

AIRCRAFT SERIOUS INCIDENT REPORT AND EXECUTIVE SUMMARY

| | | | | | | | |
|---|--------------------------------|---|--------------------------|--------------------------------|-------------------------|--------------------------|---|
| | | | | Reference: | | CA18/3/2/1470 | |
| Aircraft Registration | ZS-LFW | Date of Incident | 08 February 2025 | | Time of Incident | 1420Z | |
| Type of Aircraft | Beechcraft Super King Air B200 | | Type of Operation | | Part 91 | | |
| Captain Licence Type | | ATPL | Age | 72 | Licence Valid | Yes | |
| Captain Flying Experience | | Total Flying Hours | | 23668.9 | Hours on Type | 3022 | |
| First Officer Licence Type | | CPL | Age | 26 | Licence Valid | Yes | |
| First Officer Flying Experience | | Total Flying Hours | | 738 | Hours on Type | 117.5 | |
| Last Point of Departure | | Kimberly Airport (FAKM) | | | | | |
| Next Point of Intended Landing | | Bram Fischer International Airport (FABL) | | | | | |
| Damage to Aircraft | | Substantial | | | | | |
| Location of the incident site with reference to easily defined geographical points (GPS readings if possible) | | | | | | | |
| Twin City Shopping Mall, 4 nautical miles south-west of FABL at GPS co-ordinates 29°08'34.54" South 26°15'15.66" East | | | | | | | |
| Meteorological Information | | Surface wind: 300° at 15 knots; Visibility: 9999m; Temperature: 24°C; Dew Point: 03°C | | | | | |
| Number of People On-board | 2+2 | Number of People Injured | 0 | Number of People Killed | 0 | Other (On Ground) | 0 |
| Synopsis | | | | | | | |
| <p>On Saturday afternoon, 8 February 2025, two pilots, a medical doctor and a paramedic on-board a Beechcraft Super King Air B200 aircraft with registration ZS-LFW took off on a positioning flight from Kimberly Airport (FAKM) in Northern Cape province to Bram Fischer International Airport (FABL) in Free State province. The flight was conducted under visual meteorological conditions (VMC) by day and under the provisions of Part 91 of the Civil Aviation Regulations (CAR) 2011 as amended.</p> <p>The captain stated that prior to top of descent at flight level 130 (FL130), the cabin door warning indication light illuminated on the annunciator panel. He then requested the paramedic to inspect the door. After inspecting the door latch indicators, the paramedic advised the captain that one of the four door locks was misaligned (not centred). The captain reported that he requested the two medical personnel to put on their seatbelts before he began the descent from FL130 to FL60 to depressurise the aircraft and to join the Bram Fischer Airport circuit. Whilst the aircraft was on the downwind leg for Runway (RWY) 30 at FABL, the door opened and detached from the fuselage. The crew continued with their approach and landed safely on RWY 30. The door was later found on the paved car parking lot at the nearby Twin City Shopping Mall; it was recovered to the aircraft's hangar. No person on the ground was injured and no damage to property was sustained. Moreover, none of the occupants on-board the aircraft was injured.</p> | | | | | | | |

| |
|---|
| Probable Cause/s and/or Contributory Factors |
|---|

| |
|---|
| The cabin door latch and lock mechanism lost their rigging integrity which prevented the door from being securely latched and locked. This led to the door opening in-flight and subsequently detachment due to the relative airflow. |
|---|

| | | | |
|----------|------------------|------------------|-------------------|
| SRP Date | 9 September 2025 | Publication Date | 10 September 2025 |
|----------|------------------|------------------|-------------------|

Occurrence Details

Reference Number : CA18/3/2/1470
Occurrence Category : Category 2 (Serious Incident)
Type of Operation : Private (Part 91)
Name of Operator : Air Ambulance Health Service (PTY) LTD
Aircraft Registration : ZS-LFW
Aircraft Make and Model : Beechcraft Super King Air B200
Nationality : South African
Place : Bloemfontein
Date and Time : 8 February 2025 at 1420Z
Injuries : None
Damage : Substantial

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.

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) of the South African Civil Aviation Authority (SACAA) was notified of the occurrence on 8 February 2025 at 1420Z. The occurrence was classified as a serious incident according to the CAR 2011 Part 12 and the International Civil Aviation Organisation (ICAO) STD Annex 13 definitions. The notification was sent to the State of Design and Manufacturer in accordance with the CAR 2011 Part 12 and the ICAO Annex 13 Chapter 4. The State appointed an accredited representative and advisor. The investigator was dispatched to the serious incident site for this occurrence.

Notes:

- Whenever the following words are mentioned in this report, they shall mean the following:
Serious Incident — this investigated serious incident
Aircraft — the Beechcraft Super King Air B200 involved in this serious incident
Investigation — the investigation into the circumstances of this serious incident
Pilot — the pilot involved in this serious incident
Report — this serious incident report*
- 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

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

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| Abbreviation | Description |
|---------------------|--|
| ° | Degrees |
| °C | Degrees Celsius |
| AIID | Accident and Incident Investigations Division |
| C of A | Certificate of Airworthiness |
| C of R | Certificate of Registration |
| CRS | Certificate of Release to Service |
| ft | Feet |
| FO | First Officer |
| hPa | Hectopascal |
| kt | Knots |
| M | Metres |
| METAR | Meteorological Aerodrome Report |
| nm | Nautical Miles |
| SACAA | South African Civil Aviation Authority |
| SAWS | South African Weather Service |
| QNH | Barometric altimeter pressure setting to indicate elevation AMSL |
| Z | Zulu (Term for Universal Co-ordinated Time - Zero Hours Greenwich) |
| SACAA | South African Civil Aviation Authority |
| SAWS | South African Weather Service |
| Z | Zulu (Term for Universal Co-ordinated Time - Zero Hours Greenwich) |

