AIRCRAFT SERIOUS INCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:		CA18/3/2/1446	
Aircraft Registration	ZS-PKB	**Date of Accident**		16 April 2024		**Time of Accident**	0553Z
Type of Aircraft	Beechcraft 1900D			**Type of Operation**		Commercial (Part 135)	
Pilot-in-command Licence Type	Airline Transport Pilot Licence (ATPL)			**Age**	28	**Licence Valid**	Yes
Pilot-in-command Flying Experience		**Total Flying Hours**		2 361.0		**Hours on Type**	602.5
Last Point of Departure	O.R. Tambo International Airport (FAOR), Gauteng Province						
Next Point of Intended Landing	Venetia Mine Airfield (FAVM), Limpopo Province						
Damage to Aircraft	Minor						

Location of the accident site with reference to easily defined geographical points (GPS readings if possible)

FAVM Runway 08 at Global Positioning System (GPS) co-ordinates 22°26'56.33" South 029°20'06.06" East, at an elevation of 2 315 feet (ft)

Meteorological Information	Surface wind: 190°/12 knots: temperature, 24°C; dew point: 11°C						
Number of People On-board	2 + 17	**Number of People Injured**	0	**Number of People Killed**	0	**Other (On Ground)**	0

Synopsis

On Tuesday morning, 16 April 2024, two pilots and 17 passengers on-board a Beechcraft 1900D aircraft with registration ZS-PKB, call sign KEM001, were on a charter flight from O.R. Tambo International Airport (FAOR) in Gauteng province to Venetia Mine Airfield (FAVM) in Limpopo province when the serious incident occurred. The flight was conducted under instrument flight rules (IFR) by day and under the provisions of Part 135 of the Civil Aviation Regulations (CAR) 2011 as amended.

The captain, who was the pilot flying (PF), stated that the en route segments of the flight to FAVM were uneventful. Upon arrival at FAVM, they (crew) followed the before landing checklist as specified in the Pilot's Operating Handbook (POH). Thereafter, the captain selected the gear down and confirmed the three green lights for gear down and locked indication were illuminated. The aircraft approached at a speed of 120 knots (kts) with (0°) flaps (up position). After a few seconds, the aircraft touched down hard on the gravel area, about 3 metres (m) before the threshold of Runway 08. Consequently, the left main landing gear (MLG) drag brace bolts sheared off and the gear pivoted forward (partially collapsed), lowering the height of the aircraft on the left side. The aircraft continued to roll and, once it was on the runway, the captain successfully maintained directional control and brought it to a stop approximately 900 metres (m) from the threshold of Runway 08. The aircraft sustained minor damage; however, none of the passengers or crew members was injured. The investigation discovered that the aircraft flaps were unserviceable or inoperative (INOP) prior to depature from FAOR, but the defect (or deferred entry) was not documented on any of the aircraft's technical logs. The investigation concluded that the flapless approach at low air speed (120kts) resulted in the aircraft being unable to reach the runway and, thus, landed hard on the gravel area, about 3m before the threshold of Runway 08.

Probable Cause

Incorrect approach speed (Vref) for flapless landing configuration resulted in a high sink rate and, thus, the subsequent hard landing on the gravel area, about 3m before the threshold of the Runway 08.

SRP date	13 May 2025	Publication date	14 May 2025

Occurrence Details

Reference Number	**:** CA18/3/2/1446
Occurrence Category	**:** Serious Incident (Category 1)
Type of Operation	**:** Commercial (Part 135)
Aircraft Registration	**:** ZS-PKB
Aircraft Make and Model	**:** Beechcraft 1900D
Nationality	**:** South African
Place	**:** Venetia Mine Airfield (FAVM), Limpopo Province
Date and Time	**:** 16 April 2024 at 0553Z
Injuries	**:** None
Damage	**:** Minor

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 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 a serious incident on 16 April 2024 at 0553Z. The occurrence was classified as a serious cident according to the CAR 2011 Part 12 and ICAO STD Annex 13 definitions.

Notes:

1. *Whenever the following words are mentioned in this report, they shall mean the following:*
   Serious incident — this investigated serious incident
   Aircraft — the Becchctaft 1900D 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

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 the clarity of the report. Modifications to images used in this report were limited to cropping, magnification, file compression; enhancement of colour, brightness, and contrast; or addition of text boxes, arrows, or lines.*

Disclaimer

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Abbreviation	Description
°	Degrees
°C	Degrees Celsius
ACAS	Airborne Collision Avoidance System
AD	Airworthiness Directive
AFM	Aircraft Flight Manual
AIID	Accident and Incident Investigations Division
AME	Aircraft Maintenance Engineer
AMM	Aircraft Maintenance Manual
AMO	Aircraft Maintenance Organisation
AMSL	Above Mean Sea Level
AOC	Aircraft Operating Certificate
ATC	Air Traffic Control
C of A	Certificate of Airworthiness
C of R	Certificate of Registration
CAR	Civil Aviation Regulations
CCTV	Close Circuit Television
Cm	Centimetres
CPL	Commercial Pilot Licence
CRM	Crew Resource Management
CRS	Certificate of Release to Service
CVR	Cockpit Voice Recorder
EASA	European Aviation Safety Agency
EFIS	Electronic Flight Instrument System
FAKH	Kenhardt Airport
FAOR	O.R.Tambo International Airport
FAPP	Polokwane International Airport
FAVM	Venetia Mine Airfield
FDR	Flight Data Recorder
FL	Flight Level
FO	First Officer
Ft	Feet
GPS	Global Positioning System
HPa	Hectopascal
IAW	In Accordance With
ICAO	International Civil Aviation Organisation
IFR	Instrument Flight Rules
INOP	Inoperative
IPC	Illustrated Parts Catalogue
Kts	Knots
L	Litres
Lbs	Pounds
M	Metres
MEL	Minimum Equipment List
MHz	Megahertz

MLG	Main Landing Gear
MLW	Maximum Landing Weight
PDM	Pilot Decision Making
PF	Pilot Flying
PM	Pilot Monitoring
POH	Pilot’s Operating Handbook
PSI	Pounds Per Square Inch
RPM	Revolution per Minute
SACAA	South African Civil Aviation Authority
SAWS	South African Weather Service
SB	Service Bulletin
SHP	Shaft Horsepower
TCAS	Traffic Alert and Collision Avoidance System
TEM	Threat and Error Management
USA	United States of America
VFS	Final Segment Speed
VHF	Very High Frequency
VREF	Reference Touch Down Speed
VSI	Vertical Speed Indicator
Z	Zulu (Term for Universal Co-ordinated Time - Zero Hours Greenwich)

1. FACTUAL INFORMATION

1.1 History of Flight

1.1.1 On Tuesday morning, 16 April 2024, two pilots and 17 passengers on-board a Beechcraft 1900D aircraft with registration ZS-PKB with call sign KEM001 were on a charter flight from O.R. Tambo International Airport (FAOR) in Gauteng province with the intention to land at Venetia Mine Airfield (FAVM) in Limpopo province. A flight plan was filed with Johannesburg briefing and the flight was conducted under instrument flight rules (IFR) by day and under the provisions of Part 135 of the Civil Aviation Regulations (CAR) 2011 as amended. The aircraft flight folio, page serial number 26791, showed that 1 177 litres (l) (2 071 pounds [lbs]) of Jet A1 fuel was uplifted to make 3 150 lbs total fuel in the tanks. The captain who was seated on the left seat was the pilot flying (PF) and the first officer (FO) was the pilot monitoring (PM).

1.1.2 The captain obtained the latest weather report of the departure airport (FAOR), en route and destination airfield, as well as for the alternate aerodrome. The weather was conducive for the flight at all the mentioned areas. The crew conducted a short pre-flight briefing and, later, a pre-flight inspection of the aircraft; the aircraft was parked outside the Fireblade Aviation facility at FAOR. (*During the interview, the crew informed the investigation team that the aircraft flaps were inoperative [INOP] or unserviceable; however, none of the technical documentation had evidence of such defect or deferred entry.*) After the arrival of the passengers, the FO observed them (passengers) as they embarked the aircraft through the left front door. He provided a safety briefing after they were all seated. Later, the captain broadcasted his intentions to the FAOR ground air traffic control (ATC) officer on the very high frequency (VHF) 121.9-Megahertz (MHz). The aircraft start-up was normal, and the crew was given Runway 03L for take-off. The captain taxied the aircraft to the holding point of Runway 03L where they lined up. At 0439Z, the crew obtained the take-off clearance and taxied the aircraft to the threshold of Runway 03L.

1.1.3 The captain advanced the power levers to 1 700 revolutions per minute (RPM) and commenced with the take-off roll. The aircraft rotated and climbed to flight level (FL) 210 heading north. The en route segments of the flight to FAVM were uneventful; the aircraft cruised at an air speed of 242 knots (kts). The cockpit voice recording (CVR) revealed that the FO broadcasted to the FAVM responsible person on the VHF 124.80MHz whilst the aircraft was inbound for FAVM; the crew had expected to land on Runway 26. The weather update around the FAVM area was provided to the crew; the sky was clear around FAVM and the wind direction favoured the asphalt-covered Runway 08. The crew completed the descent checklist as outlined in the Pilot's Operating Handbook (POH) and commenced with the descent. Later, the crew followed the pre-landing checklist after which the landing gear switch was selected to the down position. The crew confirmed the three green lights for gear down and locked indication were illuminated on the annunciator panel.

