PRELIMINARY ACCIDENT REPORT

Accident and Incident Investigations Division

Accident
- Preliminary Report -
AIID Ref No: CA18/2/3/10387

Figure 1: The ZS-OKN aircraft.

Description:

On Wednesday, 1 November 2023, the crew on-board a Beechcraft B1900D aircraft registered ZS-OKN took off from Lanseria International Airport (FALA) to O.R. Tambo International Airport (FAOR) with the intention to load cargo and, thereafter, proceed to Port Elizabeth Airport (FAPE) in the Eastern Cape province before returning to FALA. The flight was conducted under visual meteorological conditions (VMC) by day.

When the cargo was loaded at FAOR, one of the crew members noticed signs of leakage from the bottle cap on one of the containers. The container was removed from the load, resealed and placed in a plastic bag before the crew and the passenger (a custodian of the dangerous goods) took off to FAPE. The flight to FAPE was uneventful, and the aircraft landed safely. Whilst the aircraft was taxiing to the apron, the custodian, informed the flying crew that there was a leak from one of the plastic containers in the cargo hold. As a result, the crew opened the cargo door for ventilation. Later, the aircraft was cleaned, followed by an inspection conducted by an aircraft maintenance engineer (AME) before it was cleared to return to FALA. The crew was unharmed during the accident. Later, it was found that the aircraft had damage on the bays underneath the floor boards.

Occurrence Details

Reference Number	**:**CA18/2/3/10387
Name of Owner	**:** National Airways Corporation
Name of Operator	**:** National Airways Corporation
Type of Operation	**:** Air Transport Operations (Part 135)
Manufacturer	**:** Beechcraft
Model	**:** B1900D
Nationality	**:** South African
Registration Marking	**:** ZS-OKN
Place	**:** Port Elizabeth Airport (FAPE)
Date	**:** 1 November 2023
Time	**:** 1309Z
Injuries	**:** None
Damage	**:** Substantial

Purpose of the Investigation:

In terms of Regulation 12.03.1 of the Civil Aviation Regulations (CAR) 2011, 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****.*

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.

Investigation Process:
The Accident and Incident Investigations Division (AIID) was notified of the occurrence involving a Beechcraft B1900D aircraft which occurred at Port Elizabeth Airport in the Westen Cape province on 1 November 2023 at 1309Z. The occurrence was reported to the AIID on 8 November 2023. The occurrence was classified as an accident according to the CAR 2011 Part 12 and the International Civil Aviation Organisation (ICAO) Standards (STD) Annex 13 definitions.

The AIID has appointed an investigator-in-charge and a second in-charge investigator who dispatched to the accident site to conduct the full investigation. Notifications were sent to the State of Registry, Operator, Design and Manufacturer in accordance with the CAR 2011 Part 12 and ICAO Annex 13 Chapter 4. The states did not appoint an accredited representative and/or advisor. The AIID will lead the investigation and issue the final report of this accident in accordance with the CAR 2011 Part 12 and ICAO Annex 13.

The information contained in this preliminary report is derived from the information gathered during the on-going investigation into the occurrence.

The AIID reports are made available to the public at:
http://www.caa.co.za/Pages/Accidents%20and%20Incidents/Aircraft-accident-reports.aspx

Notes:

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

Accident — this investigated accident
Aircraft — the B1900D involved in this accident
Investigation — the investigation into the circumstances of this accident
Pilots — the pilots involved in this accident
Report — this accident report

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

Disclaimer:

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Abbreviation	Description
AIID	Accident and Incident Investigations Division
AMO	Aircraft Maintenance Organisation
C of R	Certificate of Registration
C of A	Certificate of Airworthiness
CAR	Civil Aviation Regulations
CRS	Certificate of Release to Service
CVR	Cockpit Voice Recorder
FDR	Flight Data Recorder
FALA	Lanseria International Airport
FAOR	O.R. Tambo International Airport
FAPE	Port Elizabeth Airport
ft	feet
GPS	Global Positioning System
Kt	Knots
METAR	Meteorological Aerodrome Report
MHz	Megahertz
PIC	Pilot-in-command
QNH	Barometric pressure adjusted to sea level
SACAR	South African Civil Aviation Regulation
SAWS	South African Weather Service
UTC	Co-ordinated Universal Time
VMC	Visual Meteorological Conditions
Z	Zulu (Term for Universal Coordinated Time – Zero Hours Greenwich)

