SOUTH AFRICAN CIVIL AVIATION AUTHORITY

Section/division **Accident and Incident Investigations Division** Form Number: CA 12-12b

AIRCRAFT INCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/3/2/1261		
Aircraft Registration	**ZS-SJH**	**Date of Incident**	19 April 2019		**Time of Incident**	1430Z	
Type of Aircraft	Boeing 737-800		**Type of Operation**		Commercial (Part 121)		
Pilot-in-command Licence Type	Airline Transport Pilot Licence		**Age**	49	**Licence Valid**	Yes	
Pilot-in-command Flying Experience	Total Flying Hours		6360		Hours on Type	2307	
Last Point of Departure	O.R. Tambo International Aerodrome (FAOR) – Gauteng Province						
Next Point of Intended Landing	Cape Town International Aerodrome (FACT) – Western Cape Province						
Location of the incident site with reference to easily defined geographical points (GPS readings if possible)							
On taxiway "Alpha" where it intersects with taxiway "November" at O.R. Tambo International Aerodrome (FAOR) at GPS co-ordinates: 26° 07' 06.30" South 028° 14' 28.92" East and at an elevation of 5508 feet.							
Meteorological Information	Wind direction: 320˚; Wind speed: 14kts; Temperature: 24˚C; Visibility: +10km; Dew point: 11˚C; Cloud base: 4500ft						
Number of People On-board	2+4+183	**No. of People Injured**	0	**No. of People Killed**	0		

Synopsis

On 19 April 2019, ZS-SJH and ZS-ZWV, both Boeing 737-800 aircraft, were preparing to depart O.R. Tambo International Aerodrome (FAOR) on scheduled flights with intentions to land at Cape Town International Aerodrome (FACT) and King Shaka International Aerodrome (FALE), respectively. ZS-ZWV requested departure from intersection November. The ATC at FAOR instructed ZS-ZWV to taxi on taxiway Lima, Alpha and hold short on taxiway Echo to make way for ZS-SJH which had requested a full-length runway departure. The FAOR ground ATC instructed ZS-SJH to taxi using taxiway Echo, Alpha and hold short before entering Runway 21R. The ground ATC observed ZS-SJH turning on taxiway Foxtrot and advised ZS-ZWV to continue on taxiway Alpha and turn right on intersection November because ZS-SJH was now behind him on taxiway Alpha. Ground ATC then gave ZS-SJH an option to turn on to taxiway Golf 10, into Delta ramp then taxiway Golf 9 onto taxiway Alpha to holding point Runway 21R, which ZS-SJH read back correctly. The crew of the ZS-SJH decided to taxi around a stationary ZS-ZWV aircraft, resulting in a collision between the ZS-SJH's right-hand winglet and ZS-ZWV, which had its tail protruding on taxiway Alpha. The winglet of ZS-SJH impacted the left horizontal stabiliser of ZS-ZWV. There were no reported injuries and damage was limited to the right-hand winglet of ZS-SJH and the left horizontal stabiliser of ZS-ZWV.

The investigation revealed that the crew of ZS-SJH elected not to follow the ATC instructions and advise, resulting in a collision with the stationary ZS-ZWV.

SRP Date	10 March 2020	Publication Date	04 May 2020

ABBREVIATION	DESCRIPTION
AIID	Accident and Incident Investigations Division
AMO	Aircraft Maintenance Organisation
AOC	Air Operating Certificate
ATNS	Air Traffic Navigation System
ATPL	Airline Transport Pilot Licence
CAR	Civil Aviation Regulation
CVR	Cockpit Voice Recorder
C of A	Certificate of Airworthiness
C of R	Certificate of Registration
FACT	Cape Town International Aerodrome
FALE	King Shaka International Aerodrome
FAOR	O.R. Tambo International Aerodrome
FDR	Flight Data Recorder
FO	First Officer
ft	Feet
GND ATC	Ground Air Traffic Controller
GPS	Global Positioning System
IIC	Investigator-in-charge
KM	Kilometres
kt	Knots
MEL	Minimum Equipment List
PIC	Pilot-in-command
QAR	Quick Access Recorder
SACAA	South African Civil Aviation Authority
SOP	Standard Operation Procedure
TWR ATC	Tower Air Traffic Controller
UTC	Universal Co-ordinated Time

Reference Number	**:** CA18/3/2/1261
Name of Owner/Operator	**:** Mango Airlines
Manufacturer	**:** Boeing Aircraft Company
Model	**:** 737-800
Nationality	**:** South African
Registration Marks	**:** ZS-SJH
Place	**:** O.R. Tambo International Aerodrome, GPS position 26° 07' 06.30" South 028° 14' 28.92" East
Date	**:** 19 April 2019
Time	**:** 1430Z

All times given in this report are Co-ordinated Universal Time (UTC) and will be denoted by (Z). South African Standard Time is UTC plus 2 hours.

Purpose of the Investigation:

In terms of Regulation 12.03.1 of the Civil Aviation Regulations (CAR) 2011, this report was compiled in the interest of the promotion of aviation safety and the reduction of the risk of aviation accidents or incidents and ***not to apportion blame or liability****.*

Investigations process:

The incident was notified to the Accident and Incident Investigations Division (AIID) on 19 April 2019 at about 1430Z. The investigator/s dispatched to O.R. Tambo International Aerodrome on 19 April 2019. The investigator/s co-ordinated with all authorities on site by initiating the accident investigation process according to CAR Part 12 and investigation procedures.

The AIID appointed an investigator-in-charge (IIC) with an investigation team. The AIID sent notifications to the State of Registry, State of Operator and the State of Manufacture and Design. The National Transportation Safety Board (NTSB), representing the State of Design and Manufacture, appointed a non-travelling accredited representative. The AIID of the South African Civil Aviation Authority (SACAA) is leading the investigation as the Republic of South Africa (RSA) is the State of Occurrence.

