SOUTH AFRICAN CIVIL AVIATION AUTHORITY

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

AIRCRAFT INCIDENT REPORT AND EXECUTIVE SUMMARY

				Reference:	CA18/3/2/1206		
Aircraft Registration	ZS-VDP	**Date of Incident**	4 May 2018		**Time of Incident**	0728Z	
Type of Aircraft	Boeing 737-300		**Type of Operation**		Part 121 (Air Transport Operations)		
Pilot-in-command Licence Type	ATPL		**Age**	54	**License Valid**	Yes	
Pilot-in-command Flying Experience	Total Flying Hours		8217		Hours on Type	3026	
Last point of departure	Port Elizabeth International Airport (FAPE), Eastern Cape						
Next point of intended landing	O.R. Tambo International Airport (FAOR), Gauteng						
Location of the incident site with reference to easily defined geographical points (GPS readings if possible)							
75 NM outbound from VOR PEV en-route to FAOR							
Meteorological Information	Wind: $060^0/10^0$kt, Temperature: 19°C, Dew point: 08°C, Visibility: 9999m						
Number of people on board	8+116	**No. of people injured**	0	**No. of people killed**	0		
Synopsis							

On Friday 4th May 2018 at 0728Z, a scheduled domestic flight, flying under the call sign JE536, departed from FAPE, under the provisions of Part 121, to OR Tambo International Airport (FAOR). On board the aircraft were 8 crew members and 116 passengers.

Approximately 75 NM from the VOR "PEV" routing to FAOR, while in the climb to its allocated flight level, the flying crew noticed an anomaly with the cabin pressurisation. After some fault finding, the crew decided to move the rotator switch for the pressurisation control to the standby position. Immediately after the switch had been moved, the outflow valve began moving to the full open position, causing the cabin to depressurise while the aircraft was flying at FL230. The flight crew commenced a rapid descent to FL100 and manually controlled the pressurisation for the remainder of the flight.

Air traffic control was informed of the decompression and the crew requested an air turn-back to FAPE. The aircraft sustained no damage during the incident sequence and no injuries were reported to any of the occupants that were on board the aircraft.

The investigation revealed that the Cabin Pressure Controller (CPC) had failed to modulate the outflow valve to maintain the correct pressure schedule and the failure of the safety valves to open and relief pressure at 8.3Psi differential.

Probable Cause

The primary cause of the loss of pressurisation control was due to a loss of the CPC's ability to correctly modulate the outflow valve position.

The secondary cause of the pressurisation failure, which caused the high cabin pressure differential, was due to the failure of both pressure relief valves. Neither of these valves opened at 8,3 psi to ensure that the cabin differential did not exceed the amber band.

SRP Date	14 AUGUST 2018	Release Date	21 AUGUST 2018

Name of Owner	**:** Star Air Cargo (PTY) Ltd
Name of Operator	**:** Star Air on behalf of Mango Airlines
Manufacturer	**:** Boeing Aircraft Company
Model	**:** B737-300
Nationality	**:** South African
Registration Marks	**:** ZS-VDP
Place	**:** Port Elizabeth International Airport (FAPE), Eastern Cape
Date	**:** 4th May 2018
Time	**:** 0728Z

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

Purpose of the Investigation:

In terms of Regulation 12.03.1 of the Civil Aviation Regulations (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 establish blame or liability.***

Disclaimer:

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

1. FACTUAL INFORMATION

1.1 History of Flight

1.1.1 On Friday 4th May 2018 at 0728Z, a scheduled domestic flight, flying under the call sign JE536, departed from Port Elizabeth International Airport (FAPE), under the provisions of Part 121, to OR Tambo International Airport (FAOR). On board the aircraft were 8 crew members and 116 passengers. The crew composition was 2 flying crew, 5 cabin crew and 1 travelling technician.

1.1.2 The flight was conducted under instrument flight rules (IFR) due to the flight level requested (all flights between FL290 and FL410 are to operate under IFR due to reduced vertical separation minima) and day light conditions prevailing. The aircraft in use was a Boeing 737-300.

1.1.3 Approximately 75 NM from the VOR “PEV” abeam Fort Beaufort in the Eastern Cape, while in the climb to its allocated flight level, the flying crew noticed the cabin differential pressure indicator was in the amber band (see Figure 3). The rate of cabin pressure change had remained at zero. The cabin pressure remained at approximately 230 ft., which is the elevation of FAPE.

1.1.4 After some fault finding, the crew decided to move the rotary switch for the pressurisation control from the automatic (AUTO) mode to the standby (STBY) position (see Figure 4). Immediately after the switch had been moved, the outflow valve began moving to the full open position, causing the cabin to depressurise while the aircraft was passing FL230. The flight crew commenced a rapid descent to FL100. The aircraft flew the remainder of the flight in an unpressurised configuration.

1.1.5 Air traffic control was informed of the cabin decompression and the crew requested an air turn-back to FAPE, upon which an uneventful landing was carried out.

1.1.6 The aircraft sustained no damage during the incident sequence and no injuries were reported to any of the occupants that were on board the aircraft.