1. FACTUAL INFORMATION

1.1. History of Flight

1.1.1 On Wednesday, 1 November 2023, two pilots on-board a Beechcraft B1900D aircraft with registration ZS-OKN took off from Lanseria International Airport (FALA) to O.R. Tambo International Airport (FAOR) to load cargo and, thereafter, proceed to Port Elizabeth Airport (FAPE) before flying back to FALA. The flight was conducted under visual meteorological conditions (VMC) by day and under the provisions of Part 135 of the Civil Aviation Regulations (CAR) 2011 as amended.

1.1.2 The crew waited for some time for the cargo to arrive at FAOR. When the cargo finally arrived, the vehicle with the cargo reversed towards the cargo hold of the aircraft, and the cargo, a corrosive liquid Toxic, n.o.s (Dihydrogen hexachloroplatinate [IV] hydrate, was loaded on the aircraft. During loading, the pilot-in-command (PIC) noticed signs of leakage on the bottle cap of one of the containers. The container was removed from the load, resealed and placed in a bag; it was loaded last in the aft of the cargo hold. Once loading was complete, the flying crew helped the passenger who was the custodian of the dangerous goods (liquid chemical) untangle the cargo net to be used to secure the load, and thereafter, the crew proceeded with the flight duties whilst the custodian secured the load.

1.1.3 The aircraft took off with the custodian on-board to FAPE; the flight was uneventful, and the aircraft landed safely. Whilst the aircraft was taxiing to the apron, the custodian approached the crew in the cockpit and informed them that there was a leak on one of the plastic containers in the cargo hold (a different plastic container from the one that had a leak at FAOR). The PIC observed fumes and, shortly thereafter, smelled the chemical in the cockpit. The crew immediately opened the cockpit windows to get fresh air. The crew then realised that the custodian did not have access to fresh air (no access to a window) and the PIC instructed the first officer to open the cabin door. During this time, the PIC brought the aircraft to a stop and shut down the engines. The crew and the custodian exited the aircraft, leaving the cargo door open for ventilation. When the crew inspected the cabin, they realised that the chemical had leaked and had covered the entire cabin floor; however, at the time they did not know the location of the leaking container because the one that had leaked previously was resealed and placed aft of the cargo hold. Therefore, the cargo was off loaded by the custodian whilst inspecting each plastic container to ensure that there was no contamination. During the off-loading process, the custodian informed the PIC that some of the fluid had seeped underneath the floor boards.

1.1.4 When the custodian was off-loading the cargo, they noticed that the containers were wet at the bottom, and they then decided to stop and wait for the fire department personnel (who were alerted of the accident) to arrive at the scene. Upon their arrival, the fire department personnel commenced with the spillage containment procedure. However, they soon realised that their suits (gear) were not appropriate to withstand the effects of the chemical spillage. Therefore, they requested the third party assistants to manage the chemical in a safe manner. Once the third party personnel arrived at the scene, they instructed all people at the site to steer clear whilst they cleaned and removed the remainder of the plastic containers. As the wet plastic containers were removed, the plastic container with a leak was identified; it had a DZUS Fastener still secured to its bottom. The plastic container was removed and contained separately. The aircraft was cleaned, including the underside of the floor boards where the chemical spill had collected in the bays. The PIC was in contact with the representatives from his company headquarters; he requested that an engineer be dispatched to inspect the aircraft before its next flight because the fluid that had leaked was corrosive.

1.1.5 The aircraft maintenance engineer (AME) who was dispatched did not find any anomalies with the aircraft; it was cleared to fly back to FALA.

1.1.6 The accident occurred during daylight at FAPE in the Eastern Cape province at Global Positioning System (GPS) co-ordinates determined to be 33º59’02.62” South 025º36’49.02” East, at an elevation of 196 feet (ft).