1.1.4 The aircraft continued to approach with zero (0°) flaps at a speed of 120 knots (kts) and touched down hard on the gravel area, about 3m before the threshold of Runway 08. The aircraft continued to roll and, once on the runway, the captain successfully maintained directional control. The aircraft was brought to a stop on the runway approximately 900 metres (m) from the threshold of Runway 08. The captain engaged the park brake and, thereafter, shut down the engines. None of the passengers or the crew members was injured. Later, the FO opened the forward airstair passenger boarding door to inspect the aircraft and he noticed that the left main landing gear (MLG) had pivoted forward (partially collapsed) and, thus, lowered the height of the aircraft on the left side. The aircraft sustained minor damage to the left MLG drag brace and the front spar cap. After a few minutes, the passengers were allowed to disembark from the aircraft through the airstair and were transported to the mine's facility by bus. The captain was asked to describe the crew co-ordination between him and the FO during the flight and he stated that he thought the crew co-ordination was good, and each person had a specific role. The captain further stated that it was his second flight to FAVM and that it was the first time he was rostered with the FO. The FO also stated that it was his second flight to FAVM.

1.1.5 Post-serious incident interviews with the passengers revealed that the flight from FAOR was uneventful; however, they were astonished when the aircraft touched down on the gravel area. The passengers had flown to FAVM in the past on the same type of aircraft.

1.1.6 The serious incident occurred during day light, 3m before Runway 08 threshold at FAVM at Global Positioning System (GPS) co-ordinates determined to be 22°26´56.33" South 029°20´06.06" East at an elevation of 2 315 fe et (ft).

Figure 1: The route flown by the crew from FAOR to FAVM. (Source: Operator)

1.2 Injuries to Persons

Injuries	Pilot	Crew	Pass.	Total On-board	Other
Fatal	-	-	-		-
Serious	-	-	-	-	-
Minor	-	-	-	-	-
None	2	-	17	19	-
Total	**2**	**-**	**17**	**19**	**-**

Note: Other means people on the ground.

1.3 Damage to Aircraft

1.3.1 The left MLG drag brace was damaged during the serious incident.

Figure 2: The yellow arrow points to the collapsed left MLG – picture taken from the front of the aircraft.

Figure 3: The collapsed left MLG (pivoted forward) – picture taken from behind the aircraft.

1.4 Other Damage

1.4.1 No other damage was reported.

1.5 Personnel Information

1.5.1 Captain / Pilot Flying (PF)

Nationality	South African	Gender	Male	Age	28
Licence Type	Airline Transport Pilot Licence (ATPL)				
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Instrument and Instructor's Grade II				
Medical Expiry Date	31 October 2024 (Class 1)				
Last Line Check	3 April 2024				
Last Simulator Check	26 February 2024				
Last CRM Refresher	24 February 2024 – 28 February 2025 (Expiry date)				
Restrictions	None				
Previous Accidents	Yes				

Note: Previous accidents refer to past accidents the pilot was involved in, when relevant to this accident.

1.5.2 Scrutiny into the captain's profile kept at the South African Civil Aviation Authority (SACAA) revealed that on Friday morning, 10 March 2023 at 0855Z, he taxied the aircraft (ZS-PKB) into a stationary tug on taxiway India at FAOR which caused substantial damage to the right-wing leading-edge tip.

Flying Experience:

Total Hours	2 361.0
Total Past 90 Days	105.0
Total on Type Past 90 Days	105.0
Total on Type	602.5

1.5.3 The hours shown in the table above were obtained from the pilot questionnaire, SACAA form number CA12-03.

1.5.4 The captain had an Airline Transport Pilot Licence (ATPL) that was issued on 25 September 2023 with an expiry date of 30 September 2024. The captain was issued a Class 1 aviation medical certificate on 26 October 2023 with an expiry date of 31 October 2024. The captain had no medical restrictions listed on his pilot licence.

1.5.5 The captain was under the employ of the operator since 1 February 2023 because of his experience and hours of which many were flown on the Beechcraft 1900D aircraft model.

1.5.6 Scrutiny into the captain's records on the SACAA database showed that he had a Beechcraft 1900D aircraft endorsed on his licence. The captain's last proficiency check on the Beechcraft 1900D aircraft was provided by the operator on 3 April 2024; the captain was assessed as competent in all aspects. The captain had successfully completed the crew resource management (CRM) training at the SACAA-approved aviation training organisation (ATO); the CRM Certificate was issued on 27 February 2024 with the expiry date of 28 February 2025.

1.5.7 First Officer (FO) / Pilot Monitoring (PM)

Nationality	South African	Gender	Male	Age	39
Licence Type	Commercial Pilot Licence (CPL)				
Licence Valid	Yes	Type Endorsed	Yes		
Ratings	Instrument and Instructor's Grade III				
Medical Expiry Date	31 October 2024 (Class 1)				
Last Line Check	4 January 2024				
Last Simulator Check	4 December 2023				
Last CRM Refresher	7 November 2023 – 30 November 2024 (Expiry date)				
Restrictions	None				
Previous Accidents	None				

Note: Previous accidents refer to past accidents the pilot was involved in, when relevant to this accident.

Flying Experience:

Total Hours	721.7
Total Past 90 Days	101.5
Total on Type Past 90 Days	101.5
Total on Type	203.2

1.5.8 The hours shown on the table above were obtained from the pilot via email that was dated 19 February 2025.

1.5.9 The FO was initially issued a Private Pilot Licence (PPL) on 13 June 2022. The FO had a Commercial Pilot Licence (CPL) that was issued on 4 December 2023 with an expiry date of 31 December 2024. The FO was issued a Class 1 aviation medical certificate on 26 October 2023 with an expiry date of 31 October 2024. The FO had no medical restrictions listed on his pilot licence.

1.5.10 The FO was under the employ of the operator since 1 November 2023. Scrutiny into the FO's records on the SACAA database showed that he had a Beechcraft 1900D aircraft endorsed on his licence. The FO had successfully completed conversion training on the Beechcraft 1900D aircraft. His last proficiency check on the Beechcraft 1900D aircraft was provided by

the operator on 4 January 2024. The FO was assessed as competent in all aspects. The FO had successfully completed the CRM training at the approved ATO; the CRM Certificate was issued on 7 November 2023 with the expiry date of 30 November 2024.

1.6 Aircraft Information

1.6.1 Aircraft Description (Source: Pilot's Operating Handbook [POH])

The Beechcraft 1900D is a low-wing, T-tail, pressurised twin-engine turboprop fixed-wing aircraft manufactured by the Beechcraft Division of the Raytheon Company (now Textron Aviation) in the United States of America (USA). It was designed as a regional aircraft and is generally used as such on airports with shorter runways. The aircraft is powered by two Pratt and Whitney PT6A-67D turboprop engines rated at 1 279 shaft horsepower (SHP) each, driving a constant speed, full-feathering and reversing 4-blade Hartzell HC-E4A-3J model propellers. The aircraft landing distance is 4 667 ft (1 422 metres [m]). The aircraft is certified to fly up to an altitude of 25 000ft (7 600 metres [m]) above mean sea level (AMSL). The flight deck accommodates two pilots and Collins primary flight displays (PFD) which is shown on four electronic flight instrument system (EFIS) screens, two located on each pilot instrument panel. The typical configuration is two seats abreast, and ZS-PKB was configured for 19 passengers, and all on-board in economy class. The aircraft has one airstair passenger boarding door (left front-side) and a cargo door (left rear) for access to the baggage compartment as well as three over-wing emergency exits.

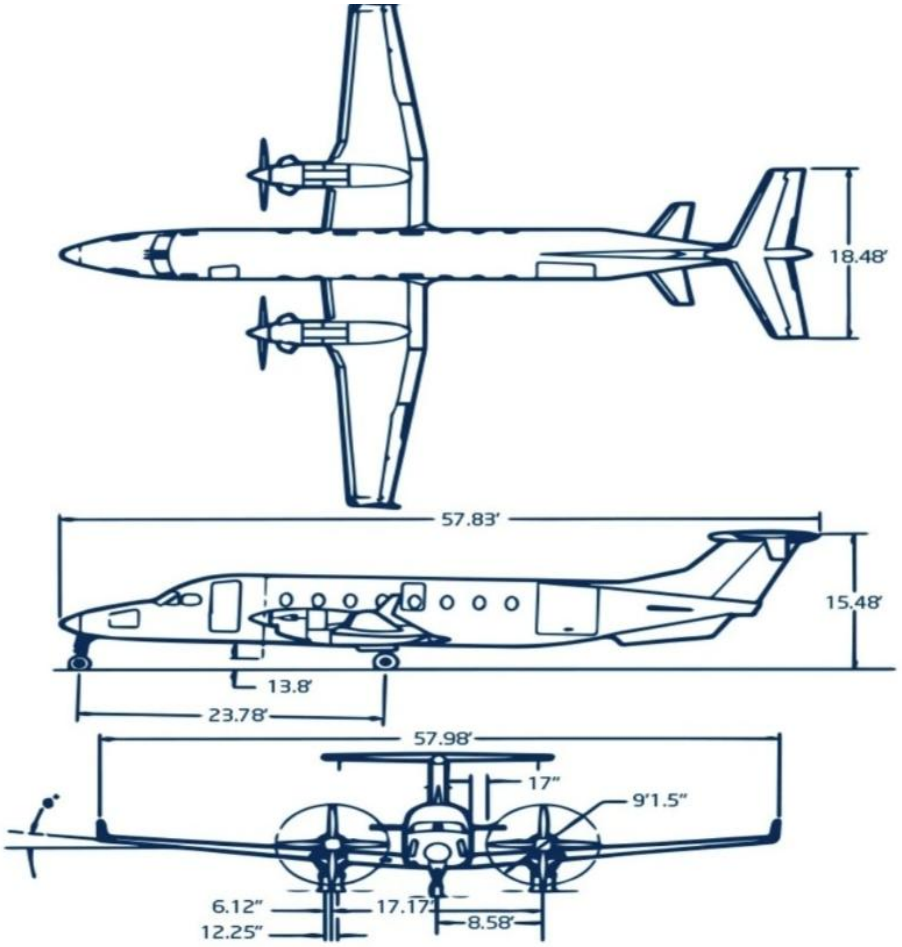


Figure 4: The Beechcraft 1900D exterior dimensions. (Source: Air-Tec Global)