Figure 1: Photograph of the Boeing 737-300 Source: jetphotos.net

Figure 2: The location of the pressurisation control on the overhead panel

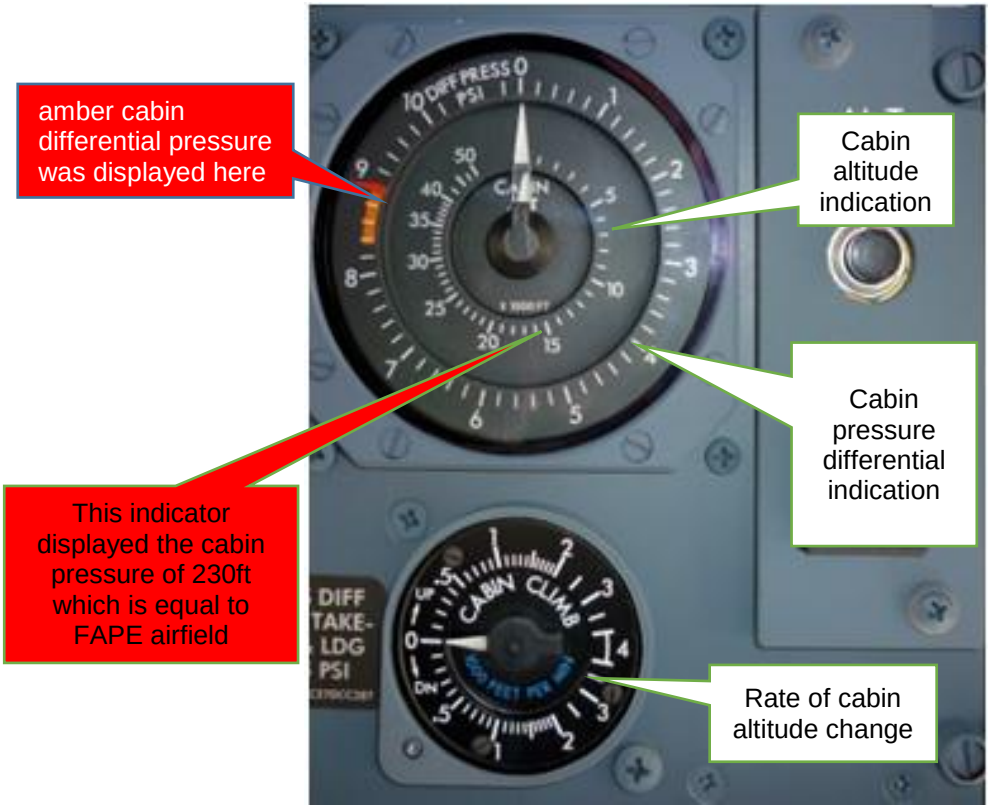


Figure 3: The visual indicators displaying the cabin altitude, the cabin pressure and the rate of cabin altitude change

Source: B737.org.uk

Figure 4: The aircraft pressurisation controls

1.2 Injuries to Persons

Injuries	Pilot	Crew	Pass.	Others
Fatal	-	-	-	-
Serious	-	-	-	-
Minor	-	-	-	-
None	2	6	116	0

1.3 Damage to Aircraft

1.3.1 No damage was sustained to the aircraft.

1.4 Other Damage

1.4.1 No other damage was sustained.

1.5 Personnel Information: Pilot in Command

Nationality	South African	Gender	Male	Age	54
Licence Number	0270277650	Licence Type		Airline Transport Pilot	
Licence valid	Yes	Type Endorsed		Yes	
Ratings	Night, Instrument, MNPS/RVSM				
Medical Expiry Date	2018/12/31				
Restrictions	Corrective lenses				
Previous Accidents	Nil				

Flying Experience:

Total Hours	8217
Total Past 90 Days	176
Total on Type Past 90 Days	176
Total on Type	3026

Personnel Information First Officer

Nationality	South African	Gender	Male	Age	28
License Number	0272325366	Licence Type		Airline Transport Pilot	
Licence valid	Yes	Type Endorsed		Yes	
Ratings	Night, Instrument, MNPS/RVSM, RNP-APCH				
Medical Expiry Date	31 January 2019				
Restrictions	None				
Previous Accidents	Nil				

Flying Experience:

Total Hours	2708,3
Total Past 90 Days	90,1
Total on Type Past 90 Days	90,1
Total on Type	90,1

1.6 Aircraft Information

Airframe:

Type	B737-300	
Serial Number	27346	
Manufacturer	Boeing Aircraft Company	
Date of Manufacture	1994	
Total Airframe Hours (At time of Accident)	56655.70	
Last MPI (Date & Hours)	18 December 2017	56513.63
Hours since Last MPI	142.07	
C of A (Issue Date)	18 November 2011	
C of R (Issue Date) (Present owner)	12 April 2012	
Operating Categories	Standard Part 121	

Engine 1:

Type	CFM56-3C1
Serial Number	725272
Hours since New	60568.22

Engine 2:

Type	CFM56-3C1
Serial Number	725193
Hours since New	61926.55

1.7 Meteorological Information

Wind direction	060°	Wind speed	10 knots	Visibility	9999 m
Temperature	19°C	Cloud cover	N/A	Cloud base	N/A
Dew point	08°C				

1.8 Aids to Navigation

The aircraft was equipped with standard navigation equipment as approved by the regulator for the aircraft type and operation. No defects that could render the navigation system unserviceable were recorded before or during the flight.

1.9 Communications

1.9.1 The crew had been in contact on the Very High Frequency (Vhf) radio system to Cape Town East Flight Information Region (124.7MHz). The first hand-over was to Port Elizabeth Approach (120.40 MHz) and lastly to Port Elizabeth Tower (118.10 MHz).

1.10 Aerodrome Information

Aerodrome Location	Port Elizabeth, Eastern Cape	
Aerodrome Co-ordinates	33°59'24.05"S 025°36'37.00"E	
Aerodrome Elevation	229 ft.	
Runway Designations	08/26	17/35
Runway Dimensions	1980x46 m	1677x46 m
Runway Used	Runway 08	
Runway Surface	Asphalt	
Approach Facilities	VOR, ILS	

1.11 Flight Recorders

1.11.1 The aircraft was equipped with a flight data recorder (FDR) and a cockpit voice recorder (CVR). No information was downloaded from either of these devices for the purpose of this investigation, as the aircraft remained in service following the incident.