1. FACTUAL INFORMATION

1.1. History of Flight

- 1.1.1. On Saturday afternoon, 8 February 2025, two pilots (crew), a medical doctor and a paramedic on-board a Beechcraft Super King Air B200 aircraft with registration ZS-LFW were on a positioning flight from Kimberley Airport (FAKM) in Northern Cape province to Bram Fischer International Airport (FABL) in Free-State province when the serious incident occurred. The flight was conducted under visual meteorological conditions (VMC) by day and under the provisions of Part 91 of the Civil Aviation Regulations (CAR) 2011 as amended.
- 1.1.2. The crew and the occupants initially took off on a medevac flight to transfer a patient from Springbok Hospital in Northern Cape province to FAKM. The captain stated that once the patient was disembarked (transferred) from ZS-LFW and embarked on another aircraft at FAKM, the crew prepared the aircraft (ZS-LFW) for a positioning flight to FABL. Prior to departure, the cabin door was closed by the paramedic on-board and called the door closed after ensuring the alignment of all latch marks, this was then confirmed by the air crew who checked if the cabin door light on the annunciator panel had extinguished. The aircraft's take-off and climb to flight level (FL) 130 was normal. The flight duration was expected to be 30 minutes. At the top of descent, the "cabin door" warning indication light illuminated on the annunciator panel. The captain requested the paramedic who was seated at the back to check the visual indicator marks on the door if they were aligned (*the green marks on the four door locks should align to indicate that the door is locked into position*). The paramedic reported that three of the visual indicator marks were centred on the mark except for one (that is, the visual indicator on the top-right corner) (see Figure 2). The captain then advised the paramedic and the doctor to fasten their seatbelts and to not tamper with the door as the cabin was still pressurised.
- 1.1.3. The crew started their descent from FL130 to 6 000ft (Altitude below FL 100) and, whilst descending, they depressurised the cabin as per the Standard Operating Procedure (SOP) and, thereafter, joined the circuit for Runway (RWY) 30 at FABL. *The airport was unmanned at the time*. During the downwind leg, the captain who was the pilot flying (PF) reduced the speed before he commenced with the before landing checklist. The crew selected first stage flaps and lowered the landing gear at a speed of approximately 150 knots (kts). Just before a call to select full flaps could be made, the door opened and detached from the fuselage. The crew did not change the aircraft configuration and speed; they landed safely on RWY 30. The crew found out later that the door landed on a car parking lot at Twin City Shopping Mall, approximately 4 nautical miles (nm) south-west of FABL. The door did not injure any person on the ground or damage property when it detached and landed in the parking lot. Footage from a security video at the shopping mall showed the door impacting the paved parking area.

1.1.4. The serious incident occurred during daylight at Twin City Shopping Mall parking lot, approximately 4nm from the threshold of RWY 30 and at Global Positioning System (GPS) co-ordinates determined to be 29°08'34.54" South 26°15'15.66" East, at an elevation of 4534 feet (ft).

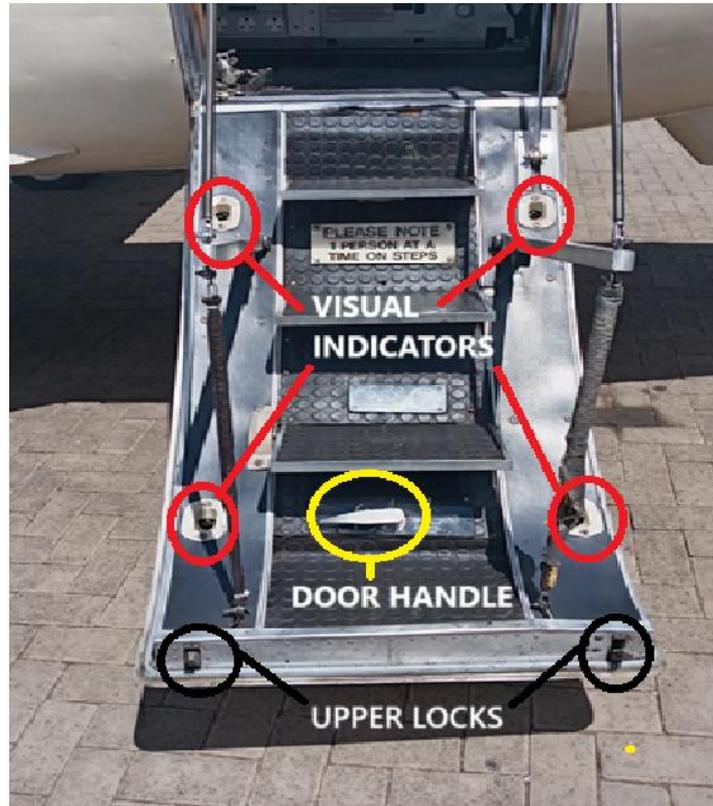


Figure 1: An example of an intact cabin door.