Notes:
1. Whenever the following words are mentioned in this report, they shall mean the following:

- *Incident – this investigated serious incident*
- *Aircraft – the Boeing 737-800 involved in this serious incident*
- *Investigation – the investigation into the circumstances of this serious incident*
- *Pilot – the pilot/s involved in this serious incident*
- *Report – this serious incident report*

2. Photos and figures used in this report are taken from different sources and may be adjusted from the original for the sole purpose of improving clarity of the report. Modifications to images used in this report are limited to cropping, magnification, file compression; or enhancement of colour, brightness, contrast; or addition of text boxes, arrows or lines.

Disclaimer:

This report is produced without prejudice to the rights of the SACAA, which are reserved.

1. FACTUAL INFORMATION

1.1 History of Flight

1.1.1 On 19 April 2019, ZS-SJH and ZS-ZWV, both Boeing 737-800 aircraft, were preparing to take-off from O.R. Tambo International Aerodrome (FAOR) on scheduled flights with intentions to land at Cape Town International Aerodrome (FACT) and King Shaka International Aerodrome (FALE), respectively. At about 1427Z, the air traffic controller (ATC) at FAOR instructed ZS-ZWV to taxi on taxiway Lima, Alpha and hold short of Echo to make way for ZS-SJH that was taxiing from Parking Bay A12 and had requested a full runway length departure from Runway 21R.

Figure 1: Blue line shows the route that was given to ZS-SJH by the GND ATC and the red line shows the route taken by ZS-SJH.

1.1.2 While ZS-ZWV requested take-off from intersection November, the ATC instructed ZS-SJH to taxi via taxiway Echo onto taxiway Alpha and hold short before entering Runway 21R; both crews acknowledged the ATC instructions by correct read back. However, ZS-SJH was observed turning out on taxiway Foxtrot. ATC then advised ZS-ZWV to continue on taxiway Alpha and turn right on intersection November because ZS-SJH was now behind ZS-ZWV on taxiway Alpha.

1.1.3 To avoid a collision, the ATC advised ZS-SJH to turn on to Golf 10 into Delta ramp then Golf 9 on to taxiway Alpha to holding point Runway 21R, which the crew of ZS-SJH read back, but decided to proceed on taxiway Alpha. To clear ZS-ZWV, ZS-SJH went off the centreline to manoeuvre and pass behind the stationary ZS-ZWV which was holding short on taxiway November and had its tail protruding on taxiway Alpha. It was during this attempt to manoeuvre behind ZS-ZWV that ZS-SJH collided with ZS-ZWV (see Figure 3).

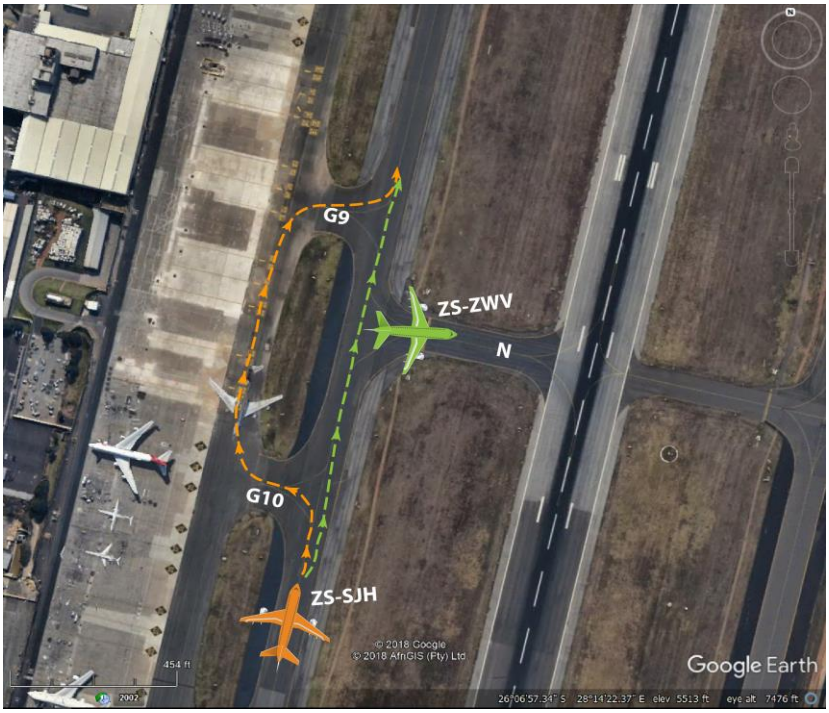

Figure 2: Orange line shows the route that was given to ZS-SJH by the GND ATC as an option and the green line shows the route taken by ZS-SJH, which resulted in a collision with a stationary ZS-ZWV.

1.1.4 At 1436Z, ZS-ZWV pilot contacted the ATC and stated that when ZS-SJH was passing behind the aircraft, they felt a bit of a “bang”, however, they were not sure if ZS-SJH had collided with their aircraft. They further requested that the ATC check with ZS-SJH if they had felt anything. The ATC contacted ZS-SJH and asked if they had felt something like a “bump” when they were taxiing behind ZS-ZWV. The crew of ZS-SJH replied that they had not collided with ZS-ZWV.

1.1.5 The crew of ZS-SJH indicated that they only felt normal bumps when taxiing over taxiway lights. The ATC then asked ZS-SJH to confirm if they had used the option suggested to them, they replied that they did not and confirmed that they taxied behind ZS-ZWV.

Figure 3: Shows the collision point where ZS-SJH collided with the stationary ZS-ZWV.