1.11.2 The flight operations quality assurance (FOQA) event was provided for the time of the incident. (See Appendix E)

1.12 Wreckage and Impact Information

1.1.12 Not applicable

1.13 Medical and Pathological Information

1.1.13 Exposure to low oxygen levels at FL230 were minimised due to the rapid descent to FL100.

1.14 Fire

1.1.14 Not applicable

1.15 Survival Aspects

1.15.1 The flying crew had access to oxygen masks. These masks supply a positive flow of oxygen from a bottle located in the forward cargo compartment. The system worked normally and no faults were reported.

1.15.2 The passengers had access to drop-down oxygen masks from the overhead passenger service units (PSUs). The PSUs above rows 4DEF and 24DEF had not opened and deployed the masks. An elderly female passenger sitting in seat 4E was given a mask from row 5DEF. The forward lavatory mask also did not deploy, but the lavatory was not occupied at the time of the incident.

1.15.3 The cabin crew had access to drop-down masks for immediate use. Portable oxygen bottles are were also available. The drop-down masks at the forward cabin crew station dropped down, but when pulled to activate the oxygen flow, no flow was noted.

1.15.4 The decompression occurred at FL230, but a rapid descent was made to minimise exposure time to high altitude thinner air.

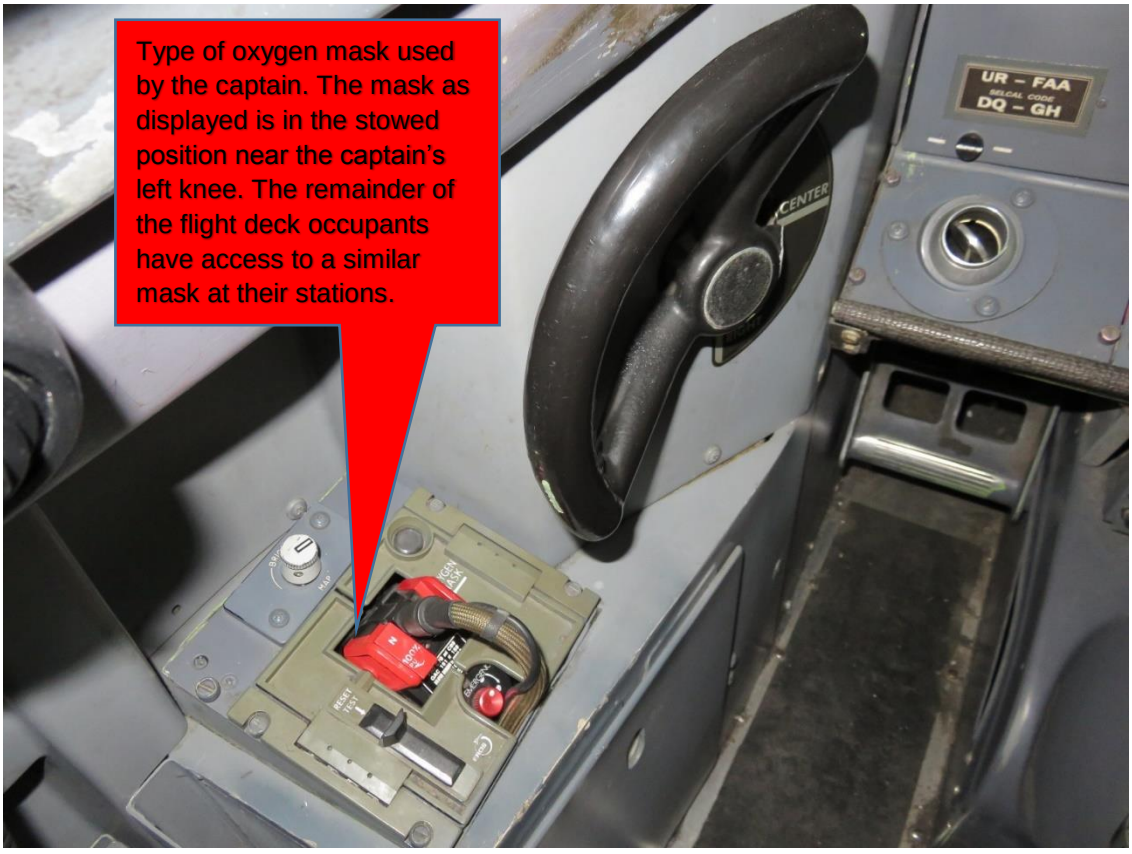


Figure 5: Flight deck crew oxygen masks

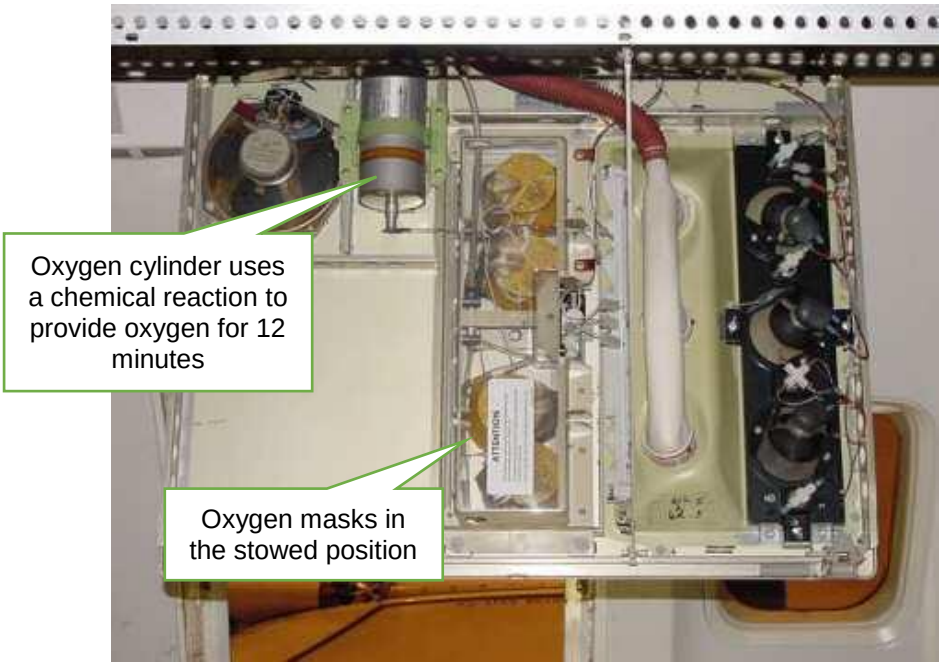


Figure 6: Passenger oxygen mask. Similar masks are fitted above the cabin crew stations and in the lavatories
Source: B737.org.uk

1.16 Tests and Research

1.16.1 The two pressure relief valves were inspected and tested for correct operation and recertified. All operations are now normal (see appendix D).

1.16.2 After replacing the CPC, the outflow valve was tested. All operations were than normal.

1.16.3 A new pressure control panel was installed for troubleshooting purposes. Once the fault was isolated to the CPC, the original control panel was re-installed.

1.17 Organisational and Management Information

1.17.1 Flying Crew:

The flying crew had complied with the Boeing 737 Flight Crew Operations Manual (FCOM). The chapter utilised was Non-Normal Checklists, Chapter 2, Air systems. An emergency descent was carried out and the remainder of the flight was flown at FL100 in an unpressurised state. The PIC carried out the required crew briefings and kept all crew updated with the cause and correction of the incident.

1.17.2 Cabin Crew:

The cabin crew had returned to their stations to use the oxygen during an emergency descent. On completion of the process, the senior cabin crew member addressed the passengers about removing the oxygen masks, notifying them that if any passenger needed assistance they should get the attention of a cabin crew member. A cabin walk-about was completed and the cabin was prepared for landing.

1.17.3 Safety Manager:

The safety manager had notified the Accident and Serious Incident Department (AIID) immediately of the incident. All relevant information was provided by the safety manager, who also set up all the required interviews and follow-ups.

1.17.4 Quality Assurance Manager, Star Air Maintenance:

The quality assurance manager provided prompt feedback about the technical actions taken to correct the pressurisation fault.

The fault corrective actions include:

- Cabin pressure controller replaced. After carrying out a test, all operations were found to be normal.
- Both pressure relief valves were removed and sent for testing.

The associated faults, which occurred due to the decompression, include:

- Row 4DEF and row 24DEF did not drop out. The corrective action carried out included an inspection of the PSU and a drop test. All operations are now normal.
- Forward lavatory mask did not drop out. During inspection, it was found that the panel had been poorly masked during painting. This caused excessive paint to harden and prevent the masks from deploying. The excess paint was removed and the panel tested. All operations were normal

1.18 Additional Information

1.18.1 The aircraft was operating under Mango Airlines (SOC) Ltd. The flight was using a JE call sign that is allocated to Mango.

1.18.2 After correcting the fault in FAPE, the aircraft was ferried back to FAOR.

1.18.3 To facilitate technical coverage, the operator carries a travelling technician on board to stations where there is no technical assistance. The travelling technician had no role or responsibilities during operation of the aircraft in flight.

1.19 Useful or Effective Investigation Techniques

1.19.1 Not applicable

2. ANALYSIS

2.1 Based on the crew interviews the following sequence of events occurred:

On the cruise from FAOR to FAPE the aircraft cabin differential pressure reached 9,4 psi. This was observed while cruising at FL360. The cabin pressure was equal to that of the station of departure (FAOR). The cabin pressure read field elevation of 5550 ft. The crew reported that the pressure was being controlled automatically and the AUTO FAIL light did not illuminate. Due to the AUTO FAIL light not illuminating, a master caution warning was not generated. In order to get the pressure differential back into the safe range the crew descended to FL340 and again to FL320 where the differential exited the amber band. On the descent into FAPE, which is at sea level, the aircraft pressure schedule was not followed and the aircraft depressurised through the negative outflow valve. It is suspected that both pressure relief valves had failed to keep the differential out of the amber band.

On the ground during troubleshooting, when the control selector was moved to the STBY mode, the outflow valve moved to the full open position, and when moved back to the AUTO mode the outflow valve moved to the full closed position. The crew assumed that the outflow valve was operating correctly and chose to dispatch the aircraft back to FAOR. The manual system was not tested to verify operations. The aircraft had a turnaround time of 30 minutes and departed FAPE on schedule with no delay.

After departure on the return leg, the crew actively monitored the cabin pressure differential. At FL230 the differential entered the amber band. The PIC decided to switch over to standby mode. At that point the outflow valve began moving to the full open position. A muffled bang occurred, followed by the cabin fogging up. The outflow valve was stopped at approximately the halfway mark, and when the commander selected the MANUAL mode. The outflow valve did not respond to any inputs and remained in the mid position for the remainder of the flight. The cabin depressurised to the ambient outside pressure and the flight returned to FAPE.