1.6.2 Airframe:

Manufacturer/Model	Textron Aviation / Beechcraft 1900D	
Serial Number	UE-003	
Year of Manufacture	1991	
Date first registered	3 November 1977	
Total Airframe Hours (at time of the accident)	38 914.64	
Third 200-Hour Interval Inspection (Date & Hours)	14 March 2024	38 913.54
Airframe Hours Since Last Inspection	1.1	
CRS Issue Date	14 March 2024	
Certificate of Airworthiness (Issue Date & Expiry Date)	15 December 2004	29 August 2024
C of R (Issue Date) (Present Owner)	26 April 2013	
CRS Issue Date	24 August 2023	
Maximum Takeoff Weight	7 765kg (17 120lbs)	
Airworthiness Directive Status	Complied With	
Recommended Fuel Types	Jet A, Jet A1, Jet B	
Fuel Used	Jet A1	
Operating Category	Commercial (Part 135)	

Previous Accidents	On 10 March 2023 at 0855Z, the aircraft's right-wing leading-edge tip was damaged after the aircraft taxied into a stationary tug on taxiway India at FAOR – CA18/3/2/1408.

Note: Previous accidents refer to past accidents the aircraft was involved in, when relevant to this accident.

Engine 1 (Left side):

Manufacturer/Model	Pratt & Whitney / PT5A-67D
Serial Number	PCE-PS0672
Part Number	3044800
Hours Since New	3 339.89
Hours Since Overhaul	3 339.89 (Time Between Overhaul [TBO] is 6 000 hours – TBO not reached

Propeller 1 Left side:

Manufacturer/Model	Harzell / HC-E4A-3J
Serial Number	HJ-2282
Part Number	HC-E4A-31
Hours Since New	5 326.83
Hours Since Overhaul	1 326.83 (TBO is 4 000 hours)

Engine 2 (Right side):

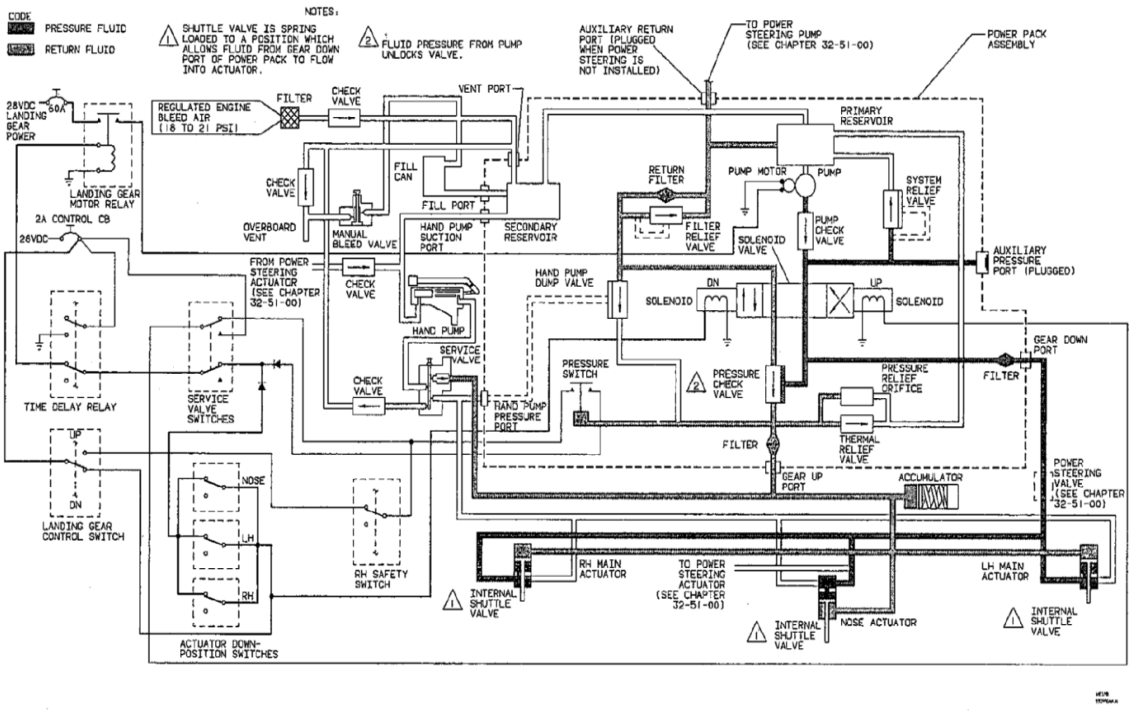
Manufacturer/Model	Pratt & Whitney / PT5A-67D
Serial Number	PS-PS0672
Part Number	3044800
Hours Since New	30 862.49
Hours Since Overhaul	862.49 – TBO not reached

Propeller 2 (Right side):

Manufacturer/Model	Harzell / HC-E4A-3J
Serial Number	HJ-1886
Part Number	HC-E4A-31
Hours Since New	27 923.37
Hours Since Overhaul	3 923.37

1.6.3 Landing Gear System Description (Source: Aircraft Maintenance Manual [AMM])

The Beechcraft 1900D aircraft is equipped with a retractable tricycle landing-gear system. The nose and main landing-gear assemblies are extended and retracted by a hydraulic system consisting primarily of an actuator located in each wheel well, a hydraulic power pack located in the left wing, and hydraulic plumbing. The nose landing gear and main landing gear assemblies use air-oil oleo struts. The nose gear strut is equipped with a single wheel and tyre, while each main gear strut is equipped with two wheels and tyres. The landing gear is retracted and extended by the action of the individual actuators and drag brace assemblies connected to each strut. Three green indicator lights in the cockpit would illuminate when the landing gear is fully down and locked. The aircraft landing gear and associated structure is designed to absorb energy equivalent to a maximum descent rate of less that 600 feet per minute when the aircraft gross weight is less than or equal to the maximum landing weight (MLW).



Illustartion 1: Hydraulic landing gear. (Source: AMM)

1.6.4 Weight and Balance Calculation:

Examination of the flight logs revealed that the aircraft was within its approved weight limit and centre-of-gravity when it departed FAOR. The calculated aircraft take-off weight was 17120 lbs, and the landing weight was 16 190 lbs. The maximum certified take-off weight for the aircraft was 17 120 lbs.

KEM001 FAOR-FAVM 16 APR 2024 04:30 Z

Payload	3370 LB	4495 LB		Trip fuel	890 LB		
Zero fuel	14040 LB	15165 LB	21.9	Landing fuel	2150 LB		
				Landing	16190 LB	16765 LB	23.5

CREW		PASSENGERS			CARGO		FUEL	
Pilot in command	212 LB	Males	15	2850 LB	Aft/Forward hold	220 LB	Main tanks	3150 LB
Co-pilot	212 LB	Females	2	300 LB	Aft/Aft hold	0 LB		
		Children	0	0 LB	Cabin hold	0 LB		
		Infants	0	0 LB				
		Luggage	0	0 LB				
		Undefined	0	0 LB				

TAKE-OFF

TAKE-OFF CONDITIONS			TAKE-OFF SETTINGS	
Planning			Take-off weight / Max.	17080 / 17120 LB
ELEV	5558 FT		Regulated max. take-off weight	17120 LB
RWY / L	03L / 4436 M		De-icing Receipt	
Braking action			Anti-ice	NO
Visibility / RVR	5000		Flaps setting	17°
Wind	20 12 KT	/	Acceleration	0.00
Ceiling	500 FT		V1	105 KT
Temp./Dewp.	11 / 11 °C		Vr	107 KT
QNH	1028 hPa		V2	112 KT
			Vft	
			Vref EMG	123 KT
			Vfr	123 KT

LANDING

LANDING CONDITIONS		LANDING SETTINGS	
Planning		Landing weight / Max.	16190 / 16765 LB
ELEV	2333 FT	Regulated max. landing weight	16765 LB
RWY / L	1524 M	Anti-ice	NO
Braking action		Flaps setting	35°
Visibility / RVR		Vref	116 KT
Wind		Vapp	125 KT
Ceiling			
Temp./Dewp.			
QNH			

1.6.5 Applicable Approach and Landing Speeds:

The Beechcraft 1900D Aircraft Flight Manual (AFM) and the Quick Refence Handbook (QRH) were on-board the aircraft and readily available to the crew at all times. The manuals describe the aircraft limitations and procedures, as well as the performance capabilities of the aircraft. The optimal approach and landing speeds are determined by the manufacturer during the certification programme of the aircraft. The performance section of the aircraft contains all the information required to obtain the landing performance data for varying conditions of temperature, airport pressure altitude and aircraft weight for the specified approach and landing configurations. This information is available in tabular form in the aircraft QRH that is

kept in the flight deck. Calculations were made using the occurrence aircraft configuration and conditions of the day. The aircraft landing weight was calculated at 16 765 lbs without (0°) flaps with the outside air temperature at 12°C.