Figure 2: Aerial view showing of the door location in relation to the airport. (Source: Google Earth)

1.2. Injuries to Persons

| Injuries | Pilot | Crew | Pass. | Total On-board | Other |
|--------------|----------|----------|----------|----------------|----------|
| Fatal | - | - | - | - | - |
| Serious | - | - | - | - | - |
| Minor | - | - | - | - | - |
| None | 2 | - | 2 | 4 | - |
| Total | 2 | - | 2 | 4 | - |

Note: Other means people on the ground.

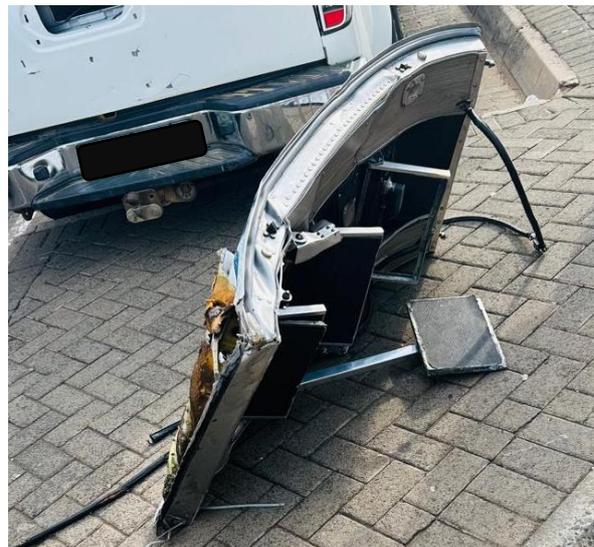
1.2.1. None.

1.3. Damage to Aircraft

1.3.1. The aircraft sustained damage to the door attachment hardware and lower cabin door frame hinge attachment points; the cabin door was also severely damaged after it impacted the ground.



Figure 3: The damaged cabin door hinge and electrical harness.



Figures 4 and 5: The aircraft without the cabin door (left), and the damaged door on the paved parking lot. (Source: Operator)

1.4. Other Damage

1.4.1. None.

1.5. Personnel Information

1.5.1 Captain

| | | | | | |
|---------------------|--|---------------|------|-----|----|
| Nationality | South African | Gender | Male | Age | 72 |
| Licence Type | Airline Transport Pilot Licence (ATPL) | | | | |
| Licence Valid | Yes | Type Endorsed | Yes | | |
| Ratings | Instrument and Night | | | | |
| Medical Expiry Date | 30 June 2025 | | | | |
| Restrictions | Yes | | | | |
| Previous Incidents | Unknown | | | | |

Note: Previous incidents refer to past serious incidents the pilot was involved in, when relevant to this serious incident.

Flying Experience:

| | |
|----------------------------|----------|
| Total Hours | 23 668.9 |
| Total Past 24 Hours | 4.1 |
| Total Past 90 Days | 71.9 |
| Total on Type Past 90 Days | 71.9 |
| Total on Type | 3 022 |

1.5.2 The pilot had an Airline Transport Pilot Licence (ATPL) that was issued on 31 December 2024 with an expiry date of 30 June 2025.

1.5.3 First Officer

| | | | | | |
|---------------------|--------------------------------|---------------|------|-----|----|
| Nationality | South African | Gender | Male | Age | 26 |
| Licence Type | Commercial Pilot Licence (CPL) | | | | |
| Licence Valid | Yes | Type Endorsed | Yes | | |
| Ratings | Instrument and Night | | | | |
| Medical Expiry Date | 31 December 2025 | | | | |
| Restrictions | Yes | | | | |
| Previous Incidents | Unknown | | | | |

Note: Previous incidents refer to past serious incidents the pilot was involved in, when relevant to this serious incident.

Flying Experience:

| | |
|----------------------------|-------|
| Total Hours | 738 |
| Total Past 24 Hours | 4.0 |
| Total Past 90 Days | 67.3 |
| Total on Type Past 90 Days | 50.2 |
| Total on Type | 117.5 |

- 1.5.4 The first officer had a Commercial Pilot Licence (CPL) that was issued on 18 December 2024 with an expiry date of 31 December 2025.

1.6. Aircraft Information

Airframe:

| | | |
|--|--------------------------------|---------------|
| Manufacturer/Model | Beechcraft Super King Air B200 | |
| Serial Number | BB-999 | |
| Year of Manufacture | 1997 | |
| Total Airframe Hours (At Time of Serious incident) | 18 081.02 | |
| Last Inspection (Date & Hours) | 06 February 2025 | 18 072.,72 |
| Hours Since Last MPI | 8.3 | |
| CRS Issue Date | 06 February 2025 | |
| C of A (Issue Date & Expiry Date) | 29 April 1997 | 30 April 2025 |
| C of R (Issue Date) (Present Owner) | 28 July 2015 | |
| Type of Fuel Used | Jet A1 | |
| Operating Category | Part 91 | |
| Previous Incidents | TBA | |

Note: Previous incidents refer to past serious incidents the aircraft was involved in, when relevant to this serious incident.