2.2 The pressurisation system on the Boeing 737-300 is controlled during all phases of flight by the Cabin Pressure Control System (CPCS). Bleed air via the air-conditioning system is used to supply and distribute air in the cabin. By modulating the outflow valve, pressurisation can be accomplished.

2.3 The pressurisation system comprises of the following components:

- 2 pressure relief valves fitted near the outflow valve. These valves prevent the pressure differential from exceeding 8.65 psi.
- 1 negative relief valve. This prevents the outside atmospheric pressure from exceeding the cabin pressure.
- 1 flow control valve, which acts as an exhaust for the electronics and equipment bay. This valve closes when the cabin differential pressure is 2.5 psi or higher. The valve opens on the ground, during unpressurised flight and when the cabin pressure differential is less than 2.5 psi.
- 1 main outflow valve, which is controlled by either an AC motor or a DC motor. The AC motor controls the outflow valve either through the AUTO mode or during MANUAL AC operations. The DC motor drives the outflow valve in the STBY mode or the MANUAL DC mode. A forward outflow valve acts as an exhaust for the forward cargo compartment and is in the full closed position when the main outflow valve is nearing full closed or if the recirculation fans are running.
- A cabin pressure controller (CPC) with four modes of operation:
    - AUTO: All pressurisation operations are automatically accomplished. The AC motor on the main outflow valve is used. This is the normal operating mode.
    - STBY: If an AUTO FAIL occurs, the standby mode will be used. This provides semi-automatic pressurisation control. The main outflow valve is controlled by the DC motor.
    - MAN AC: In the case of the STBY system failing, the crew can manually drive the outflow valve position. This is done using the AC motor.
    - MAN DC: The operation is the same as MAN AC, except in this case the main outflow valve is controlled by the DC motor.