Reference touch down speed (VREF) with 35° of flaps selected = 119 knots indicated air speed (KIAS)
Final segment speed (VFS) with or zero (0°) or INOP = 134 KIAS

SPEEDS FOR LANDING		
SPEEDS ARE VALID FOR ALL-ENGINE AND SINGLE-ENGINE APPROACHES		
WEIGHT (LBS)	VREF FLAP 35° (KTS)	VREF FLAPS UP (KTS)
17120	119	134
16765	118	133
16000	116	131
15000	114	128
14000	111	124
13000	109	121
12000	106	117
11000	102	112
10000	97	107
INCREASE VREF SPEED BY 15KTS WHEN LANDING IN ICING CONDITIONS FOR TURBULENT CONDITIONS INCREASE APPROACH SPEED BY ADDING HALF THE HEADWIND COMPONENT AND THE FULL GUST FACTOR TO VREF. MAXIMUM OF 20KTS MAY BE ADDED.		

Figure 4: Speed table from the Beechcraft 1900D QRH.

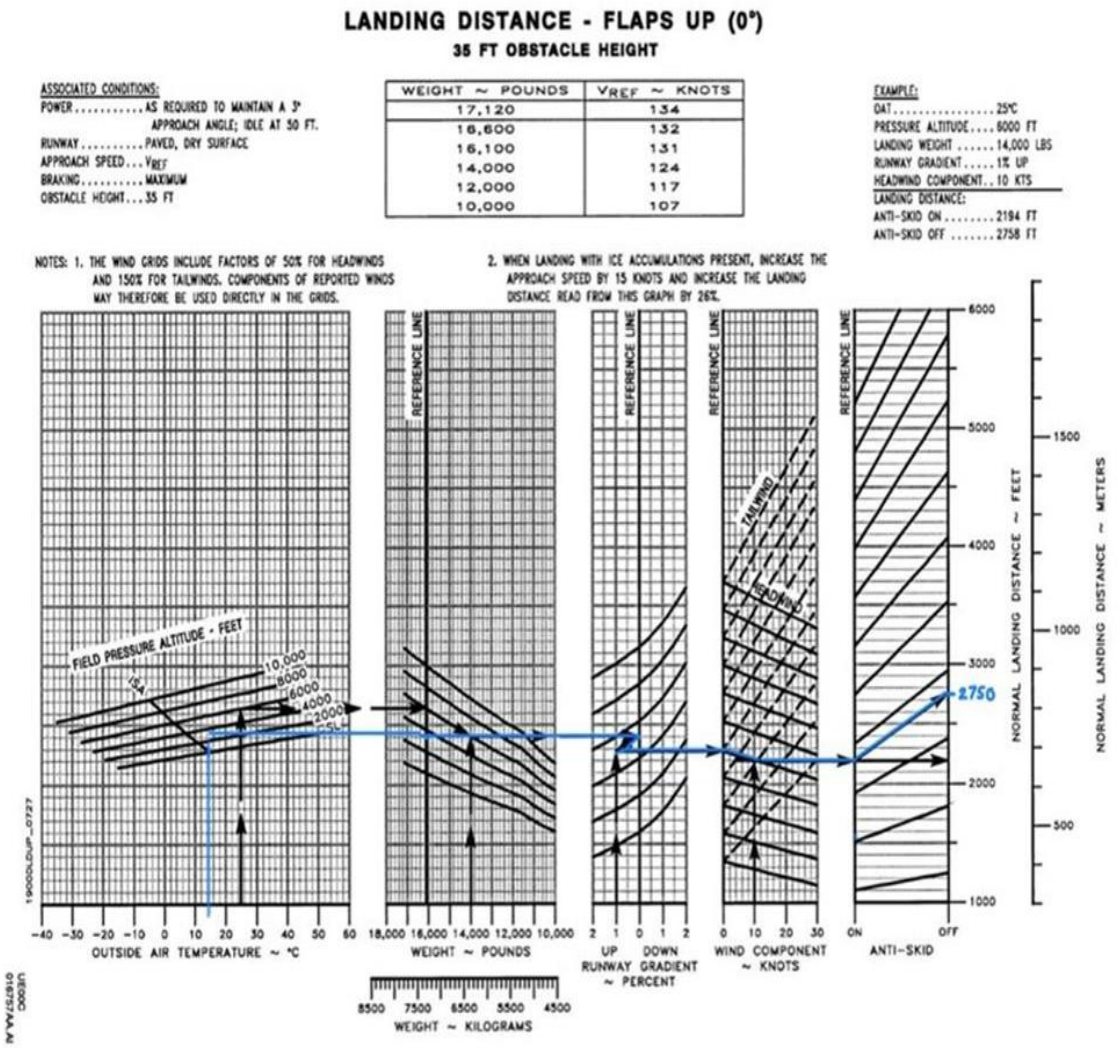


Figure 5: The perfomace calculation completed by the crew before departure from FAOR. (Source: Operator)

*Note: The temperature on the day was 24˚C, and the field elevation for FAVM is 2 315ft. The aircraft landing weight was 16 765 lbs, the wind was 12 kts. Following the crew's calculations, the aircraft needed 2 750ft (838.2m) of runway for landing.

1.7 Meteorological Information

1.7.1 An official weather report was supplied by the captain using the pilot questionnaire form number CA12-03.

Wind Direction	190°	Wind Speed	12 knots	Visibility	9999m
Temperature	24°C	Cloud Cover	CAVOK	Cloud Base	Nil
Dew Point	11°C	QNH	1028hPa		

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 flight.

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 before the flight.

1.10 Aerodrome Information

1.10.1 Venetia Mine Airfield (FAVM) is situated on a diamond mine approximately 80 kilometres (km) west of Musina and 36km west of Alldays in Limpopo province. The airfield comprises 1 asphalt runway (08/26). The runway is 1 550m long and 15m wide.

Aerodrome Name	Venetia Mine Airfield (FAVM) [ICAO designation]
Aerodrome Location	Limpopo Province
Aerodrome Status	Licensed
Aerodrome GPS coordinates	22º26’56.33” South, 029º20’06.06” East
Aerodrome Elevation	2 315ft
Runway Headings	08/26
Dimensions of Runway Used	1 550 x 15m
Heading of Runway Used	08
Surface of Runway Used	Asphalt
Approach Facilities	None
Radio Frequency	124.80 / 130.70 MHz

Figure 6: Arial view of FAVM. The arrow indicates the direction of landing. (Source: Google Earth)

1.11 Flight Recorders

1.11.1 The aircraft was fitted with a flight data recorder (FDR) and a cockpit voice recorder (CVR). Both units were retrieved from the aircraft after the serious incident.

1.11.2 The FDR was a Fairchild recorder with serial number 00255.

1.11.3 The CVR was a Fairchild recorder with serial number 59130. The aircraft was airborne for more than an hour and the information recorded on both units was intact.01.06.

1.12 Wreckage and Impact Information

1.12.1 The close circuit television (CCTV) footage that was received from FAVM security management showed the aircraft's approach into the wind at 0553 (time stamped) on Runway 08. The flaps were in the up (0°) position and the aircraft touched down on the gravel (outside the designated landing area), 3m before the beginning of the asphalt runway threshold at a speed of 120 kts (CVR transcript). The aircraft entered the runway and continued to roll before it was brought to a stop approximately 900m from the runway threshold. After shutdown, the FO disembarked from the aircraft through the airstair and noticed that the left MLG drag link had separated because the bolts that secured it had sheared off, this caused the gear to pivot forward (partially collapsed) and, subsequently, damaged the front spar cap.

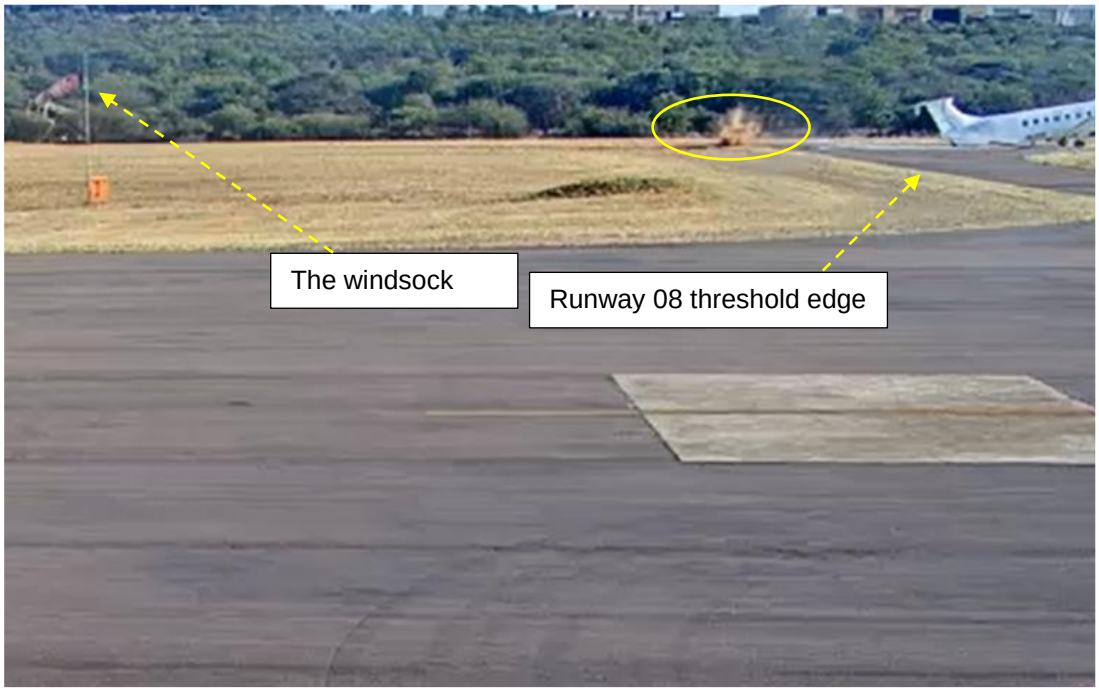


Figure 7: A still picture from the CCTV footage shows the direction of the windsock and a cloud of dust that rose (yellow circle) after the main wheels touched down on the gravel area, short of the runway threshold.