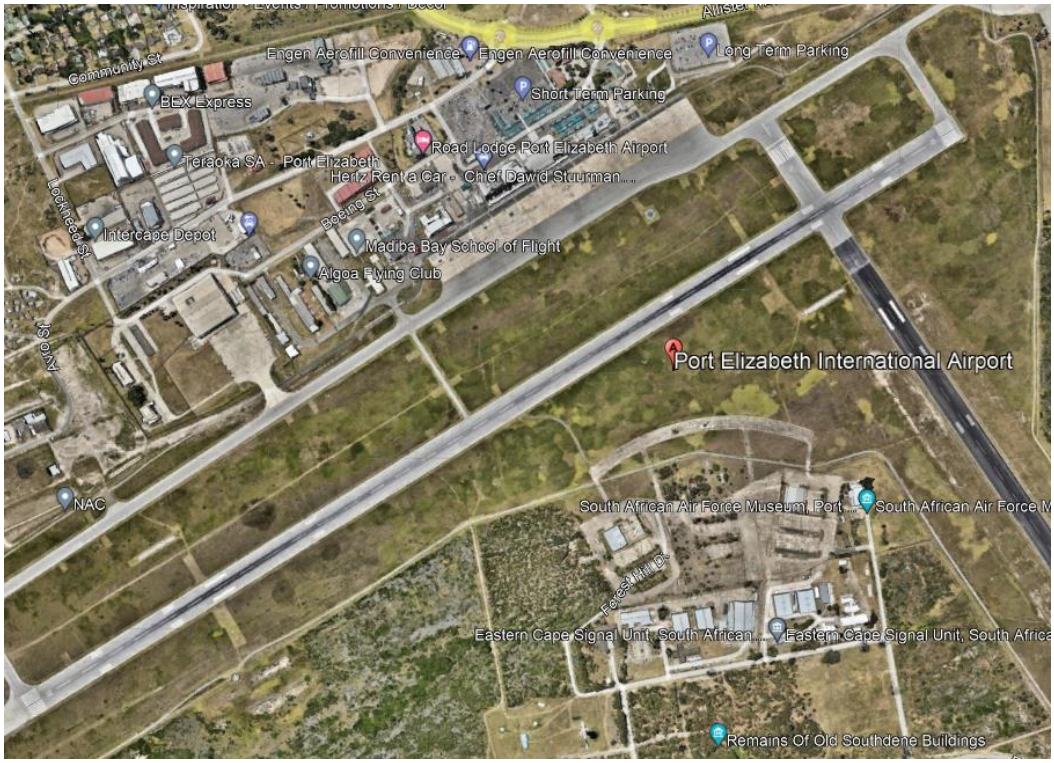

Figure 2: Aerial view of the runway and apron.

1.2. Injuries to Persons

Injuries	Pilot	Crew	Pass.	Total On-board	Other
Fatal	-	-	-	-	-
Serious	-	-	-	-	-
Minor	-	-	-	-	-
None	2	-	1	3	-
Total	**2**	**-**	**1**	**3**	**-**

1.3. Damage to Aircraft

1.3.1 The aircraft's floor boards were damaged by the spilt chemical. The chemical reaction with the metal occurred a few days after the chemical was cleaned off the floor boards. The chemical corroded the metal on the belly of the aircraft where it was most concentrated. The operator grounded the aircraft whilst awaiting the outcome of the consultation with the manufacturer.

Figure 3: Floor boards damaged by the spilt chemical.

1.4. Other Damage

1.4.1 None.

1.5. Personnel Information:

Pilot-in-command (PIC)

Nationality	South African	Gender	Male	Age	33
Licence Type	Commercial Pilot Licence (CPL)				
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Instrument				
Medical Expiry Date	31 March 2024				
Restrictions	Corrective Lenses				
Previous Accidents	None				

Flying Experience:

Total Hours	2700
Total Past 24 Hours	1.6
Total Past 7 Days	1.6
Total Past 90 Days	70
Total on Type Past 90 Days	70
Total on Type	1650

1.5.1 The PIC was issued a Commercial Pilot Licence (CPL) on 30 March 2023 with an expiry date of 30 March 2024 under Part 61 of the South African CAR 2011.

1.5.2 The PIC was issued a valid Class 1 aviation medical certificate on 31 March 2023 with an expiry date of 31 March 2024.