Engine # 1 (left side):

| | |
|----------------------|---------------------------|
| Manufacturer/Model | Pratt & Whitney / PT6A-42 |
| Serial Number | PCE-94643 |
| Part Number | PT6A-42 |
| Hours Since New | 10 400.69 |
| Hours Since Overhaul | 6 796.19 |

Engine # 2 (right side):

| | |
|----------------------|---------------------------|
| Manufacturer/Model | Pratt & Whitney / PT6A-42 |
| Serial Number | PCE-94643 |
| Part Number | PT6A-42 |
| Hours Since New | 8 641.19 |
| Hours Since Overhaul | 3 664.09 |

Propeller # 1 (left side):

| | |
|----------------------|-----------|
| Manufacturer | Hartzell |
| Serial Number | FY3845 |
| Part Number | HC-D4N-3A |
| Hours Since New | 5544.75 |
| Hours Since Overhaul | 154.85 |

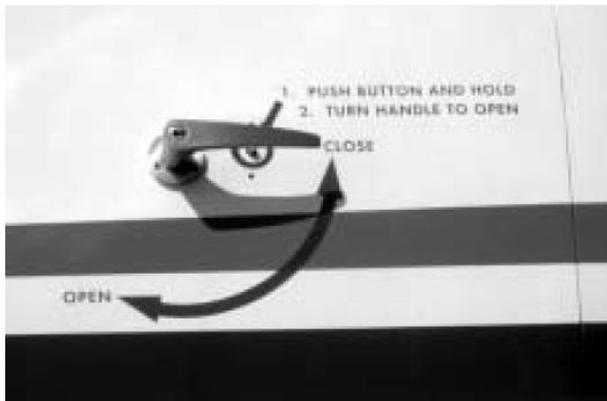
Propeller # 2 (right side):

| | |
|----------------------|-----------|
| Manufacturer | Hartzell |
| Serial Number | FY3847 |
| Part Number | HC-D4N-3A |
| Hours Since New | 6 500.77 |
| Hours Since Overhaul | 1 777.25 |

1.6.1. Cabin Door Handle Operation (Source: Flight Safety International; Super King Air 200/B200 Pilot Training Manual)

The door-locking mechanism can be operated by either the outside or inside door handle, which rotates simultaneously. A release button is adjacent to each handle and must be held depressed before the handle can be rotated. The handle system necessitates a two-hand operation, thereby, ensuring a deliberate action. The release button also incorporates a pressure-sensing diaphragm so that if there is a pressure differential between the inside and outside, the pressure on the release button must be proportionally increased to prevent inadvertently opening the door while pressurised. Never attempt to check or unlock the door in-flight. If the CABIN DOOR light is on (amber in the 200, red in the B200), or if the pilot suspects door security, direct all occupants to remain seated with seatbelts secured, descend as necessary, and depressurise the airplane. When closing the door from inside the airplane, pull up on the handrail until the airstair door reaches the door frame. Rotate the door handle up as far as possible, pulling inward on the door. The door should seal; then rotate the handle down to lock the door. Positive locking may be checked by attempting to rotate the handle without depressing the release button. It should not move. A placard is located beneath the folded step just below the door handle. The placard shows how to check the locks in the inspection port windows near each corner of the door (Figure 1-29). A green stripe painted

on each of the four latch bolts should be aligned with its respective black pointer. See Figures 6, 7 and 8.



Figures 6 and 7: Exterior door handle and interior door handle.



Figure 8: Latch bolt inspection port and green alignment marks.

1.6.2. Cabin Door Latch and Lock Mechanism Operation (Source: Beech Super King Air Model 200 Series Maintenance Manual)

When the door is closed and latched, the lower forward latch bolt compresses the spring that actuates the switch mounted on the cabin bulkhead behind the latch plate in the doorway. When the handle is rotated to the locked position, the latch arm actuates the switch mounted in the door adjacent to the lock assembly. With both of these switches actuated, the circuit is grounded to bias the annunciator panel transistor so that current no longer flows to the Cabin DOOR UNLOCKED light”

“Check the upper and lower latch pins on each side of the door for proper travel. Each of the latch pins should have approximately one inch of travel and the upper and lower latch pins should reach their limit of travel simultaneously. If the travel of any latch is too limited or if the upper and lower latch pins are not synchronised, the upholstery and access panels on the

steps should be removed so that the upper and lower latch chains that transfer the movement from the door handle to the latch rods can be checked.

- 1.6.3. The cabin door has three distinct conditions, namely: Open, Latch and Lock as indicated on the internal door handle decal. In the Open condition, the lock safety aid and all latch pins and hooks are fully disengaged, and the door can be opened. In the Latch condition, all latch pins and hooks are positively engaged in the door frame, but the braze arm assembly lock safety aid is disengaged, and the door handle can be freely rotated. In the Lock condition, all latches and hooks are positively engaged in the door frame, the braze arm assembly safety aid lock is positively engaged, and the door handle cannot be rotated (see Figure 9).



Figure 9: The ZS-LFW cabin door interior door handle decal.

- 1.6.4. The cabin door locking mechanism has a built-in safety aid in the form of a braze assembly arm that engages a bolt to prevent the inadvertent rotation of the cabin door handle. The bolt is machined to have a wide diameter shank portion and a narrow diameter shank portion. This safety feature is deactivated by depressing a button adjacent to the cabin door handle, the action of pressing the button moves the bolt in an inboard direction, aligning the narrow diameter shank portion with the opening in the braze arm, thereby, allowing the braze arm to rotate free from the bolt. When the button is released, the bolt moves in an outboard direction and the wide diameter shank portion enters the braze arm opening and prevents it from being rotated (see Figure 10).