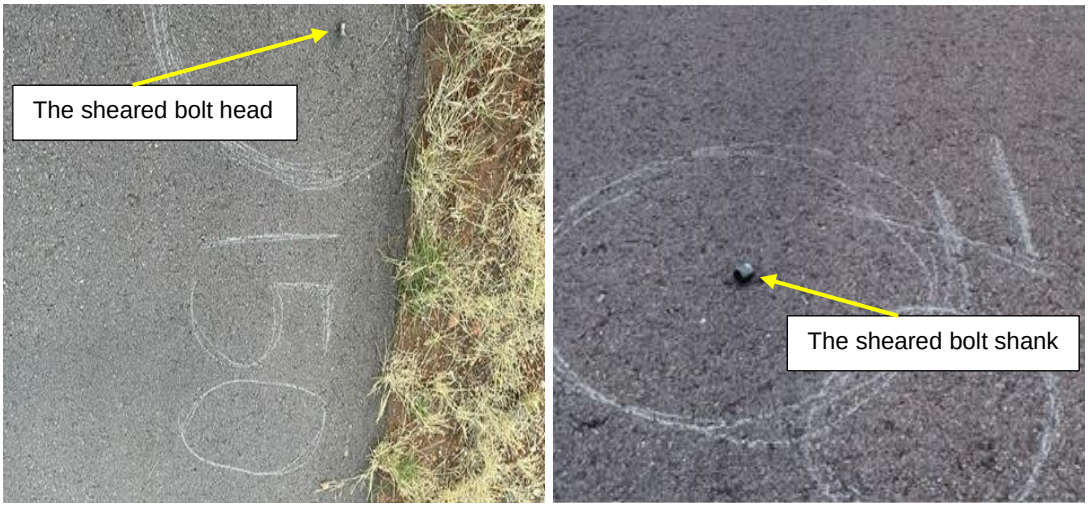
Figure 8: Front view of the aircraft which is leaning to the left, and the left MLG that had pivoted forward.

Figure 9: The replaced left MLG drag brace. The yellow arrows point tothe bolts that secure the drag brace.

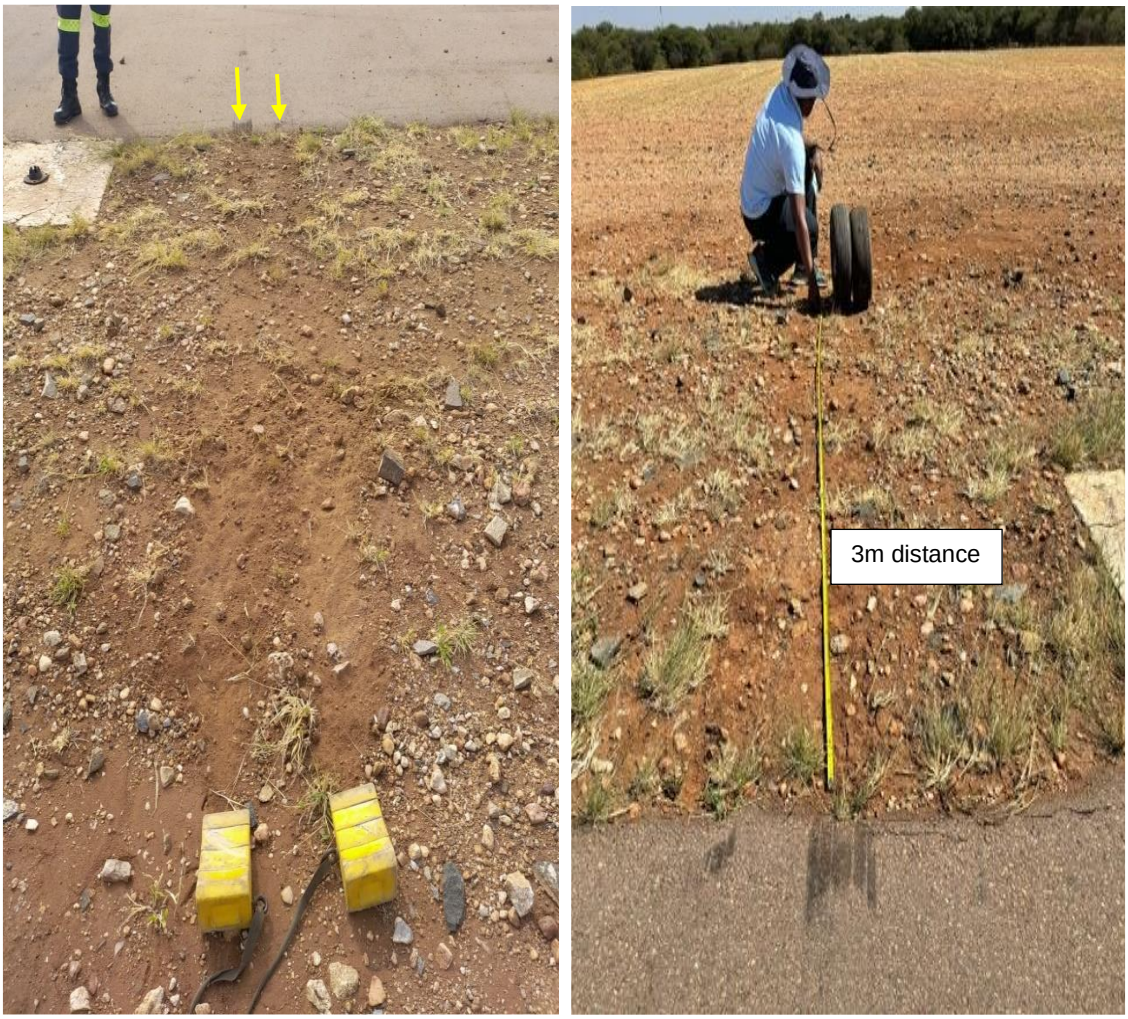
1.12.2 The crew and the airfield security personnel inspected the runway during which the front spar cap material was found approximately 40m from the threshold of Runway 08. The first drag link bolt head that sheared off was found approximately 150m, and the bolt shank piece approximately 70m. After inspecting the left MLG wheel well area, engineers found the remaining piece of the second bolt that had sheared off.

Figures 10 and 11: The left MLG drag brace that was replaced (left picture). The drag brace fasteners that had sheared off (right picture). (Source: Operator)

Figure 12: The yellow arrows point to the piece of the front spar cap and the final position of the aircraft. (Source: Operator)



Figures 13 and 14: The sheared bolt head (left picture) and the sheared bolt shank (right picture).



Figures 15 and 16: The left gear main wheels touchdown point marked with the wheel chocks (left picture). The measured 3m distance between the touchdown point and the runway threshold edge (right picture).

1.13 Medical and Pathological Information

1.13.1 None of the passengers on-board was injured.

1.13.2 None of the crew members had medical conditions during their employment with the airline that would have rendered them unfit for the flight.

1.14 Fire

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

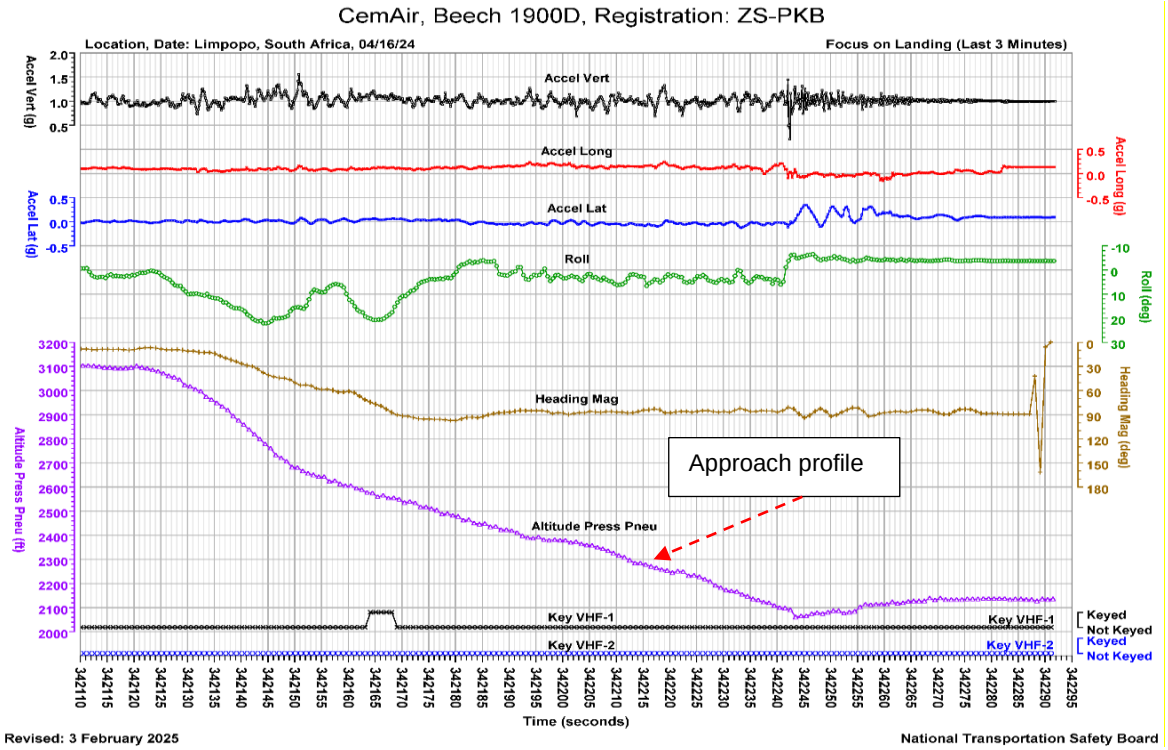
1.15 Survival Aspects

1.15.1 The serious incident was considered survivable as no damage was caused to the cockpit and cabin structure of the aircraft.