1.1.6 The crew of ZS-ZWV reported that after a while, the ATC mentioned twice that ZS-SJH crew was sure that they had cleared ZS-ZWV. The crew of ZS-ZWV then presumed the wobble came from the ZS-SJH jet blast that was blown over the tail of their aircraft; the ZS-ZWV took off without any further incidents.

1.1.7 At approximately 1441Z, ZS-SJH contacted ATC stating that they wanted to turn back to the bay to inspect the aircraft as they were uncertain if they did touch ZS-ZWV.

1.1.8 During a walk-around with the ground engineer, it was discovered that ZS-SJH had indeed collided with ZS-ZWV, causing damage to the aircraft's right-hand winglet.

1.1.9 ZS-ZWV operated normally throughout the flight to FALE. On approach into FALE, the ATC informed ZS-ZWV crew that ZS-SJH aircraft had returned to the bay at FAOR and the ground engineers had found damage on the aircraft's winglet. After safely landing the aircraft at FALE, ZS-ZWV was also inspected and the engineers found that one static wick on the left elevator was bent and the left aft tip of the horizontal stabiliser was also damaged.

1.1.10 Following this serious incident, the captain of the ZS-SJH reported that they were cleared by ATC to taxi on taxiway Alpha to the holding point of Runway 21R for a full-length departure. The ZS-ZWV aircraft was at the holding point of intersection November and the ZS-SJH was given the option of taxiing through the Delta apron by ATC. According to available information, ZS-SJH was supposed to take off first or before ZS-ZWV. Because ZS-SJH was running late as a result of a runway change, ZS-SJH crew saw what looked like enough space to taxi behind ZS-ZWV and they proceeded on taxiway Alpha. ZS-SJH

was steered to the left of the taxiway centreline to avoid colliding with ZS-ZWV.

1.1.11 ZS-ZWV pilot reported that they were told by the ATC to taxi via taxiway Alpha and hold short on taxiway Echo to allow ZS-SJH to taxi ahead of ZS-ZWV. ZS-SJH was seen taking taxiway Foxtrot and ended up behind ZS-ZWV on taxiway Alpha. ATC instructed ZS-ZWV to cancel the hold at taxiway Echo and continue to holding point on taxiway November for Runway 21R where ZS-ZWV stopped and got ready to switch frequency. The pilot further reported that after a short period, he felt a slight wobble. While looking on the left-hand side of the aircraft, he saw ZS-SJH passing behind ZS-ZWV. The captain then asked the cabin crew members at the rear of the aircraft if they had felt a wobble. They confirmed that they, too, had felt a slight wobble, however, no noise of an impact was heard.

1.1.12 The first officer (FO) of ZS-SJH stated that the reason they were a few minutes behind schedule would be attributed to operational reasons such as awaiting catering, awaiting passengers to be seated so that safety briefings can commence, and for doors to be closed or for refuelling to be completed, and so forth. The ATC (tower) informed the ZS-SJH crew members to standby due to a runway change and gave them a new departure clearance from Runway 03L to Runway 21R. The FO further stated that this was when they began to set up for the runway change and brief for the departure, which increased the delay to approximately 15 minutes. He also stated that the instruction received from the ATC was not a re-clearance which will need adherence. The decision to taxi through Alpha was at the pilot's discretion as it seemed there was enough clearance behind ZS-ZWV. He further stated that an effort was made to clear ZS-ZWV's tail by taxiing slightly to the left.

1.1.13 No injuries were reported on both ZS-SJH and ZS-ZWV aircraft. The ZS-SJH sustained damage to the right-hand winglet and the ZS-ZWV sustained damage to the left horizontal stabiliser.

1.1.14 The incident occurred during daylight at FAOR at Global Positioning System (GPS) 26° 07' 06.30" South 028° 14' 28.92" East, at an elevation of 5558 feet (ft).

1.2 Injuries to Persons

1.2.1 **ZS-SJH**

Injuries	Pilot	Crew	Pass.	Other
Fatal	-	-	-	-
Serious	-	-	-	-
Minor	-	-	-	-
None	2	4	183	-

1.2.2 **ZS-ZWV**

Injuries	Pilot	Crew	Pass.	Other
Fatal	-	-	-	-
Serious	-	-	-	-
Minor	-	-	-	-
None	2	5	131	-

1.3 **Damage to Aircraft**

1.3.1 The ZS-SJH sustained damage to the right-hand winglet and ZS-ZWV sustained damage to the left horizontal stabiliser.

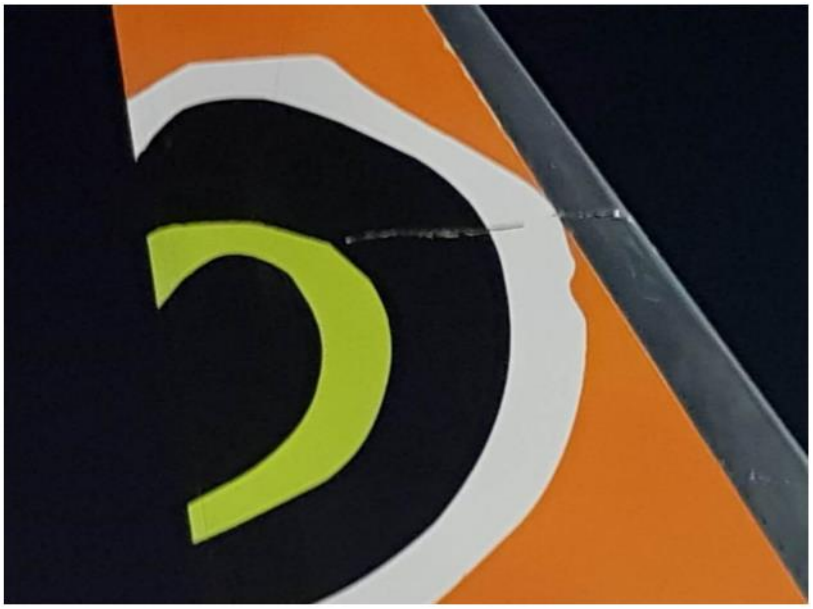

Figure 4: Picture of the damaged right-hand winglet on the ZS-SJH. (Picture courtesy of Mango Airlines)