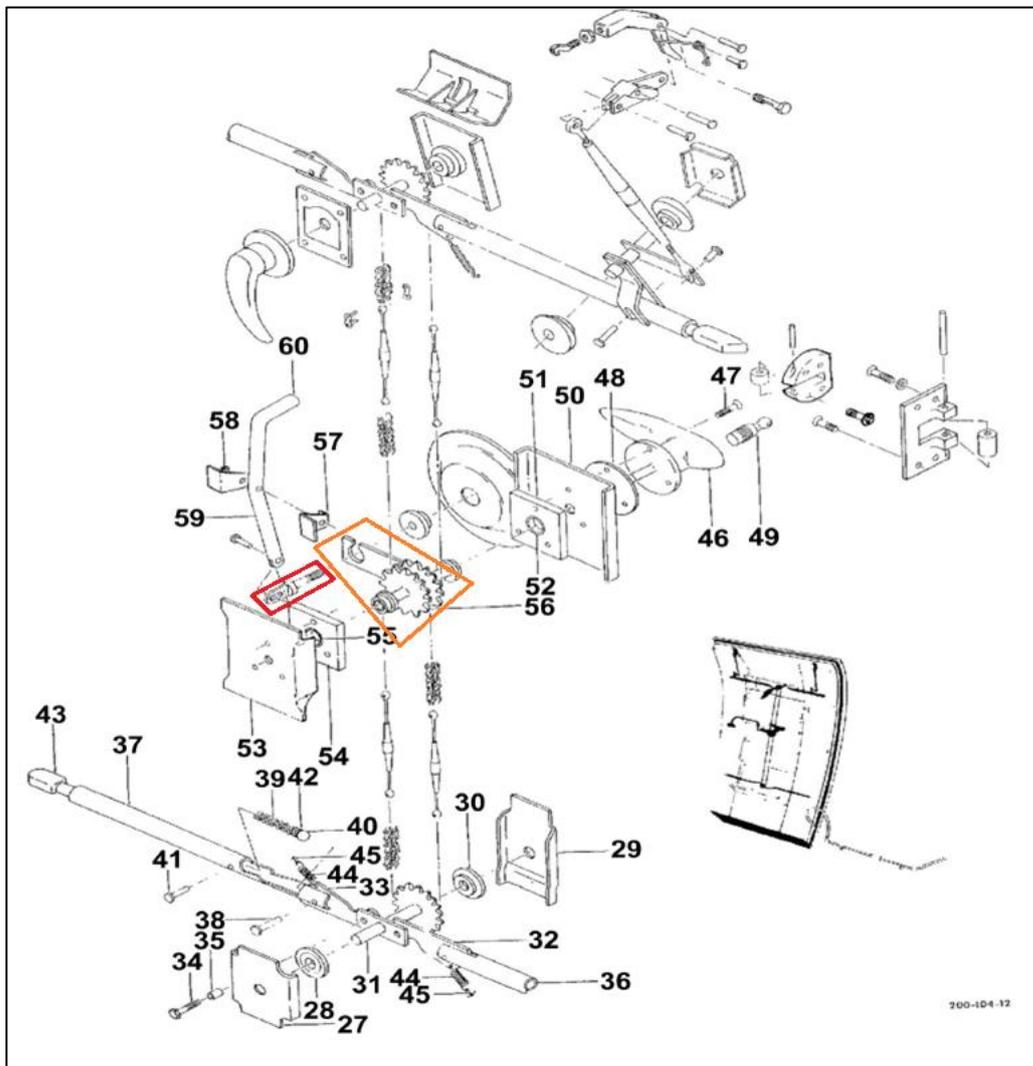


Figure 10: The bolt (in red) and braze arm assembly (in orange).

- 1.6.5. According to the status report printed on 20 January 2025, the cabin door forward and aft side latches were installed on 17 October 2019 at 14958 airframe cycles. They have a life of 5000 cycles and, on the day of the serious incident, they had 936 cycles remaining before replacement. The status report also indicated that the two top latch hooks and attaching hardware were replaced on 27 April 2012 at 13146 airframe cycles, and that they had 6630 cycles remaining on the day of the serious incident.
- 1.6.6. The two engines were maintained on a continued airworthiness programme that defines specific maintenance tasks and their associated maintenance schedule and are used as supplementary to the Pratt & Whitney Canada Manuals. Limitations and conditions using the Supplementary Type Certificate (STC) SE00001EN are maintained in accordance with Revision 3 of the More on Reliable Engines (MORE) instructions for continued airworthiness, dated 4 October 2022. The MORE programme increases the time before overhaul (TBO) time from 6000 to 8000 airframe hours.

1.7. Meteorological Information

1.7.1. The weather information below was obtained from the pilot questionnaire, completed on 10 February 2025.

| | | | | | |
|----------------|------|-------------|---------|------------|-------|
| Wind Direction | 300° | Wind Speed | 15 | Visibility | 9999m |
| Temperature | 24°C | Cloud Cover | None | Cloud Base | Nil |
| Dew Point | 3°C | QNH | Unknown | | |

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 records indicating that the navigational equipment was unserviceable prior to the serious incident.

1.9. Communication

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

1.10. Aerodrome Information

1.10.1. Bram Fischer International Airport (FABL)

| | |
|---------------------------|---|
| Aerodrome Name | Bram Fischer International Airport (FABL) |
| Aerodrome Location | Free State Province |
| Aerodrome Status | Licensed |
| Aerodrome GPS coordinates | 29°05'37.64" South, 026°18'14.27" East |
| Aerodrome Elevation | 4457 feet |
| Runway Headings | 12/30 02/20 |
| Dimensions of Runway Used | 30 |
| Heading of Runway Used | 030° |
| Surface of Runway Used | Paved |
| Approach Facilities | PAPI |
| Radio Frequency | Approach 124.30MHz Tower 120.80MHz |

1.11. Flight Recorders

1.11.1. The aircraft was neither equipped with a flight data recorder (FDR) or a cockpit voice recorder (CVR), nor was it required by regulation to be fitted to the aircraft type.