1.16 Tests and Research

1.16.1 On Tuesday afternoon, maintenance personnel (engineers) from the operator were flown to FAVM to inspect the aircraft. They brought with them ground support equipment tools and spares that would be needed to carry out their inspection. Upon arrival, the engineers jacked the aircraft's left wing to replace the defective left MLG drag brace with a serviceable one. The gear locked into position and, as a safety precaution, it (the gear) was momentariy secured with a steel bar and cable tie wraps before the aircraft was taxied to the designated parking area for further examination. The primary flight displays were examined and no anomalies were noted. Examination of the aircraft's primary flying controls (from the cockpit mounted yokes and rudder pedal control assemblies to the respective flying control surfaces) did not reveal any evidence of a pre-serious incident flying control system failure or defects. The elevator trim system indicated no anomalies. All aircraft systems, excluding the flaps, were serviceable; they operated and responded as designed throughout the approach and landing phases of the flight. Examination of the components that were recovered from the runway revealed no evidence of any pre-existing defects.

1.16.2 The engineers removed the flight recorders that were fitted to the aircraft. Their batteries were removed before they were sent to the National Transportation Safety Board (NTSB) engineering laboratory in the USA for read-out. The CVR was successfully downloaded and the data was reliable. However, the FDR could not download as expected; therefore, it was downloaded using the lab's surrogate method of recording. Only eight parameters were decoded and validated. The downloaded FDR data was also reliable; however, data from the pitch angle and indicated airspeed during the final approach were invalid and were not included on the graph below.



1.16.3 According to the downloaded FDR data, take-off, cruise and climb were uneventful. At 342.123 seconds, a descent was commenced at top of descent. The approach was recorded; however, the FDR did not record the position of the flaps. The CVR audio was made available to the investigation team during which the crew was heard perfoming the pre-landing checks in accordance with the POH prescriptions. The FO was heard asking the captain: C*an I give you flaps?* The captain's response was*: "Remember we don't have flaps", meaning that the flaps were INOP*.

1.16.4 The investigation team later conducted a separate interview session with the pilots during which one of the crew members informed the investigation team that one of the pilots who flew the last two flights between FAOR and Kenhardt Airport (FAKH) in Northern Cape province on Sunday, 14 April 2024, informed them prior to dispatch from FAOR that ZS-PKB flaps were INOP. The crew member also stated that during their pre-flight checks, they noticed that the flaps were indeed INOP and had briefed on this issue prior to departure from FAOR; however, he could not remember whether they were snagged or deferred. No defect was recorded in the flight folio after the last flight. The pilots had, individually, flown the same aircraft model with a known deferred / INOP flaps in the past. Chapter 27 (flight controls) of the Beechcraft 1900D fleet minimum equipment list (MEL) specifies that the aircraft can be flown with INOP flaps provided they are in a full up (0°) position and appropriate performance data for no flap take-off and landings is used. The INOP flap defect is, according to the MEL, classified a category 'B' item if deffered, permitting three days of flying.

1.16.5 The CVR audio indicated no communication difficulties between the crew members or between the flight and the responsible person at FAVM. The crew was heard conducting the pre-landing checks; however no pre-landing briefing regarding the flapless landing was

heard. The air speed was affirmed at 2 800ft above the ground. The aircraft descended to below 500ft above ground at a speed of 120 knots. From this point, neither deviation calls were made, nor were there any flight path corrections initiated. This indicated that the pilots were comfortable with the approach profile they were flying. However, immediately after, the aircraft radio altitude auto call-out system annouced 100ft and then 50ft. A few seconds, thereafter, the aircraft touched down (CCTV footage) on the gravel area about 3m from the threshold with the nose pitched up. According to the FDR data, the vertical acceleration slowly reduced to 1.0g and the roll angle settled to about -3.75 degrees. The data recording ended 27 seconds after at 342.292 seconds.

Figure 17: A still picture from a CCTV footage shows the aircraft attitude before touchdown on the gravel area, short of the threshold of Runway 08.

Figure 18: Another still picture from a CCTV footage that shows the aircraft attitude before touchdown on the gravel area, short of Runway 08 threshold.

Figure 19: The CCTV footage shows the aircraft during touchdown on the gravel area.

1.17 Organisational and Management Information

1.17.1 The flight was conducted IAW the provisions of Part 135 of the CAR 2011 as amended.

1.17.2 The last 200-hour third interval maintenance inspection of the aircraft was certified on 14 March 2024 at 38 913.54 total airframe hours. The aircraft had accumulated 38 914.64 airframe hours at the time of the serious incident, which meant that the aircraft had accrued 1.1 hours since the last inspection.

1.17.3 The aircraft was issued the Certificate of Release to Service (CRS) on 14 March 2024 with an expiry date of 14 April 2026 or at 39 107.54 airframe hours, whichever occurs first.

1.17.4 The AMO that conducted the inspection prior to the serious incident flight had an approved AMO Certificate that was issued by the SACAA on 2 April 2024 with an expiry date of 31 March 2025.

1.17.5 The AMO had A, B, C, W, X and X5 ratings.

1.17.6 The operator had an Air Operating Certificate (AOC) which was issued by the SACAA on 8 January 2024 with an expiry date of 30 November 2024.

1.17.7 The aircraft was listed on the Operations Specifications certificate which was issued by the SACAA with an effective date of 26 May 2023. The aircraft was duly authorised to be operated under the AOC.

1.17.8 The operator had a safety management system (SMS) approved by the Regulator.

1.18 Additional Information

1.18.1 Rectification of Unsatisfactory Items
Part 43.02.4

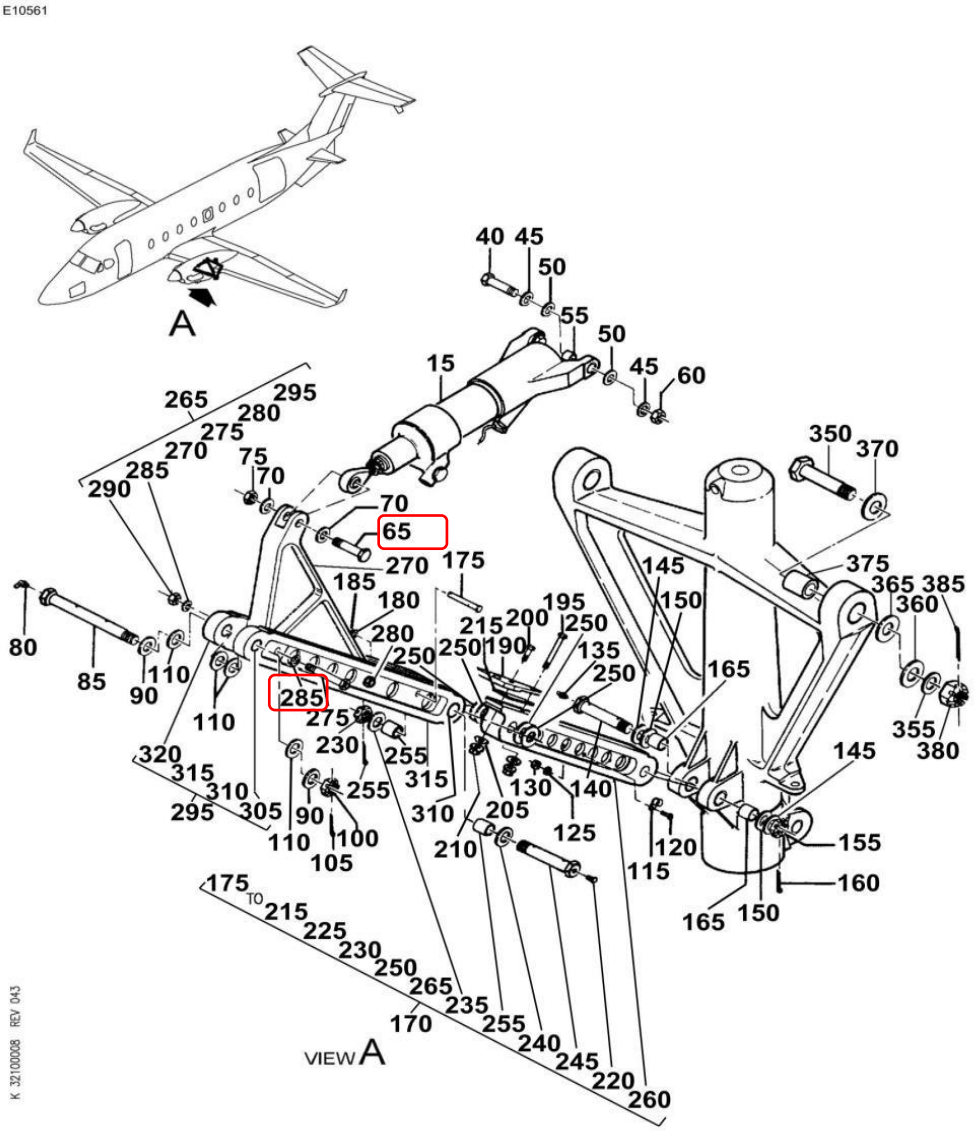
(1) When during any maintenance or at any other time any part, product, component, equipment or item is found to be unserviceable or is unlikely to remain serviceable under normal operating conditions during the period preceding the next inspection, such rectification action as considered necessary shall be taken to ensure the continued serviceability of the part, component or item prior to releasing the aircraft to service.
(2) Deferred defects shall be transferred from the flight folio onto a work sheet. Any maintenance carried out to restore the serviceability of any part, component, equipment or item shall be clearly recorded in the relevant logbook or other approved recording system, and be certified by an appropriately rated licence or approval holder prior to releasing the aircraft to service.
(3) The person certifying the entry referred to in sub-regulation (2) shall furthermore certify in the relevant flight folio that the deferred defect has been rectified, and he or she shall date and sign the entry accordingly.