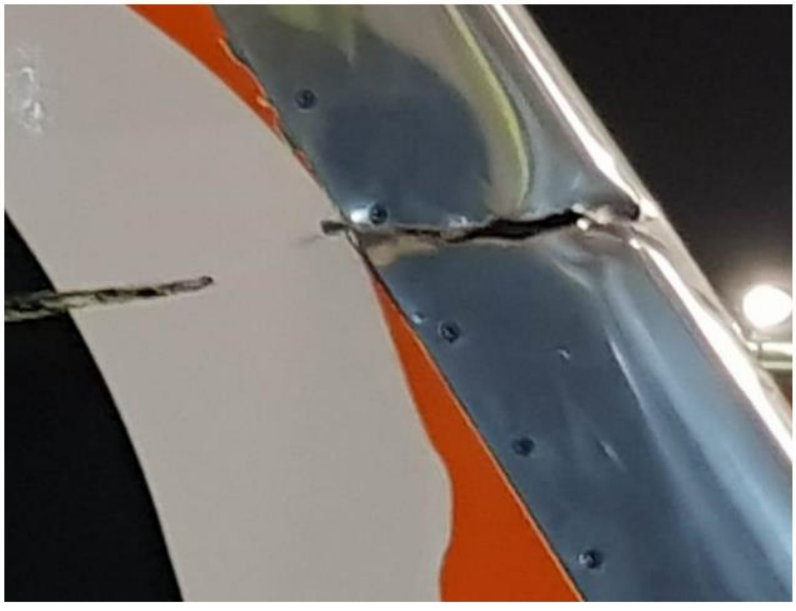

Figure 5: Close-up of the damaged right-hand winglet on ZS-SJH. (Picture courtesy of Mango Airlines)

Figure 6: The damaged static wick and the left-hand horizontal stabiliser tip on ZS-ZWV. (Picture courtesy of Comair Limited)

1.4 Other Damage

1.4.1 None.

1.5 Personnel Information

1.5.1 (a) Captain (ZS-SJH)

Nationality	South African	Gender	Male	Age	49
Licence Number	**********	Licence Type	Airline Transport Pilot Licence		
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Night Flight and Instrument				
Medical Expiry Date	31 January 2020				
Restrictions	None				
Previous Accidents	None				

Flying Experience:

Total Hours	6360
Total Past 90 Days	162
Total on Type Past 90 Days	162
Total on Type	2307

(b) First Officer (ZS-SJH)

Nationality	South African	Gender	Male	Age	29
Licence Number	**********	Licence Type	Airline Transport Pilot Licence		
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Night Flight, Instrument and Flight Instructor Grade II				
Medical Expiry Date	31 March 2020				
Restrictions	None				
Previous Accidents	None				

Flying Experience:

Total Hours	2647.1
Total Past 90 Days	159.2
Total on Type Past 90 Days	159.2
Total on Type	872

1.5.2 (a) Captain (ZS-ZWV)

Nationality	South African	Gender	Male	Age	40
Licence Number	**********	Licence Type	Airline Transport Pilot Licence		
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Night Flight and Instrument				
Medical Expiry Date	31 August 2019				
Restrictions	None				
Previous Accidents	None				

Flying Experience:

Total Hours	12595.7
Total Past 90 Days	187.7
Total on Type Past 90 Days	166.5
Total on Type	4354.9

(b) First Officer (ZS-ZWV)

Nationality	South African	Gender	Male	Age	27
Licence Number	**********	Licence Type	Airline Transport Pilot Licence		
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Night Flight and Instrument				
Medical Expiry Date	31 August 2019				
Restrictions	None				
Previous Accidents	None				

Flying Experience:

Total Hours	3883.6
Total Past 90 Days	151.9
Total on Type Past 90 Days	151.9
Total on Type	151.9

1.6 Aircraft Information

1.6.1 (a) Airframe: ZS-SJH

Type	Boeing 737-8BG	
Serial Number	32354	
Manufacturer	Boeing Aircraft Company	
Date of Manufacture	12 December 2000	
Total Airframe Hours (At time of Accident)	50347	
Last C-Check (Date & Hours)	12 September 2018	49 544
Hours since Last C-Check	803	
C of A (Expiry Date)	30 November 2019	
C of R (Issue Date) (Present owner)	9 January 2017	
Operating Categories	Air Transport Operations (Part 121)	

1.6.1 (b) Engine #1:

Type	CFMI
Part Number	CFM56-7B
Serial Number	876638
Hours Since New	43396
Hours Since Overhaul	6726

1.6.1 (c) Engine #2

Type	CFMI
Part Number	CFM56-7B
Serial Number	877676
Hours Since New	44819
Hours Since Overhaul	10092

1.6.2 (a) Airframe: ZS-ZWV

Type	Boeing 737-800	
Serial Number	30414	
Manufacturer	Boeing Aircraft Company	
Date of Manufacture	2000	
Total Airframe Hours (At time of Accident)	64239	
Last C-Check (Date & Hours)	1 April 2019	64096
Hours since Last C-Check	143	
C of A (Issue Date)	31 August 2019	
C of R (Issue Date) (Present owner)	7 July 2011	
Operating Categories	Air Transport Operations (Part 121)	

1.6.2 (b) Engine #1:

Type	CFMI Engine Assembly
Part Number	CFM56-7B26
Serial Number	888102
Hours Since New	61 382.06
Hours Since Overhaul	4 495

1.6.2 (c) Engine #2

Type	CFMI Engine Assembly
Part Number	CFM56-7B26
Serial Number	876690
Hours Since New	52 903.14
Hours Since Overhaul	4 440

1.7 Meteorological Information

1.7.1 The weather information below was obtained from ZS-SJH pilot's questionnaire.

Wind direction	320˚	Wind speed	14kts	Visibility	+10km
Temperature	24˚C	Cloud cover	Few	Cloud base	4500ft
Dew point	11˚C	QNH	N/A		

1.8. Aids to Navigation

1.8.1 Both aircraft were equipped with navigational equipment approved by the Regulator (SACAA). No defects to this equipment were recorded prior to flight.