1.12. Wreckage and Impact Information

1.12.1. Whilst on approach for landing at FABL during the downwind leg for RWY 30, the cabin door opened and detached from the fuselage. It landed on a shopping mall parking lot and sustained substantial damage. No person was injured on the ground, and no property was damaged during the serious incident (see Figures 2 and 5).

1.12.2. The cabin door was found with components in the following positions:

- The braze assembly arm was in the open position, not engage on the bolt (Figure 11).
- The upper forward and aft latch pins that engage in the door frame were partially extended and the lower forward and aft latch pins that engage in the door frame were fully extended (Figure 12).
- The latch hooks at the top of the door were partially extended (Figure 13).
- The interior and external handle (although impacted through the door skin) were still aligned and both were orientated in the latch (bias position) (Figures 13 and 14).



Figure 11: Braze arm assembly with engaged bolt.



Figure 12: The fully extended lower latch pin (left red circle) and the partially extended upper latch pin (right red circle).

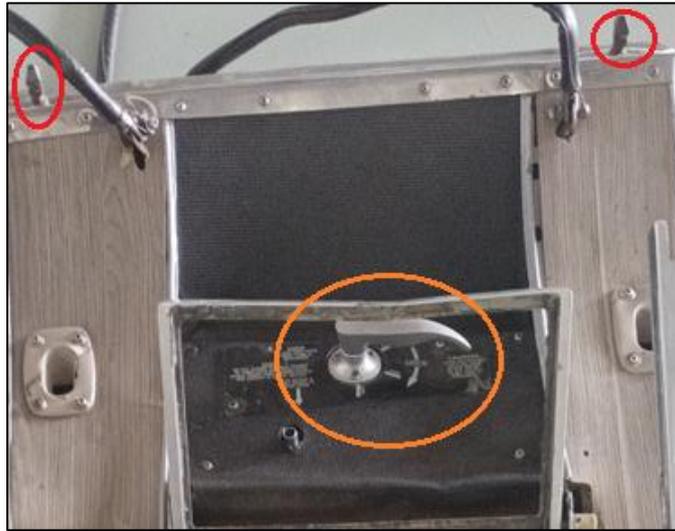


Figure 13: Partially extended top latch hooks (red circles), and the interior door handle biased to the latch position (orange circle).



Figure 14: Exterior door handle position. The circle indicates the chipped handle piece, and the arrow indicates the approximate position the handle would point when placed back in position on the cabin door skin.

1.13. Medical and Pathological Information

1.13.1. None.

1.14. Fire

1.14.1. There was no pre- or post-occurrence fire.

1.15. Survival Aspects

1.15.1. The flight was survivable as the damage was limited to the door and the occupants were wearing their seat belts.

1.16. Tests and Research

- 1.16.1. A licensed aircraft maintenance engineer (AME) with the appropriate type rating opened the cabin door panelling to investigate the latch and lock mechanism in the presence of the investigator. According to the pilot's questionnaire, the top right latch pin alignment marks were not aligned as required. The top right latch pin mechanism was examined, and it was found that it could extend, however, due to the damage on the door, the full actuation and rigging of the entire door latch and lock mechanism could not be tested.
- 1.16.2. The closing of the door does not require depressing the button for the safety aid actuation as the bolt has a chamfered arc at the bottom that allows the braze arm assembly to slide up and around the bolt with noticeable force as it passes behind the wide diameter portion of the bolt, and produces a positive engagement feel and "click" when the locked position is reached as the bolt snaps back to its original position (see Figure 15).

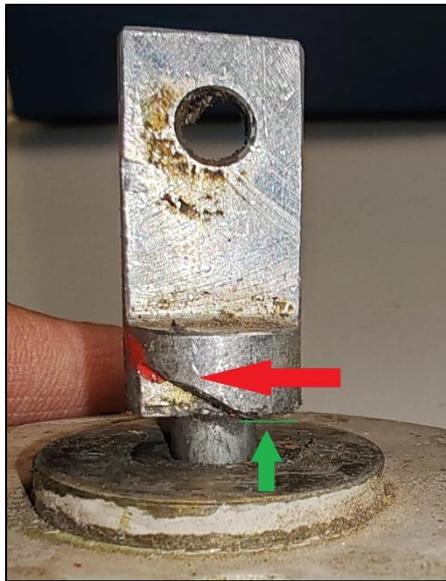


Figure 15: Chamfered arc on bolt indicated by the red arrow; the green arrow and line indicate the flat surface behind the wide diameter portion of the bolt that is passed before positive locking around the wide diameter portion of the bolt.

- 1.16.3. The braze arm assembly and bolt that form the door lock mechanism were removed from the cabin door to facilitate a check of the interference fit of the two components when in locked position. It was found that the interference fit was serviceable as the braze arm assembly could not be moved past the bolt without first depressing the bolt into the bellows. The braze arm assembly and bolt had no damage or deformation that would suggest the braze arm was forced past the bolt into a disengaged position (see Figure 16).