1.18.2 Crew Resource Management (CRM) Discription (Source: Fairchild SA227-AC Metro III, C-FLRY accident report)

The flight deck of a multi-crew aircraft is a dynamic, challenging workplace where flight crews are constantly interacting with the aircraft, the environment, and each other. Crew resource management (CRM) is about making effective use of the resources available—human, hardware, and information—to manage the hazards and challenges that can arise during any flight. According to the International Civil Aviation Organization (ICAO), CRM has as its fundamental purpose "to improve flight safety through the effective use of error management strategies in individual as well as systemic areas of influence" and proposes the integration of threat and error management (TEM) into modern CRM training. TEM is a conceptual framework regarding aviation operations and human performance, and can be used in different contexts, including flight deck operations and occurrence investigations. Three basic components of TEM are the management of threats, errors, and undesired aircraft states. The premise is that operational hazards are a normal, inherent and predictable aspect of flight operations, creating threats to safety that must be proactively identified and mitigated.

If an error occurs, the error is identified and mitigated appropriately and, if an undesired aircraft state develops, then it is identified and mitigated using emergency procedures.

1.18.3 The Illustrated Parts Catalogue (IPC) below shows the left main gear and the explanation of some of the part numbers.



			ATTACHING PARTS		
40	130909B169	.	BOLT	FE	2
45	AN960-716	.	WASHER ALTERNATE SPARE: NAS1149F0763P	FE	4
45	NAS1149F0763P	.	WASHER ALTERNATE SPARE: AN960-716	FE	4
50	AN960-716L	.	WASHER MINIMUM OF ONE AT EACH ATTACH POINT ALTERNATE SPARE: NAS1149F0732P	FE	AR
50	NAS1149F0732P	.	WASHER MINIMUM OF ONE AT EACH ATTACH POINT ALTERNATE SPARE: AN960-716L	FE	AR
55	114-810041-1	.	BUSHING	FE	2
60	130909N26	.	NUT ALTERNATE SPARE: 130909N39	FE	2
60	130909N39	.	NUT ALTERNATE SPARE: 130909N26	FE	2
65	130909B163	.	BOLT	FE	1
70	AN960-816L	.	WASHER ALTERNATE SPARE: NAS1149F0832P	FE	2
70	NAS1149F0832P	.	WASHER ALTERNATE SPARE: AN960-816L	FE	2
75	130909N44	.	NUT	FE	1
80	MS15001-4	.	FITTING-LUBRICATION ALTERNATE SPARE: AS15001-4-P AS15001-4-C	FE	1
			--*--		
80	AS15001-4-P	.	FITTING-LUBRICATION ALTERNATE SPARE: MS15001-4 AS15001-4-C	FE	1

250	NAS1149F1232P	. .	WASHER ALTERNATE SPARE: AN960-1216L	FE	4
255	114-810038-1	. .	BUSHING	FE	2
260	114-810027-1	. .	LEG-LOWER, DRAG	FE	1
265	114-810024-1	. .	LEG ASSY-UPPER, DRAG	FE	1
270	114-810026-1	. . .	ARM	FE	1
			ATTACHING PARTS		
275	NAS1307-36	. . .	BOLT	FE	1
280	NAS1307-32	. . .	BOLT	FE	1

1.18.4 Traffic Alert and Collision Avoidance System (TCAS) (Source: National Business aviation association [NBAA]).

The Traffic Alert and Collision Avoidance System (TCAS), also known as the Airborne Collision Avoidance System (ACAS) is an airborne system designed to increase cockpit awareness of nearby aircraft and service as a last defense against mid-air collisions. The system monitors airspace around an aircraft for other transponder-equipped aircraft that may present a collision threat. The TCAS operates independently of ground-based equipment to provide pilots with guidance on how to avoid a potential collision.

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

2.2 Analysis

2.2.1 Man

Records indicated that the flight crew was certified and qualified for the flight in accordance with the regulations. The flight crew pairing for the occurrence flight met the regulatory requirements, given that both pilots had completed their training consolidation period and line check. No evidence indicated any pre-existing medical or physical condition that might have adversely affected their performance during the occurrence flight. Based on the review of the flight crew's work and rest schedules, fatigue was not considered a factor in this occurence. The captain had an Airline Transport Pilot Licence (ATPL) that was issued by the SACAA on 25 September 2023 with an expiry date of 30 September 2024. The captain was issued a Class 1 aviation medical certificate on 26 October 2023 with an expiry date of 31 October 2024; he had no medical restrictions listed on his pilot licence. The FO was initially issued a Private Pilot Licence (PPL) by the Regulator on 13 June 2022. The FO had a Commercial Pilot Licence (CPL) that was issued on 4 December 2023 with an expiry date of 31 December 2024. The FO was issued a Class 1 aviation medical certificate on 26 October 2023 with an expiry date of 31 October 2024. The FO had no medical restrictions listed on his pilot licence.

2.2.2 Aircraft

The aircraft was on a charter flight from FAOR in Gauteng province with the intention to land at FAVM in Limpopo province. The aircraft flight folio, page serial number 26791, revealed that 1 177 litres (l) of Jet A1 fuel was uplifted to make 3 150 lbs total fuel in the tanks. Maintenance records indicated that on 14 March 2024, the last 200-hour third interval maintenance inspection of the aircraft was certified at 38 913.54 total airframe hours. The AMO that conducted the inspection prior to the serious incident flight had an approved AMO certificate that was issued by the SACAA on 2 April 2024 with an expiry date of 31 March 2025. Records indicated that all applicable Airworthiness Directives (ADs) and Mandatory Service Bulletins (SBs) were complied with as on the date of the serious incident. The weight

of the aircraft was below the maximum gross weight allowed and the centre of gravity of the aircraft was within the prescribed limits. The flight folio, with page serial number 26790, which indicated a return flight between FAOR and FAKH on Sunday, 14 April 2024, had no defects or deferred maintenance items recorded after shutdown at FAOR.

2.2.3 Operator

The operator provided crew resource management (CRM) training and threat and error management (TEM) training through the SACAA-approved ATO. Training included ground school and flight simulations.

2.2.4 Conclusion

The crew were aware that the aircraft flaps were INOP and they had briefed on this issue before departure from FAOR. The flap defect appeared to have been viewed as a minor hindrance and was communicated to the flight crew members each time the aircraft was scheduled but was not documented in any of the aircraft technical logs as required in Part 43.02.4 of the CAR (2011) as amended. Upon approaching their destination (FAVM), the crew were provided with the updated weather information which favoured Runway 08. The crew completed the approach and landing briefing. The CVR, however, did not provide adequate evidence that the crew completed adequate planning for the flapless landing. According to the captain, to maximise the available roll-out distance, they planned to touchdown on the designator area just after the threshold markings, followed by the use of the reverse thrust. The FDR data showed the aircraft descending and the CVR audio revealed that the crew confirmed the aircraft approach speed at 120 kts which was below the required speed of 134 kts for a flapless approach. Consequently, the inadequate speed resulted in a higher than normal sink rate and at no point during the final approach did the crew recognise that they were on an unsafe flight path. The crew could have increased power and executed a go-around. The aircraft TCAS announced a height of 50ft 1 minute before touchdown; meaning that the aircraft approach was shallow and incorrect (see Figures 17,18 and 19). There were no calls for corrections because everything was considered to be within the planned approach.

3. CONCLUSION

3.1 General

From the available evidence, the following findings, causes and contributing factors were made with respect to this accident. 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 serious incident sequence, but they are not always causal or indicate deficiencies.
- **Causes —** are actions, omissions, events, conditions, or a combination thereof, that 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 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

Crew

3.2.1 The captain was issued a Class 1 aviation medical certificate on 26 October 2023 with an expiry date of 31 October 2024. The captain had no medical restrictions listed on his pilot licence.

3.2.2 The captain's last proficiency check on a Beechcraft 1900D aircraft was provided by the operator on 3 April 2024; the captain was assessed as competent in all aspects.

3.2.3 The first officer (FO) had a Commercial Pilot Licence (CPL) that was issued on 4 December 2023 with an expiry date of 31 December 2024.

3.2.4 The FO was issued a Class 1 aviation medical certificate on 26 October 2023 with an expiry date of 31 October 2024. The FO had no medical restrictions listed on his pilot licence.

3.2.5 The FO's last proficiency check on the Beechcraft 1900D aircraft was provided by the operator on 4 January 2024; the FO was assessed as competent in all aspects.

3.2.6 The crew was current on their CRM; however, during this flight they failed to demonstrate the principles of promoting safety and keeping the aircraft and occupants out of danger at all times.