1.9. Communication

1.9.1 The aircraft was equipped with communication equipment approved by the Regulator. No defects to this equipment were recorded prior to flight.

1.10 Aerodrome Information

Aerodrome Location	O.R. Tambo International Aerodrome (FAOR)	
Aerodrome Coordinates	26°08'47.11" South 028°14'03.63" East	
Aerodrome Elevation	5558ft	
Runway Designations	03L/21R	03R/21L
Runway Dimensions	4421m x 60m	3405m x 60m
Runway Used	21R	
Runway Surface	Asphalt	
Approach Facilities	DVOR; UHF DME; ILS LOC; ILS GP CAT II; ILS/DME	

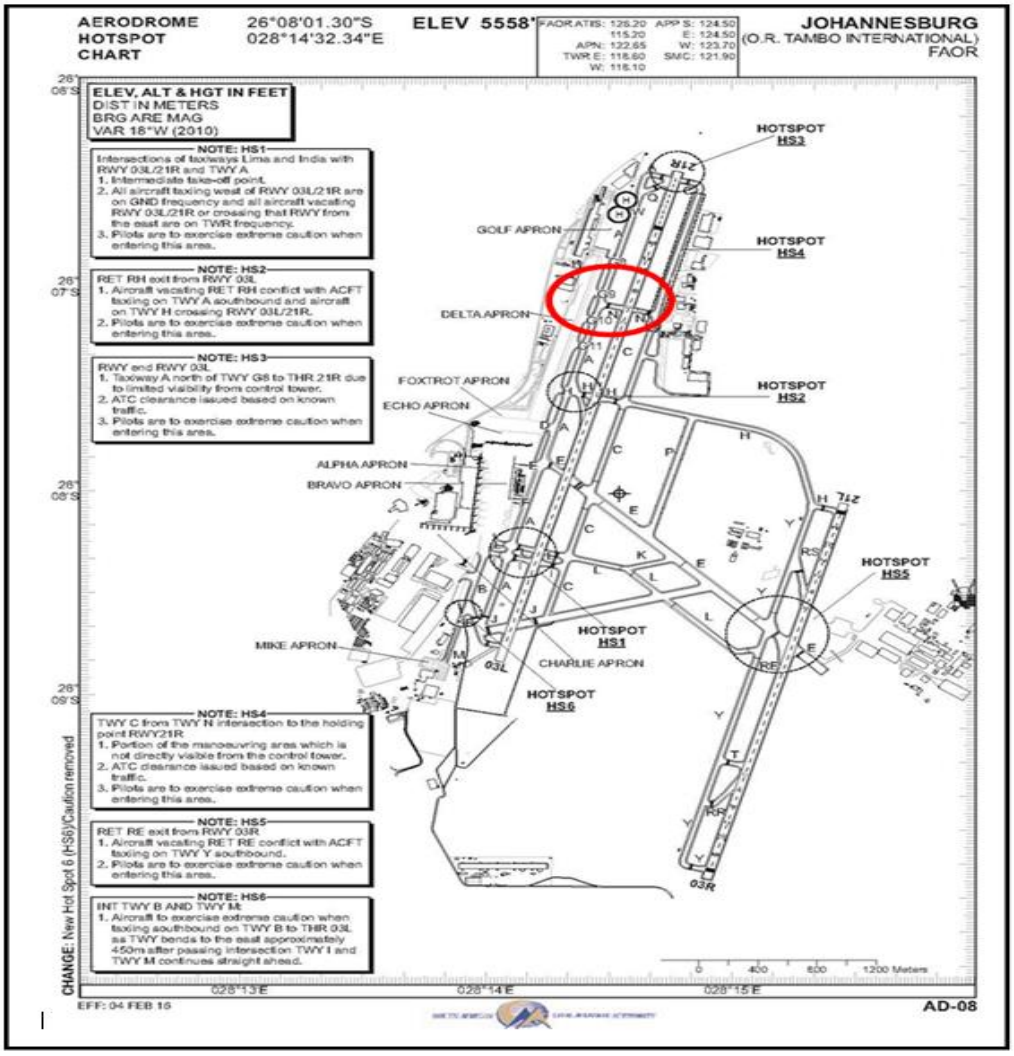

Figure 7: Shows FAOR Aerodrome hot spot chart.

1.10.1 Both aircraft have an overall length of 39.47 metres (m) with a wingspan of 35.79m. The distance from the holding point Echo to the centreline of Alpha is 54.7m, which leaves the area of manoeuvrability to be 18.91m. The FO stated that ZS-ZWV aircraft's nose wheel was 5m short of holding point lines. The 5m was not taken into consideration as the radome of the aircraft would have been above the holding point lines. The total length from the holding point line to the end of taxiway Alpha is 68.5m.

1.11 Flight Recorders

1.11.1 Both aircraft were equipped with a flight data recorder (FDR) and a cockpit voice recorder (CVR) as required by the relevant aviation regulations.

