer	CFM International
Engine type	CFM56-5B4/3

Damage to aircraft

Nose landing gear (NLG)

1. NLG was damaged with 2 wheels lost.
2. NLG sliding tube fractured.
3. Bottom of NLG main fitting wear.
4. NLG lower torque link fractured.
5. Taxi light bracket fractured.
6. NLG Flight / Ground Sensing Mechanism fractured.

Forward fuselage

1. Deformation at frame 17 – frame 24, stringer 30 right hand – right hand lower stringer.
2. Deformation at frame 18 – frame 24, lower right hand stringer trace – lower left hand stringer trace.
3. Deformation at frame 15 – frame 24, stringer 30 left hand – left hand lower stringer.
4. Deformation at frame 20 and cabin floor beam.

Left engine

1. All 35 fan blades damaged.
2. 2 penetration damages in fan case.
3. Severe damage at low-pressure compressor (LPC) and high-pressure compressor (HPC) blades due to foreign object debris.
4. Combustor, high-pressure turbine (HPT) and low-pressure turbine (LPT) are attached with melted metal.
5. Penetration damage at leading edge of inner fan cowl.
6. Severe damage at acoustic panels.
7. Nicks and dents at thrust reversers.
8. 3 Nicks at pylon movable fairing

Right engine

1. 6 fan blades were damaged.
2. 2 acoustic panels were damaged.
3. Damage at LPC and HPC blades within Aircraft Maintenance Manual (AMM) limit.
4. 4 nicks and dents at inner fan cowl.

Damage at left hand main landing gear (MLG) fixed fairing.

Drain mast at AFT fuselage was deformed with abrasion wear.

Abrasion wear at auxiliary power unit (APU) drain mast.

Weather and environment information

According to METAR published at 02:56:59, the weather for the approach into Macau International Airport runway 34 included 4 knots of wind in direction 200, visibility 10 Km, Few (1 - 2 oktas) clouds at a height of 1,200 feet, scattered (3 - 4 oktas) clouds at a height of 3,000 feet. The temperature on the ground was 29 °C.

Raw data collected from wind sensor at runway 34 shown from 03:15:00 to 03:15:57, gust wind sudden changed from 10 knot to 22 knot with wind direction ranging from 170 to 190 which is tail wind.

Recorded flight data

The aircraft was fitted with a cockpit voice recorder, flight data recorder and a quick access recorder, which recorded the flight data associated with the occurrence.

The recorded flight data indicated that the aircraft was touchdown in conditions of tail wind of 28 knot at about 03:15:35, the aircraft first touchdown on the main landing gear, the descent rate was 640 feet per minute, the speed was 122 knot, and the peak pitch angle was 7.73 degrees. The peak recorded vertical acceleration during the first touchdown was 2.359G.

At 03:15:39, the aircraft touched down again on the nose landing gear and took off. The peak recorded vertical acceleration during the second touchdown was 3.406G.

Continuing investigation

The investigation is continuing and will consider the followings:

- Wheel debris examination and analysis
- Flight data analysis
- flight performance analysis
- crew training and qualifications
- weather and environment influences
- aircraft systems
- aircraft maintenance history
- ATC procedures