Aircraft

3.2.7 The flight was conducted IAW the provisions of Part 135 of the CAR 2011 as amended.

3.2.8 The aircraft had a valid Certificate of Registration (C of R) that was issued on 26 April 2013.

3.2.9 The aircraft had a valid Certificate of Airworthiness (C of A) that was initially issued on 15 December 2004; the latest reissued C of A had an expiry date of 29 August 2024.

3.2.10 All relevant Airworthiness Directives (ADs) and Mandatory Service Bulletins (SBs) were complied with as on the date of the serious incident.

3.2.11 The last 200-hour third interval maintenance inspection of the aircraft was certified on 14 March 2024 at 38 913.54 total airframe hours. The aircraft had accumulated 38 914.64 airframe hours at the time of the serious incident which meant that it had accrued 1.1 hours since the last maintenance inspection.

3.2.12 The aircraft was issued the CRS on 14 March 2024 with an expiry date of 14 April 2026 or at 39 107.54 airframe hours, whichever occurs first.

3.2.13 The AMO that conducted the inspection prior to the serious incident flight had an approved AMO Certificate that was issued by the SACAA on 2 April 2024 with an expiry date of 31 March 2025.

3.2.14 The AMO had A, B, C, W, X and X5 ratings.

3.2.15 The operator had an Air Operating Certificate (AOC) which was issued by the SACAA on 8 January 2024 with an expiry date of 30 November 2024.

3.2.16 The aircraft was listed on the Operations Specifications certificate which was issued by the SACAA with an effective date of 26 May 2023.

3.2.17 The weight of the aircraft was below the maximum gross weight allowed and the centre of gravity of the aircraft was within the prescribed limits. The loading of the aircraft did not impose any unusual stress on the aircraft or contribute materially to the occurrence.

3.2.18 The aircraft had a known flap defect which was not documented in any of the aircraft technical logs as required by Part 43.02.4 of the CAR (2011) as amended. Moreover, the nature of the defect was not known.

Organisation

3.2.19 It was not the first time the crew flew with the aircraft with INOP flaps; however, on the day of the occurrence, they confirmed knowledge of INOP flaps but never saw the need to follow regulation and document the defect as required by Part 43.02.4 of the CAR (2011) as amended.

3.2.20 The aircraft technical logs were examined and there was no entry of an unserviceable flap defect or deferred record.

Environment

3.2.21 Fine weather conditions prevailed at the time of the flight; the weather had no bearing to this serious incident.

Aerodrome

3.2.22 FAVM is a licensed airfield.

3.3 Probable Cause

3.3.1 Incorrect approach speed (Vref) for flapless landing configuration resulted in a high sink rate and, thus, the subsequent hard landing on the gravel area, about 3m before the threshold of the Runway 08.

3.4 Contributory Factors

3.4.1 The crew's failure to recognise that they were on an unsafe profile during the final approach and the decision not to execute a go-around.

3.4.2 Poor airmanship.

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

4.2.1 It is recommended to the Director of the South African Civil Aviation Authority (SACAA) that effective oversight be exercised by the Regulator at the operator in question because of the likely adoption norm of not documenting certain defects/deficiencies as required by Part 43 of the Civil Aviation Regulations (CAR) 2011 as amended. This highlights an increased risk that safety deficiencies will not be identified and properly addressed.

4.2.2 The SACAA needs to ensure that comprehensive audits of its operators' SMS are conducted to ensure that deficiencies are identified and effectively mitigated.

5. APPENDICES

5.1 CVR transcript

5.2 Approach and go-around procedures/checklist:

This report is issued by:

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

KEM001				
Key: PM-Pilot Monitoring PF-Pilot Flying - Air Traffic Control Officer (ATCO) - Venetia Mine Mobile (VMM) on frequency 124-80 MHz				
Time	**From**	**To**	**Message**	Notes
18:23	PM	PF	I am going to call FAVM to ask for surface conditions and ask for RWY26. I see the weather is clearing up.	
18:23	VMM	KEMOO1	Good morning CemAir 001, this is Venetia Mine Venitia Mine mobile…I hear that you are inbound to Venitia mine this morning. Your ETA please	
18:33	KEM OO1	VMM	Very good morning, Sir, ETA 0551 at the moment, would you be so kind to give us some surface information…	
18:41	VMM	KEMOO1	Affirm Sir, thank you very much Sir. We've got clear sky over the field, QNH 1024, temperature 20° and your wind is easterly and south, south easterly, dominating between 090 and 130° on a maximum of 12 knots, Runway 08 and 26 has been inspected. Your recommendation on which runway to use thank you Sir…	
1921	PM	PF	We gonna have to use Runway 08…12 knots …08...	
19:27	KEM OO1	VMM	Copied, thank you very much for the update…QNH 1024 and we will be landing Runway 08…CemAir 001	
19:31	VMM	KEMOO1	Thank you, Sir I will be going out on a final runway inspection. I will be clear on final approach, see you on the ground. Thank you, Sir.	
19:45	KEM OO1	VMM	Copied, thank you very much. We'll call you on final approach. CemAir 001.	
19:52	PM	PF	I forgot his name, but he's a very nice guy!	
20:00	PM	PF	Actually, we are going straight for 08…you can put down to three and half thousand	Instrument setting
20:03	PM	PF	There we go three and half	
			One thousand to go. You just keep a good look out… I think that's the field coming up there…Affirm…I see somewhere around a white patch there… yeah somewhere there. Three and half putting us thousand foot above ground we'll get us all nice and stable setup…we'll get us that speed under nice and control…beautiful	
20:50	PM	PF	There's altitude three and half thousand…speed looking good..	
20:54	PM	PF	And we're about 10 miles	
21:07	PM	PF	Let's go landing gear first actually…ok	Landing

			landing gear speed checks…landing gear down	checks
21:14	PM	PF	Just keep a look out for that runway…I got it I…can you see it? I got it…there by that patch over there…okay cool …prop full forward	PM checking PF
21:33	PM	PF	Prop full forward checks set	
21:45	PM	PF	There we go! Can I give you flaps…remember we don't have flaps…agh fock! I am sorry	
22:05	PM	PF	Can you see it? Not as yet…I am gonna do, I'm gonna go a bit further to our left… put us on 020 is gonna be our right base, happy? Copy that!	
22:38	PM	PF	Anything? Negative	Asking about the airfield
	PM	PF	Sorry man there's a mine over there so if you so if you fly straight for the mine. I looked at the wrong plate my apologies, fock!	
22:51	PM	PF	I haven't flown here for a while 026 confirm speed is good	
23:23	PM	PF	There's we go there's the runway (the other pilot	
23:50	PM	PF	Okay altimeter, I have 1024 on my side and everything cross checked. Nav instrument? set for approach runway 08	
24:17	PM	PF	Checks prop full forward, landing gear three greens. Flaps not applicable…pre landing checks complete. Speed is good. 2800 feet…we are below 500 feet. Call final approach…	
24:53	KEM OO1	VMM	Venetia mine, CemAir 001 on final approach Runway 08…	
25:02	Aircraft annunciator		500	
25:14	Aircraft annunciator		400	
25:16	PM	PF	There's 120 knots	
25:20	Aircraft annunciator		300	
25:37	Aircraft annunciator		200	
25:47	PM	PF	Did you call finals?	
25:53	Aircraft annunciator		100	
25:59	Aircraft annunciator		50	
26:00	Aircraft annunciator		Long Peeep sound, another warning alarm going off	Two alarms at the same time
26:18	PM	PF	It is not clear what the pilots are	The

			saying…either slow or we are low	alarms go on until 27:07 (1m7s)

5.2 Approach and go-around procedures/Cchecklist

Cleared for the approach & on the intercept heading (aircraft with flight director)	Approach mode selected: ***"APPROACH MODE ARMED" (PM to select EADI mode)***	***"ARM APPROACH MODE" (PF selects EADI mode)*** ***"CHECKS"***
At the first indication of the localiser needle movement	***"LOCALISER ALIVE"***	***"CHECKS"***
Once the localiser has captured (LOC turns green or if there is no FD, when the PF turns onto the localiser)	***"LOCALISER CAPTURED"*** Sets runway heading and calls: ***"RUNWAY HEADING SET"***	***"SET RUNWAY HEADING"***
At the first indication of glide slope movement	***"GLIDE SLOPE ALIVE"***	***"CHECKS"***
At half scale fly up	Select gear down & landing lights ON. When three green lights are indicating then call: ***"GEAR DOWN, THREE GREENS"*** Select props full forward and call: ***"PROPS 1700 RPM SET "***	***"GEAR DOWN"*** • IAS 170kts or less ***"PROPS SET 1700 RPM"***
Once the glide slope is captured (GS turns green or if there is no FD when the PF starts the descent to intercept glide slope)	***"GLIDE SLOPE CAPTURED"*** ***"MISSED APPROACH ALTITUDE SET"*** ***"FLAPS 35 ? ....SELECTED"*** Once the flaps are indicating down then call: ***"FLAPS 35 INDICATING"*** Read out the landing checklist and call: ***"LANDING CHECKLIST COMPLETED"***	***"SET MISSED APPROACH ALTITUDE"*** (Confirm missed approach alt is set) ***"SET FLAPS 35"*** Disengage the yaw damper ***"LANDING CHECKLIST"***
At the outer marker OR 1000FT AGL	***Outer marker position checks....alt....ft*** ***or*** ***"1000ft, stable"***	***"CHECK"***
At 500ft AGL	***"500 FEET"***	***"CHECK*** **Confirm:** Gear down Flap 17 or 35 Propeller 1700 Yaw damper off ENG ANTI-ICE on
At 100 feet to minimums (PM looks outside and ahead	**"Approaching minima"**	

MISSED APPROACH FLAPS 35 AEO