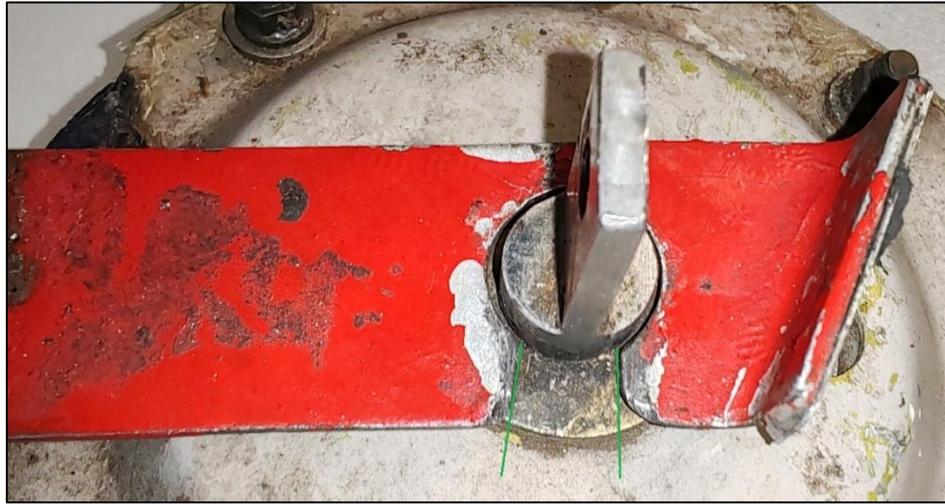
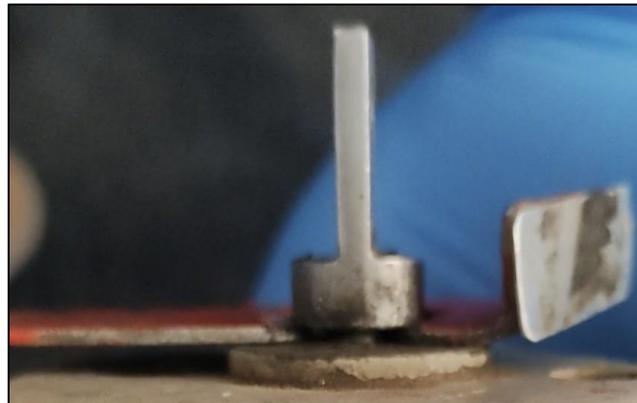


Figure 16: Braze arm assembly engaged around the bolt with positive interference as shown with green lines, and no damage beyond normal wear.

1.16.4. When testing the action of the braze arm assembly engaging the diaphragm bolt during the closing action, it was found that the potential for the braze arm assembly to remain wedged behind the wide diameter portion of the bolt of the lock mechanism and the bellows face plate flange exist without fully engaging around the shank in a locked position during the closing of the cabin door as depressing the button to move the bolt is not required during the closing action. The friction of the surface of the braze arm between the bolt and the bellows face plate flange produces a feeling of secure engagement. The braze arm would, however, not be secured in this condition and could easily disengage due to the chamfered arc on the bolt (see Figures 17 and 18).



Figures 17 and 18: The braze arm wedged behind wide diameter portion of shank and bellows face plate flange.

1.16.5. A review of the approved Aircraft Maintenance Program (AMP) revealed that the braze arm assembly and bolt do not have a manufacturer-defined life limit.

1.17. Organisational and Management Information

1.17.1. The aircraft maintenance organisation (AMO) which conducted maintenance on the aircraft had the AMO Certificate that was issued by the Regulator on 31 August 2024 with an expiry date of 31 August 2025.

1.17.2. The operator had an Air Operating Certificate (AOC) that was issued by the Regulator on 26 July 2024 with an expiry date of 30 June 2025. The operator's operational specification included emergency medical services.

1.18. Additional Information

1.18.1. Detailed maintenance records for the installation of the cabin door upper latch hooks and attaching hardware on 27 April 2012 were not available at the time of the investigation. The South African Civil Aviation Technical Standards Part 43.03.1 only requires maintenance records to be kept for a period of five years from the date of signing the release of maintenance.

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 incident. This shall not be read as apportioning blame or liability to any organisation or individual.

2.2. Analysis

2.2.1. Crew Qualifications

The crew's medical certificates and licenses were current, and they were appropriately rated for the aircraft type. The pilot-in-command had an Airline Transport Pilot Licence (ATPL) with 23 668.9 hours of flying experience of which 3 022 hours were on the King Air B200 aircraft type.

2.2.2. Operational Procedures

When the cabin door warning light illuminated, the crew followed the correct procedural requirements by instructing all passengers to remain seated with their seat belts fastened, as well as reducing the cabin pressure differential to zero by descending and planning to land as soon as possible.

2.2.3. Weather

Fine weather conditions persisted on the day of the serious incident; the weather had no bearing to the cause of the serious incident.

2.2.4. Aircraft

- The aircraft was serviceable for the flight as it had a valid Certificate of Airworthiness (C of A), Certificate of Registration (C of R) and Certificate of Release to Service (CRS), as well as no open defects in the aircraft's technical log report.
- Maintenance records indicated that the aircraft maintenance was up to date and accomplished by an approved organisation in accordance with the manufacturer's requirements. The last maintenance inspection was conducted and certified on 6 February 2025 at 18072 airframe hours by an approved AMO. The aircraft was issued a CRS on 6 February 2024 with an expiry date of 5 February 2026 or at 18263.51 airframe hours, whichever comes first. The aircraft had accrued 8.3 hours since the last maintenance on the day of the serious incident.