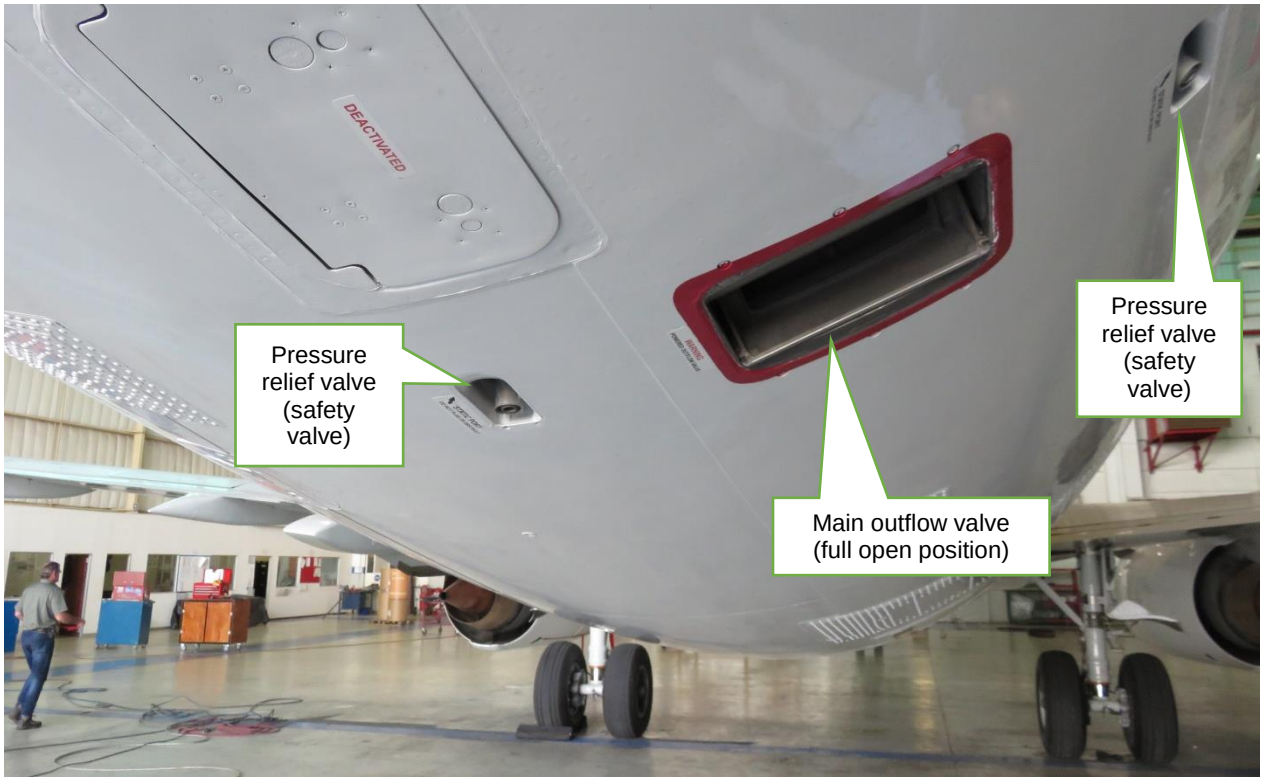


Figure 7: Main outflow valve and two pressure relief valves

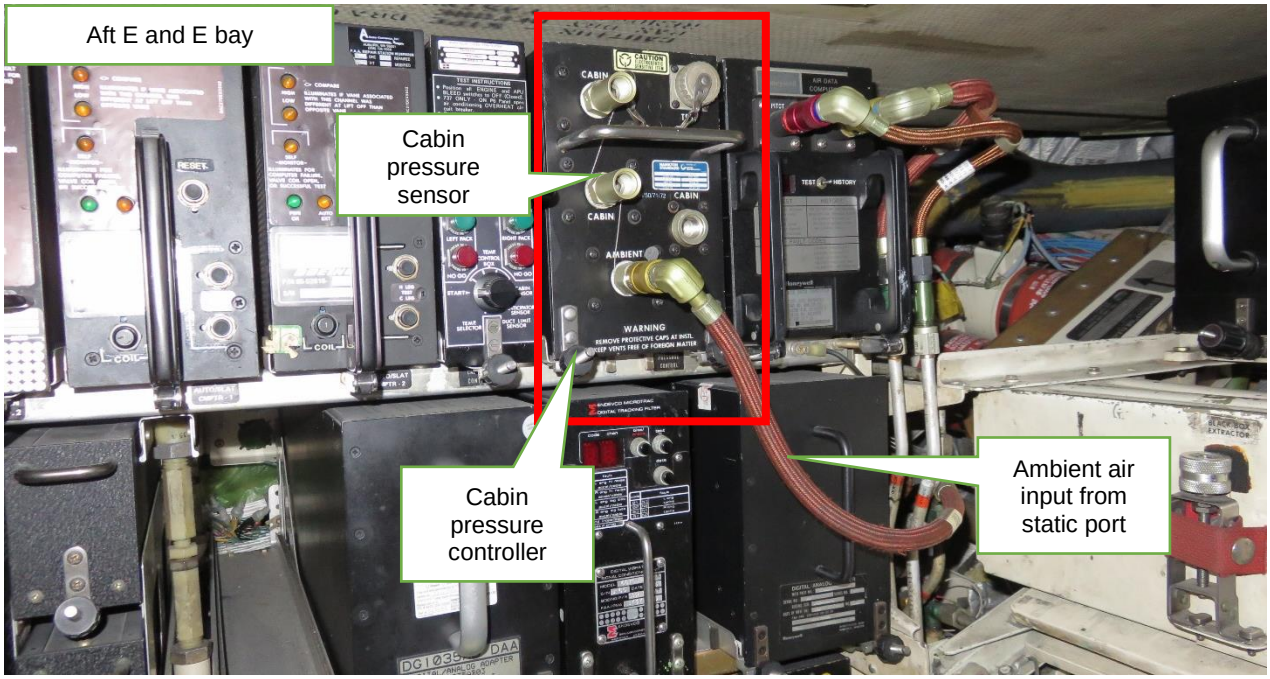


Figure 8: Cabin pressure controller in the Aft E and E bay

2.4 Based on the crew report for the inbound leg from FAOR to FAPE, while the aircraft was in the cruise at FL360, the cabin pressure differential was observed to be in the region of 9,4 psi. The crew descended to FL340 and then on to FL320 to lower the cabin differential pressure. The descent help lower the pressure to below the amber band. Due to this excessive high pressure, it is evident that the two pressure relief valves did not operate as

required.

2.5 On the ground at FAPE, the technician, assisted by the PIC, carried out troubleshooting. The initial assumption was that the outflow valve was “sticky”. On the ground, the crew noticed the valve position change while troubleshooting and regarded this as normal operation. When the selector was moved to STBY the valve moved to the full open position. When the selector was moved to AUTO, the valve moved to the full closed position. The aircraft was then dispatched for the outbound leg to FAOR. The flight deck crew had decided to actively monitor the cabin pressure differential in flight.

2.6 Once airborne, upon passing FL230, the PIC saw the cabin pressure differential entering the amber band. He then selected the STBY mode, which caused the outflow valve to move towards the full open position. This caused the cabin to depressurise. In AUTO mode, the static ports provide the airplane altitude, while in STBY mode, the altitude is gathered electrically from the air data computers (ADC). Due to a failure in the CPC, correct pressure calculations were not achieved, leading to the incorrect positioning of the main outflow valve.

2.7 The investigation revealed that the Cabin Pressure Controller (CPC) had failed to modulate the outflow valve to maintain the correct pressure schedule and the failure of the safety valves to open and relief pressure at 8.3Psi differential.

3. CONCLUSION

3.1 Findings

3.1.1 The pilot in command (PIC) of the flight held a valid Airline Transport Pilot Licence (ATPL) and held the necessary rating to operate the aircraft. The aviation medical certificate of the PIC was valid at the time of the incident.

3.1.2 The first officer (FO) held a valid Airline Transport Pilot Licence (ATPL) and held the necessary rating to operate the aircraft. The aviation medical certificate of the FO was valid at the time of the incident.

3.1.3 The travelling technician on board held a valid Aircraft Maintenance Engineers Licence (AMEL). The technician held the necessary type ratings to carry out maintenance on the aircraft.

3.1.4 The last maintenance check carried out on the aircraft was a 4A Check. This was accomplished on the 20th of December 2017. The aircraft had flown a total of 142,07 hours since then.

3.1.5 The aircraft held a valid certificate of release to service and certificate of airworthiness.

3.1.6 On the inbound leg to FAPE from FAOR, the crew noticed the cabin pressure differential to be in the vicinity of 9,4 psi and decided to carry out troubleshooting on the ground.

3.1.7 Prior to the flight departing from FAOR to FAPE, the aircraft had no historic defects relating to the pressurisation system.

3.1.8 Before selecting the switch to the STBY mode on the pressurisation panel, the AUTO FAIL light had NOT illuminated. The selection was made primarily on a fault-finding bases. The light bulb was functional at the time of the incident.

3.1.9 The last overhaul of the pressure relief valves before the incident was done in February 2014. They were serviced and tested. All operations were normal at the time of certifying the valves for release.