1.11.2 Both the CVR and FDR from the two aircraft were removed by both airlines after the serious incident for downloading.

1.11.3 According to information that was received from the operators, the CVRs on both aircraft were overwritten and, therefore, no data pertaining to the serious incident flight could be retrieved.

1.11.4 The cockpit voice recorder (CVR) fitted on both aircraft was a tape type recorder with a nominal recording duration of 30 minutes.

1.12 Wreckage and Impact Information

1.12.1 The ZS-ZWV was cleared to taxi on taxiway Alpha and hold short on taxiway November, and the crew followed the ATC instructions. As ZS-SJH was behind ZS-ZWV and with the tail of ZS-ZWV protruding on taxiway Alpha, ZS-SJH attempted to manoeuvre behind ZS-ZWV but collided with the stationary ZS-ZWV.

1.12.2 The length between the holding point of taxiway November and the left shoulder of taxiway Alpha is approximately 69m. The ZS-ZWV aircraft had taken approximately 40m of that length, leaving a distance of 29m behind it. The wingspan of ZS-SJH is 36m long, which made the crew to manoeuvre the aircraft (ZS-SJH) to the left of the centreline to clear ZS-ZWV, but this was unsuccessful. During this manoeuvre, the ZS-SJH sustained damage to the right-hand winglet and the ZS-ZWV sustained damage to the left horizontal stabiliser.

1.13 Medical and Pathological Information

1.13.1 None.

1.14 Fire

1.14.1 There was no evidence of a pre- or post-impact fire.

1.15 Survival Aspects

1.15.1 The incident was considered survivable because there was no damage to the cabin or cockpit area which could have caused injuries to persons on-board.

1.16 Tests and Research

1.16.1 Not applicable.

1.17 Organisational and Management Information

1.17.1 The operator of the ZS-SJH was issued an air operating certificate (AOC) No. CAA/N942D on 26 April 2019 with an expiry date of 30 April 2020. The aircraft was duly authorised to operate under the AOC.

1.17.2 The operator of the ZS-ZWV was issued an AOC No./CAA/N067D on 26 April 2018 with an expiry date of 30 April 2019. The aircraft was duly authorised to operate under the AOC.

1.18 Additional Information

1.18.1 ***Taxi Procedures / Briefing Notice 171: Source: Operators Approved Procedures***

The Operations Manual provides further guidance in relation to the manoeuvring of aircraft:

13.3.5.1 *Proximity*
An aircraft shall not be operated in such proximity to other aircraft as to create a collision hazard. Varying from acceptable practice places yourself, as well as the company at risk.

Cockpit Voice Recorder (CVR) & Flight Data Recorder (FDR) Cockpit Voice Recorder & Flight Data Recorder /Briefing Notice 182

Flight crews to disconnect the aircraft's flight data and cockpit voice recorders immediately after an aircraft has come to rest following a ground incident or accident. This will ensure that the contents in the recording, which are crucial to subsequent investigations, are preserved. The Operations Manual provides further guidance in relation to CVR and FDR after an incident:

Chapter 2 – P-24 and Chapter 4 – P-7

1.19 Useful or Effective Investigation Techniques

1.19.1 None.

2 ANALYSIS

2.1 General

From the available evidence, the following analysis was made with respect to this serious incident. These shall not be read as apportioning blame or liability to any particular organisation or individual.

2.1.1 All crew members on both aircraft were qualified for the flights in accordance with regulatory requirements. All pilots were issued with ATPLs with the aircraft type rating endorsed on them. Their aviation medical certificates were valid with no restrictions.

2.1.2 All crew members had operated at O.R. Tambo International Aerodrome several times before and the aerodrome is their home base. They (aircraft) were both actively flying on that day. The flight crew members from both aircraft were familiar with the taxiway layout and had enough operational experience regarding communication with ATC.

2.1.3 The ATC cleared ZS-SJH to taxi via taxiway Echo onto taxiway Alpha and hold short before entering Runway 21R. Although the crew acknowledged the instruction by making a correct read back, they did not follow the ATC instructions. Instead, they taxied via taxiway Foxtrot on to taxiway Alpha. The ATC instruction would have made ZS-SJH to be positioned in front of ZS-ZWV as it (ZS-SJH) was scheduled to depart prior to ZS-ZWV.

2.1.4 The ATC cleared ZS-ZWV to taxi on taxiway Lima on to taxiway Alpha and hold short on taxiway Echo to make way for ZS-SJH. The crew of ZS-ZWV adhered to the ATC instructions and stopped at holding point Echo. As ZS-SJH had used taxiway Foxtrot, the ATC instructed ZS-ZWV to proceed on taxiway Alpha and hold short on taxiway November. The crew again adhered to the ATC instruction and the aircraft's tail protruded on to taxiway Alpha.

2.1.5 The ATC gave ZS-SJH an optional route which would have been the safest route past the stationary ZS-ZWV. The ATC's optional route to ZS-SJH was to taxi via taxiway Golf 10 into Delta ramp then taxiway Golf 9 onto taxiway Alpha to holding point Runway 21R, which the crew of ZS-SJH read back correctly but elected to proceed on taxiway Alpha. The ZS-SJH attempted to maneouvre behind ZS-ZWV on taxiway Alpha and, during this attempt, the winglet of ZS-SJH collided with the left horizontal stabiliser of ZS-ZWV.

2.1.6 It is not clear why the ATC gave the crew of ZS-SJH an option to taxi via taxiway Golf 10 into Delta ramp then taxiway Golf 9 onto taxiway Alpha to holding point Runway 21R instead of instructing them to do so. The ATC should have issued ZS-SJH with an instruction and not give them an option. It is also likely that the ATC knew or suspected that the ZS-SJH would not safely maneouvre behind ZS-ZWV.