2.2.5. Aircraft Cabin Door

- Prior to the flight, the aircraft cabin door was confirmed closed with all alignment marks aligned by the paramedic; this was verified by the air crew by confirming the cabin door light that was extinguished on the annunciator panel.
- The partial protrusion of the upper forward and aft latch pins when compared to the lower forward and aft latch pins, as well as the statement by the medic who checked the door that only the top right latch pin indication marks were not aligned indicated the existence of a possible rigging issue and lack of synchronisation. Because the motion of the upper latch pins is directly transferred to the two top latch hooks, a loss of synchronisation in the upper latch pins and lack of extension of those pins would likely limit the extension movement and correct over-centre engagement of the top latch hooks. This would compromise the security of the cabin door. It should be borne in mind that the potential of the impact of the cabin door with the ground to move the position of the door handles and latch pins could not be ruled out.

- The cabin door warning light is extinguished by two micro switches, one actuated by the lower forward latch pin, and the other actuated by the braze arm assembly in the lock position. The lack of over-centre engagement of the upper latch pins and two top latch hooks would not have triggered a warning light and could have gone unnoticed, allowing the crew to dispatch with the cabin door not secured by all latching points.
- There exists a potential for the braze arm assembly to remain wedged behind the wide diameter portion of the bolt of the lock mechanism and the bellows face plate flange without fully engaging around the shank in a locked position during the closing of the cabin door, as depressing the button to move the bolt was not required in the closing action. This may have allowed enough contact with the microswitch to switch off the cabin door light on the cabin door annunciator panel and, because of the friction of the two surfaces against each other, it may have felt secured. The braze arm would, however, not be secured and the combination of vibration from the aircraft's operation and the chamfered edge of the bolt would easily allow the braze arm assembly to slip down and away from the microswitch, thereby, illuminating the cabin door warning light on the annunciator panel (see Figures 17 and 18).
- The braze arm assembly, having been found in the unlocked position, was likely the case that the door mechanism was not fully locked prior to the aircraft's departure. This is also supported by the position of the interior door handle being in the latch position. It is also likely that it was the microswitch actuated by the braze arm assembly that closed the circuit and caused the illumination of the cabin door light on the annunciator panel in the cockpit. It should be borne in mind that the potential of the impact of the cabin door with the ground to move the position of the door handles and latch pins could not be ruled out.
- According to the statement given by the captain, at the time of the serious incident, the cabin door opened and broke off after completely depressurising the aircraft cabin. It is likely that whilst the cabin was pressurised, the force of the pressure on the cabin door helped keep the latches in place, as well as the limited movement due to vibration. When the cabin pressure was dumped, the force assisting in limiting the effect of aircraft vibration was lost and the cabin door latch mechanism vibrated at an increased rate to the point where the door opened in-flight and detached due to the relative airflow of the aircraft.

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 organisation or individual.

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

- **Findings** — are statements of all significant conditions, events, or circumstances in this serious incident. The findings are significant steps in this 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 serious incident occurring, or would have 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. Personnel

The captain had an Airline Transport Pilot Licence (ATPL) that was issued on 10 December 2024 with an expiry date of 31 July 2025. The captain was issued a Class 1 aviation medical certificate on 5 December 2024 with an expiry date of 30 June 2025. The captain was adequately experienced and licensed to conduct the flight.

The first officer had a Commercial Pilot Licence (CPL) that was issued on 18 December 2024 with an expiry date of 31 December 2025. The first officer was issued a Class 1 aviation medical certificate on 9 December 2024 with an expiry date of 31 December 2025.

The captain and the first officer were both appropriately licensed on the aircraft type and had the required endorsements in their pilot logbooks.

Their response to the cabin door light illumination was in line with procedural requirements. The competency of the aircrew had no bearing on this serious incident.

3.2.2. Aircraft

The aircraft was serviceable for the flight as it had a valid Certificate of Airworthiness, Certificate of Registration and Certificate of Release to Service, and no open defects in the aircraft's technical log report.

3.2.3. Aircraft Cabin Door

After analysis of all available information and evidence, it was found that the cabin door rigging was most likely not 100% correct and it, ultimately, led to the cabin door not being able to be latched and locked securely by rotation of the cabin door handle. What may have led to the loss of rigging integrity of the cabin door latching and locking mechanism cannot be determined with certainty and remains inconclusive.

3.2.4. Operational Procedures

The positive confirmation of the closing of the cabin door and alignment of the door latch indicators by the paramedic, as well as the verification of the extinguishing of the cabin door light by the aircrew is procedurally correct. When the Cabin Door warning light illuminated in flight, the crew followed the correct procedural requirements by instructing all passengers to remain seated with their seat belts fastened, reducing the cabin pressure differential to zero by descending, and planning to land as soon as possible.

3.2.5. Maintenance

Maintenance records indicated that the aircraft maintenance was up to date and accomplished by an approved organisation in accordance with the manufacturer's requirements.

3.2.6. Weather

Fine weather conditions persisted on the day of the serious incident. The weather had no bearing on the cause of this serious incident.

3.3. **Probable Cause/s**

- 3.3.1. The cabin doors latch and lock mechanism lost their rigging integrity which prevented the door from being securely latched and locked. This led to the door opening in-flight and subsequently detaching due to relative airflow.

3.4. **Contributory Factor/s**

- 3.4.1. None.

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. APPENDICES

5.1. None.

This report is issued by:

**Accident and Incident Investigations Division
South African Civil Aviation Authority
Republic of South Africa**