First Officer (FO)

Nationality	South African	Gender	Male	Age	39
Licence Type	Commercial Pilot Licence (CPL)				
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Instrument				
Medical Expiry Date	29 February 2024				
Restrictions	None				
Previous Accidents	None				

Flying Experience:

Total Hours	2298.3
Total Past 24 Hours	1.6
Total Past 7 Days	1.6
Total Past 90 Days	77.5
Total on Type Past 90 Days	77.5
Total on Type	1526

1.5.3 The FO was issued a Commercial Pilot Licence (CPL) on 20 February 2023 with an expiry date of 29 February 2024 under Part 61 of the South African CAR 2011.

1.5.4 The FO was issued a valid Class 1 aviation medical certificate on 28 February 2023 with an expiry date of 29 February 2024.

1.6. Aircraft Information

1.6.1 Beechcraft B1900D

(Source: https://www.globalair.com/aircraft-for-sale/specifications?specid=28)

The aircraft type was produced between 1982 and 2002, and a total of 695 Beechcraft 1900 aircraft of all variants were built. The Beechcraft 1900 is a 19-passenger, pressurised twin-engine turboprop fixed-wing aircraft manufactured by the Beechcraft Division of the Raytheon Company (now Textron Aviation). It was designed, and is primarily used, as a regional airliner. It is also used as a freight aircraft and corporate transport and by the United States military and other governments. While the 1900C had become a popular regional airliner, Beechcraft undertook a substantial redesign of the aircraft, and in 1991 introduced a new version called the 1900D. This design featured a stretched interior, allowing passengers to walk upright instead of bending forward while loading the airplane. Other elements of the 1900D

were also changed, with more powerful engines installed and winglets added to help with the drag added to the design by the taller passenger cabin.

Airframe:

Manufacturer/Model	Beech Aircraft Corporation/ B1900D	
Serial Number	UE-23	
Year of Manufacture	1982	
Total Airframe Hours (At Time of Accident)	31437.60	
Last maintenance carried out (Hours & Date)	31394.0	15 September 2023
Hours Since Last Inspection	43.6	
Certificate of Airworthiness (Issue Date)	17 August 2012	
Certificate of Airworthiness (Expiry Date)	31 August 2024	
C of R (Issue Date) (Present Owner)	15 December 2020	
Type of Fuel Used in the Aircraft	Jet A1	
Operating Categories	Air Transport Operations (Part 135)	
Previous Accidents	None	

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1.6.2 According to available information, the aircraft was registered to the present owner on 15 December 2020.

1.6.3 The last annual inspection was conducted on 31 July 2023 at 31 285.10 airframe hours. The aircraft was issued a Certificate of Release to Service (CRS) on 31 July 2023 with an expiry date of 31 July 2024 or at 31 481.00 hours, whichever occurs first.

Engine:

Manufacturer/Model	Pratt and Whitney PT6A-67D
Serial Number	PS0094
Hours Since New	29 062.40
Hours Since Overhaul	1 220.70

Engine:

Manufacturer/Model	Pratt and Whitney PT6A-67D
Serial Number	PS0012
Hours Since New	29 157.82
Hours Since Overhaul	373.07

Propeller:

Manufacturer/Model	Hartzel HC E4A-3J
Serial Number	HJ1022
Hours Since New	25 886.18
Hours Since Overhaul	1 613.23

Propeller:

Manufacturer/Model	Hartzel HC E4A-3J
Serial Number	HJ2606
Hours Since New	10 861.00
Hours Since Overhaul	2 602.20

1.7. Meteorological Information

1.7.1 The weather information entered in the table below was obtained from the pilot questionnaire which detailed the weather conditions for FAPE on 1 November 2023 at 1309Z.

Wind Direction	110º	Wind Speed	16 knots	Visibility	9999
Temperature	20ºC	Cloud Cover	FEW	Cloud Base	2000ft
Dew Point	14ºC	QNH	-		

1.8. Aids to Navigation

1.8.1 The aircraft was equipped with standard navigational equipment as approved by the Regulator (SACAA). There were no recorded defects with the navigational equipment prior to the flight.

1.9. Communication

1.9.1 The aircraft was equipped with standard communication system as approved by the Regulator. There were no recorded defects with the communication system prior to the flight.