3.1.10 After the incident had occurred, both pressure relief valves were removed for inspection. A bench test was carried out on each unit to check for serviceability. Paint over spray was found in both valves static ports. This was cleaned up prior to the commencement of the test therefore the actual effect of the over spray could not be determined. Both valves "crack" pressure was noted to be too high and was adjusted to the correct "crack" pressure. (refer to Appendix F for work pack extract)

3.1.11 The investigation revealed that the Cabin Pressure Controller (CPC) had failed to modulate the outflow valve to maintain the correct pressure schedule and the failure of the safety valves to open and relief pressure at 8.3Psi differential.

3.2 Probable Cause/s

The primary cause of the loss of pressurisation control was due to a loss of the CPC's ability to correctly modulate the outflow valve position.

The secondary cause of the pressurisation failure, which caused the high cabin pressure differential, was due to the failure of both pressure relief valves. Neither of these valves opened at 8,3 psi to ensure that the cabin differential did not exceed the amber band.

4. SAFETY RECOMMENDATIONS

4.1 No safety recommendations

5. APPENDICES

5.1 Appendix A (Approximate location of the incident)

5.2 Appendix B (Pressure relief valve breakdown)

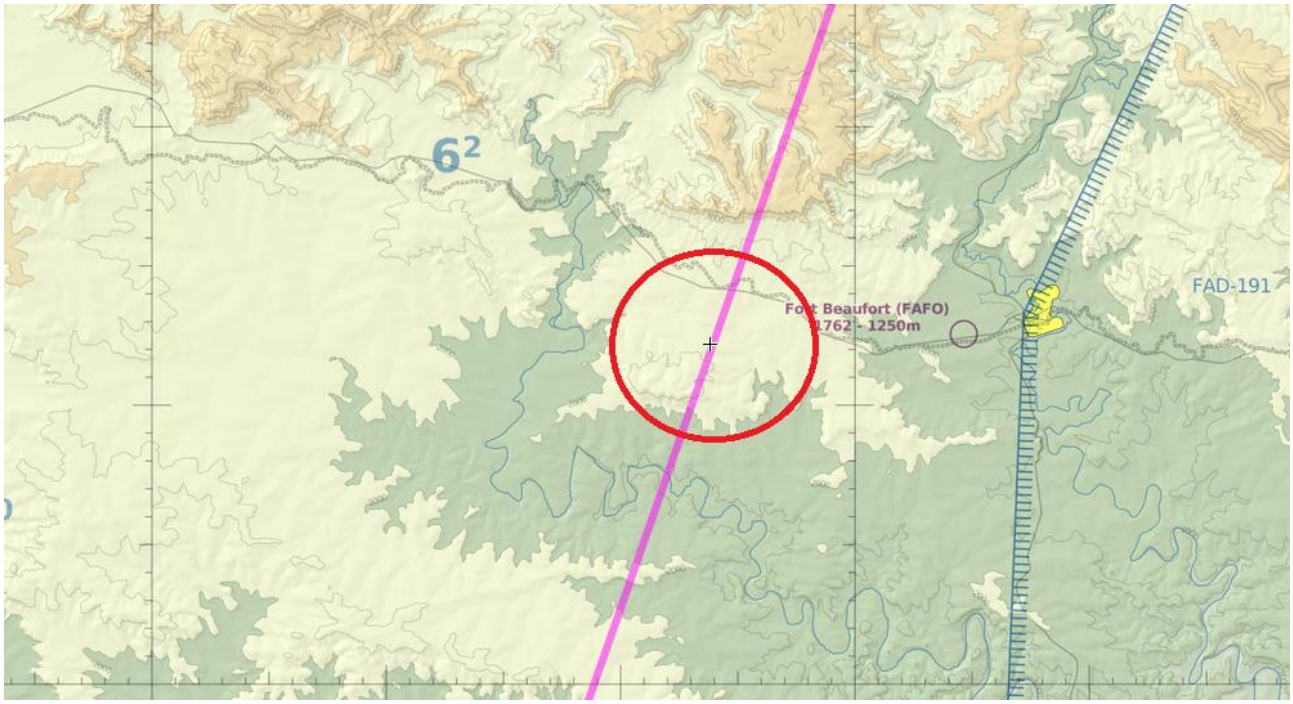
5.3 Appendix C (Outflow valve breakdown)