2.1.7 The length between the holding point of taxiway November and the left shoulder of taxiway Alpha is approximately 69m. The ZS-ZWV aircraft had taken approximately 40m of that length, leaving a distance of 29m behind it. The wingspan of ZS-SJH is 36m long, which made the crew to manoeuvre the aircraft (ZS-SJH) to the left of the centreline to clear ZS-ZWV, but this was unsuccesful. During the maneouvre, the ZS-SJH was behind ZS-ZWV. The ZS-SJH impacted the elevator and rudder of the stationary ZS-ZWV.

2.1.8 The ZS-ZWV continued to FALE without any further incidents and the crew members were advised by ATC FALE of the incident which occurred in FAOR.

2.1.9 Both aircraft were maintained in accordance with the manufacturers prescripts and were both correctly certified to be operated in the commercial Part 121 operations in terms of the Civil Aviation Regulations (CAR) 2011.

2.1.10 Clear weather conditions prevailed at the time of this serious incident and the weather was no factor to this serious incident.

2.1.11 The investigation revealed that the crew of the ZS-SJH elected not to follow the ATC instructions and advise, resulting in a collision with the stationary ZS-ZWV.

3 CONCLUSION

3.1 General

From the available evidence, the following findings, causes and contributing factors were made with respect to this serious incident. These shall not be read as apportioning blame or liability to any particular organisation or individual.

To serve the objective of this investigation, the following sections are included in the conclusions heading:

- **Findings —** are statements of all significant conditions, events or circumstances in this serious incident. The findings are significant steps in this serious incident sequence, but they are not always causal or indicate deficiencies.
- **Causes —** are actions, omissions, events, conditions or a combination thereof, which led to this serious incident.

- **Contributing factors —** are actions, omissions, events, conditions or a combination thereof, which, if eliminated, avoided or absent, would have reduced the probability of the accident or serious incident occurring, or mitigated the severity of the consequences of the serious incident. The identification of contributing factors does not imply the assignment of fault or the determination of administrative, civil or criminal liability.

3.2 Findings

3.2.1 The captain of the ZS-SJH was issued an ATPL on 9 November 2018 with an expiry date of 30 November 2019. He was also issued a class 1 aviation medical certificate on 19 January 2019 with an expiry date of 31 January 2020.

3.2.2 The FO of the ZS-SJH was issued an ATPL on 20 March 2019 with an expiry date of 31 March 2020. Has was also issued a class 1 aviation medical certificate on 29 March 2019 with an expiry date of 31 March 2020.

3.2.3 The captain of the ZS-ZWV was issued an ATPL on 12 September 2018 with an expiry date of 30 September 2019. He was also issued a class 1 aviation medical certificate on 16 August 2018 with an expiry date of 31 August 2019.

3.2.4 The FO of the ZS-ZWV was issued an ATPL on 26 February 2019 with an expiry date of 29 February 2020. He was also issued a class 1 aviation medical certificate on 16 August 2018 with an expiry date of 31 August 2019.

3.2.5 The crew of the ZS-SJH did not follow the instructions and advise/option given by ATC. The ATC gave the ZS-SJH crew an option to use an alternate route to safely pass ZS-ZWV through taxiway Golf 10 onto Delta ramp and Golf 9 into taxiway Alpha for the holding point of Runway 21R.

3.2.6 Both aircraft were maintained in accordance with the manufacturers prescripts and were both correctly certified to be operated in the commercial Part 121 operations in terms of the Civil Aviation Regulations (CAR) 2011.

3.2.7 Clear weather conditions prevailed at the time of this serious incident and the weather was no factor to this serious incident.

3.2.8 The ZS-SJH collided with the stationary ZS-ZWV during an attempt to maneouvre behind ZS-ZWV to get to the holding point of Runway 21R.

3.3 Probable Cause/s

3.3.1 The crew of the ZS-SJH opted not to follow the ATC advise for an alternate route and

proceeded on taxiway Alpha before attempting to maneouvre behind ZS-ZWV, resulting in a collision with ZS-ZWV.

3.3.2 **Contributory Factors:**

3.3.2.1 Failure to adhere to the ATC instructions and advise.

3.3.2.2 Deviation to SOP and non-compliance to ATC instructions.

3.3.2.3 Poor airmanship by the ZS-SJH crew.

3.3.2.4 Poor situational awareness by the ZS-SJH crew.

4. SAFETY RECOMMENDATIONS

4.1 General

The safety recommendations listed in this report are proposed according to paragraph 6.8 of Annex 13 to the Convention on International Civil Aviation and are based on the conclusions listed in heading 3 of this report; the AIID expects that all safety issues identified by the investigation are addressed by the receiving States and organisations.

4.2 Safety Recommendation/s

4.2.1 None.

5. LIST of APPENDICES

5.1 Appendix A: ATC transcript.

Appendix A

CAW 219 (ZS-ZWV) and MNO149 (ZS-SJH)

Ground (GND)