1.10. Aerodrome Information

1.10.1 Port Elizabeth Airport is a manned, unlicensed airport with a single runway oriented 17/35.

Aerodrome Location	Eastern Cape Province	
Aerodrome Status	Licensed	
Aerodrome Co-ordinates	33º59’02.62” S 025º36’49.02” E	
Aerodrome Altitude	196ft	
Runway Headings	08/26	17/35
Runway Dimensions	1980m X 46 m	1677 X 46
Runway Used	N/A	
Runway Surface	Asphalt	
Approach Facilities	PAPI	
Radio Frequency	122.10 MHz	

1.11. Flight Recorders

1.11.1 The aircraft was fitted with a flight data recorder (FDR) and cockpit voice recorder (CVR).

1.12. Wreckage and Impact Information

1.12.1 The aircraft was loaded with cargo of corrosive fluid that leaked onto the floor boards and seeped into the bays below it. The bays were cleaned but the fluid had already reacted with the metal which became apparent a few days after the cleaning. The reaction with the metal corroded the belly of the aircraft where it had concentrated.

Figure 4. Close-up view of parts of the corroded floor board.

Figure 5: One of the affected bays.

1.13 Medical and Pathological Information

1.13.1 Not applicable.

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 accident was considered survivable; and the aircraft had windows that could be opened for ventilation.

1.16 Tests and Research

1.16.1 To be discussed in the final report.

1.17 Organisational and Management Information

1.17.1 The flight was conducted in accordance with the provisions of Part 135 (Air Transport Operations) of the CAR 2011 as amended. The operator was approved (certified) to carry dangerous goods.

1.18 Additional Information

1.18.1 To be discussed in the final report.

1.19 Useful or Effective Investigation Techniques

1.19.1 To be discussed in the final report.

2. Findings

2.1 General

From the available evidence, the following preliminary findings were made with respect to this accident. 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 accident. The findings are significant steps in this accident sequence, but they are not always causal or indicate deficiencies.

2.2 FINDINGS

2.2.1 The pilot in command (PIC) was initially issued a Commercial Pilot Licence (CPL) on 15 December 2014 under Part 61 of the South African CAR 2011. The latest CPL was issued on 30 March 2023 with an expiry date of 30 April 2024.

2.2.2 The pilot was issued a valid Class 1 aviation medical certificate on 31 March 2023 with an expiry date of 31 March 2024.

2.2.3 The PIC had training in dangerous goods category 10; he obtained his certificate on 22 March 2022.

2.2.4 The first officer (FO) was initially issued a Commercial Pilot Licence (CPL) on 12 January 2017 under Part 61 of the South African CAR 2011. The latest CPL was issued on 20 February 2023 with an expiry date of 29 February 2024.

2.2.5 The FO was issued a valid Class 1 aviation medical certificate on 28 February 2023 with an expiry date of 29 February 2024.

2.2.6 The FO had training in dangerous goods category 10; he obtained his certificate on 5 April 2023.

2.2.7 The aircraft was issued a Certificate of Airworthiness (C of A) on 17 August 2012. The

latest C of A had an expiry date of 31 August 2024. The aircraft was airworthy when it dispatched for the flight.

2.2.8 The aircraft was issued a valid Certificate of Registration (C of R) on 15 December 2020.

2.2.9 The last annual inspection was conducted on 31 July 2023 at 31 285.10 airframe hours. The aircraft was issued a Certificate of Release to Service (CRS) on 31 July 2023 with an expiry date of 31 July 2024 or at 31 481.00 airframe hours, whichever occurs first.

2.2.10 The operator is permitted to carry dangerous goods.

2.2.11 The chemical that was loaded on the aircraft was a corrosive liquid, Toxic, n.o.s (Dihydrogen hexachloroplatinate [IV] hydrate).

2.2.12 The corrosive liquid leaked because of a DZUS Fastener that pierced the bottom of the plastic container.

2.2.13 The aircraft started corroding after the spill was cleaned up. The corrosion made holes on the belly of the aircraft.

3. On-going Investigation

3.1 The AIID investigation is on-going and the investigators will be investigating other aspects of this occurrence which may or may not have safety implications.

4. APPENDICES

4.1 None.

This report is issued by:
Accident and Incident Investigations Division
South African Civil Aviation Authority
Republic of South Africa