Time	From	To	Message
14:15:09	CAW219	GND	GND CAW219 bay C1we are ready for start-, copy runway change.
14:15:10	GND	CAW 219	CAW 219 standby for start I'll call you back.
14:15:12	CAW 219	GND	Standing by CAW219
14:23:35	GND	MNO149	MNO 149 give way to the B737 inbound to foxtrot for bravo11. Push start approved face north for runway 21R
14:23:44	MNO149	GND	Push start approved face north give way to the B737 MNO149
14:23:48	GND	CAW219	CAW 219 push start approved face east for runway21
14:23:50	CAW219	GND	Push start approved face east for runway21 CAW 219
14:27:31	CAW 219	GND	GND CAW 219 request taxi
14:27:33	GND	CAW 219	CAW 219 taxi lima, alpha, short of echo.
14:27:45	CAW 219	GND	Copy Lima, Alpha, short of Echo if possible intersection November CAW 219 on request.
14:27:47	GND	CAW 219	Copied
14:29:04	GND	MNO149	MNO 149 how much longer for taxi?
14:29:06	MNO149	GND	MNO149 ready for taxi, request full length.
14:29:12	GND	MNO149	MNO149 taxi echo, alpha holding point runway 21
14:29:14	MNO149	GND	Echo, alpha holding point runway 21 MNO149
14:29:18	GND	CAW 219	CAW 219 give way to the MNO out bound on echo; taxi alpha, November holding point runway 29
14:29:24	CAW 219	GND	Give way to the MNO traffic, taxi alpha, holding point November runway 21
14:30:14	GND	MNO149	MNO149 I see you turned out on foxtrot continue taxi Alpha holding point runway 21
14:30:20	MNO149	GND	Apologies, continue Alpha holding point runway 21R
14:30:22	GND	CAW 219	CAW 219 you can disregard the traffic they are now behind you.
14:30:25	CAW 219	GND	Copy will continue taxi CAW 219
14:30:50	GND	MNO149	MNO149 copy your 21 clearance?
14:30:53	MNO149	GND	Go ahead for MNO149
14:31:54	GND	MNO149	MNO149 after departure runway 21R comply with the RAGUL 2B SID, the rest remain the same.
14:32:28	CAW 219	GND	CAW 219 approaching November ready in turn
14:32:39	GND	CAW 219	CAW 219 tower 118.1Mhz
14:32:42	GND	MNO149	MNO149 if required golf 10, delta, golf 9, alpha to holding point is approved.
14:32:56	MNO149	GND	If we require golf 10, delta, alpha to holding 21R MNO149
14:36:22	MNO149	GND	MNO149 we are ready in turn
14:36:25	GND	MNO149	MNO149
14:37:36	GND	MNO149	MNO149 GND
14:37:39	MNO149	GND	Go ahead for MNO149
14:37:46	GND	MNO149	MNO149 when you went past the Comair at the November hold did you feel anything that's like a bump anything like that?
14:38:00	MNO149	GND	Nothing that we noticed MNO149
14:38:04	GND	MNO149	It's just that Comair is reporting that they felt something when you guys went behind them.

14:38:20	GND	MNO 149	MNO 149 confirm you did go to the delta ramp to the holding point?
14:38:24	MNO 149	GND	Negative we taxied behind them
14:38:26	GND	MNO 149	Copied
14:41:00	MNO 149	GND	GND MNO 149, if there is any uncertainty about the Comair perhaps we should taxi to the bay and check it out.
14:41:02	GND	MNO 149	Standby
14:42:43	GND	MNO 149	MNO 149 GND
14:42:45	MNO 149	GND	Go-ahead
14:42:47	GND	MNO 149	MNO 149 the Comair is departing now if you say that nothing happened and you are happy to go, you are more than welcome to go, but if you want to return we can organize that as well
14:43:03	MNO 149	GND	Okay no we'll, we'll rather taxi; back and check it out thanks
14:43:09	GND	MNO 149	MNO 149 copy that contact tower 118.1
14:43:11	MNO 149	GND	Tower 118.1 MNO 149

CAW 219 (ZS-ZWV) and MNO149 (ZS-SJH)

Tower (TWR)

Time	**From**	**To**	**Message**
14:33:37	CAW219	TWR	TWR CAW219 November ready in turn
14:33:39	TWR	CAW 219	CAW 219 hold short runway 21R November
14:33:41	CAW 219	TWR	Holding short CAW219 on November
14:35:55	CAW 219	TWR	TWR CAW 219
14:35:57	TWR	CAW 219	CAW 219 go-ahead
14:36:00	CAW 219	TWR	When Mango passed behind us we felt a bit of a bang we, I am not sure if they touched us. Can you find out if they also felt anything?
14:36:05	TWR	CAW 219	Copied will do
14:38:44	TWR	CAW 219	CAW 237 from the Mango he didn't feel anything at all are you happy to depart?
14:38:51	CAW 219	TWR	Okay if he is sure he was clear it might have been a wind gust as well, it could have been that. If he is sure that he did not connect we are happy to go.
14:38:58	TWR	CAW 219	Copy sir line up and wait 21right November
14:39:00	CAW 219	TWR	Line up and wait 21 November CAW 219
14:40:00	TWR	CAW 219	Once again from the MNO he didn't feel anything.
14:40:04	CAW 219	TWR	Alright thank you
14:40:08	TWR	CAW 219	CAW 219 do you require a heading or are you ready to go?
14:40:13	CAW 219	TWR	We require a heading just standby while we our weather radar pangs
14:40:14	TWR	CAW 219	Copied
14:40:29	CAW 219	TWR	From CAW 219 we would like an early left turn 090 degrees
14:40:30	TWR	CAW 219	CAW 219 stand by
14:41:08	CAW 219	TWR	CAW 219 we can accept a right turn overhead heading 090

14:41:15	TWR	CAW 219	Say again sir right turn out confirm?
14:41:24	CAW 219	TWR	We can do that overhead 090
14:41:32	TWR	CAW 219	CAW 219 cancel the SID after departure runway 21 right non-standard; when ready turn right heading 300 degrees, climb to 8000 feet request level change in route and the rest remains the same.
14:41:39	CAW 219	TWR	Right heading 360,300, 8000 feet CAW 219
14:41:53	TWR	CAW 219	CAW 219 your read back correct runway 21 right from November cleared take-off surface wind 180 degrees 15 knots. Bye bye
14:41:58	CAW 219	TWR	Cleared take-off runway 21 right CAW 219