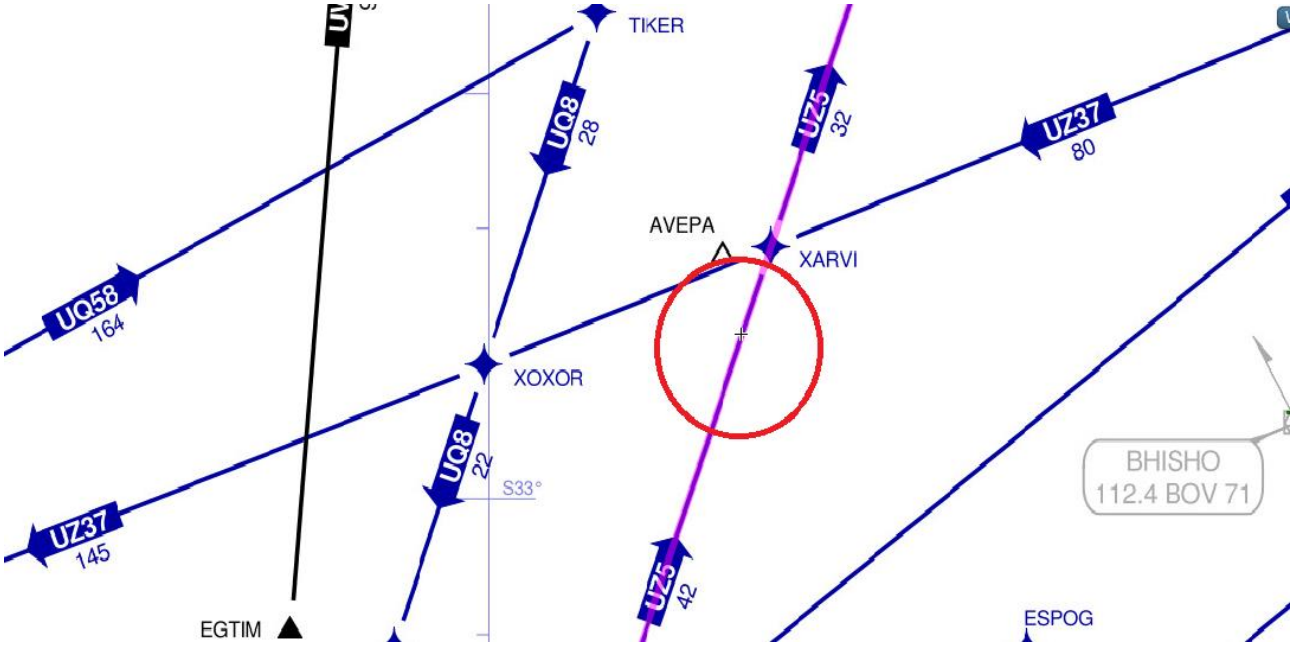
5.4 Appendix D (Pressure relief valve certificate of compliance)

5.5 Appendix E (FOQA event)

5.6 Appendix F (Work pack extract)

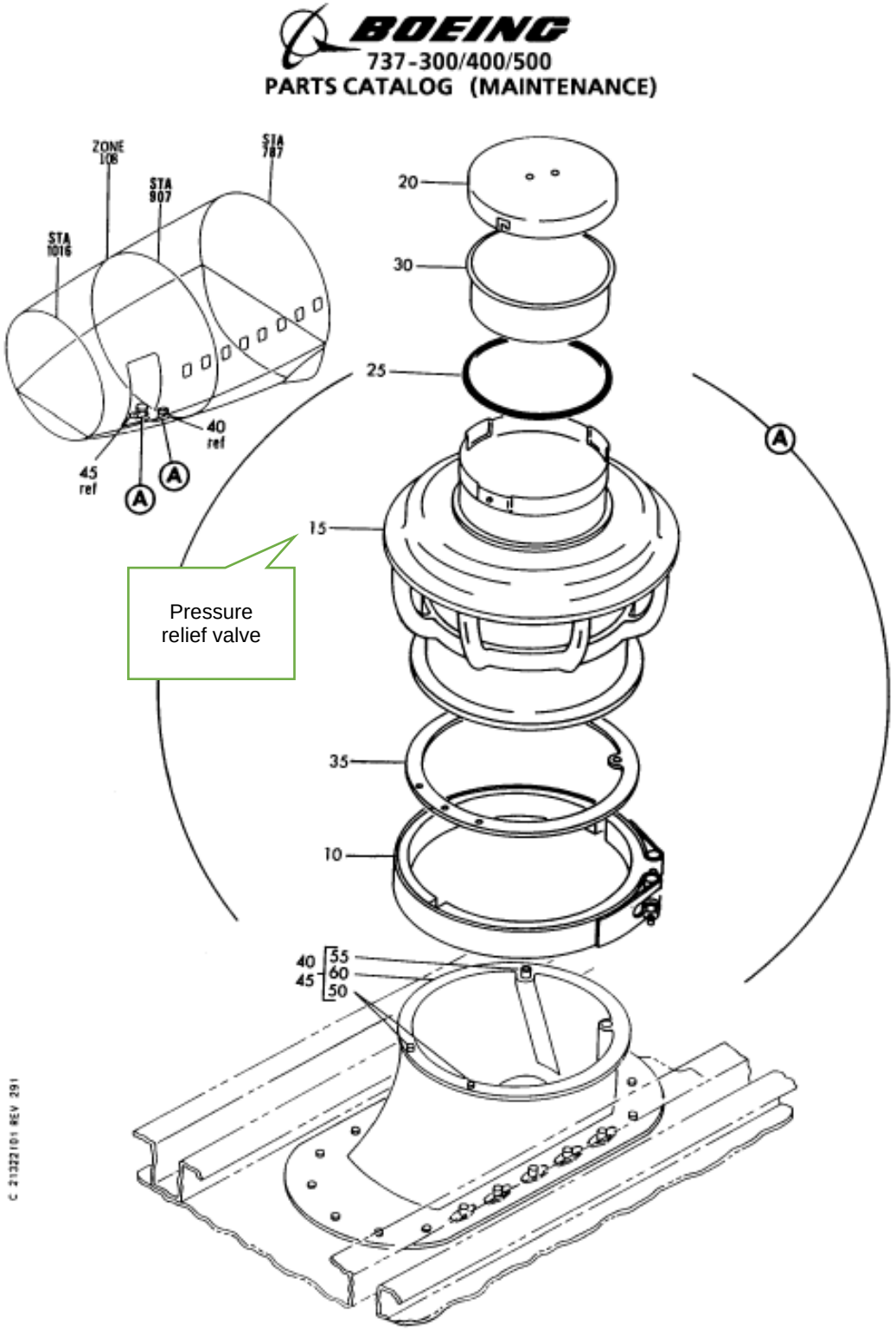
Appendix A





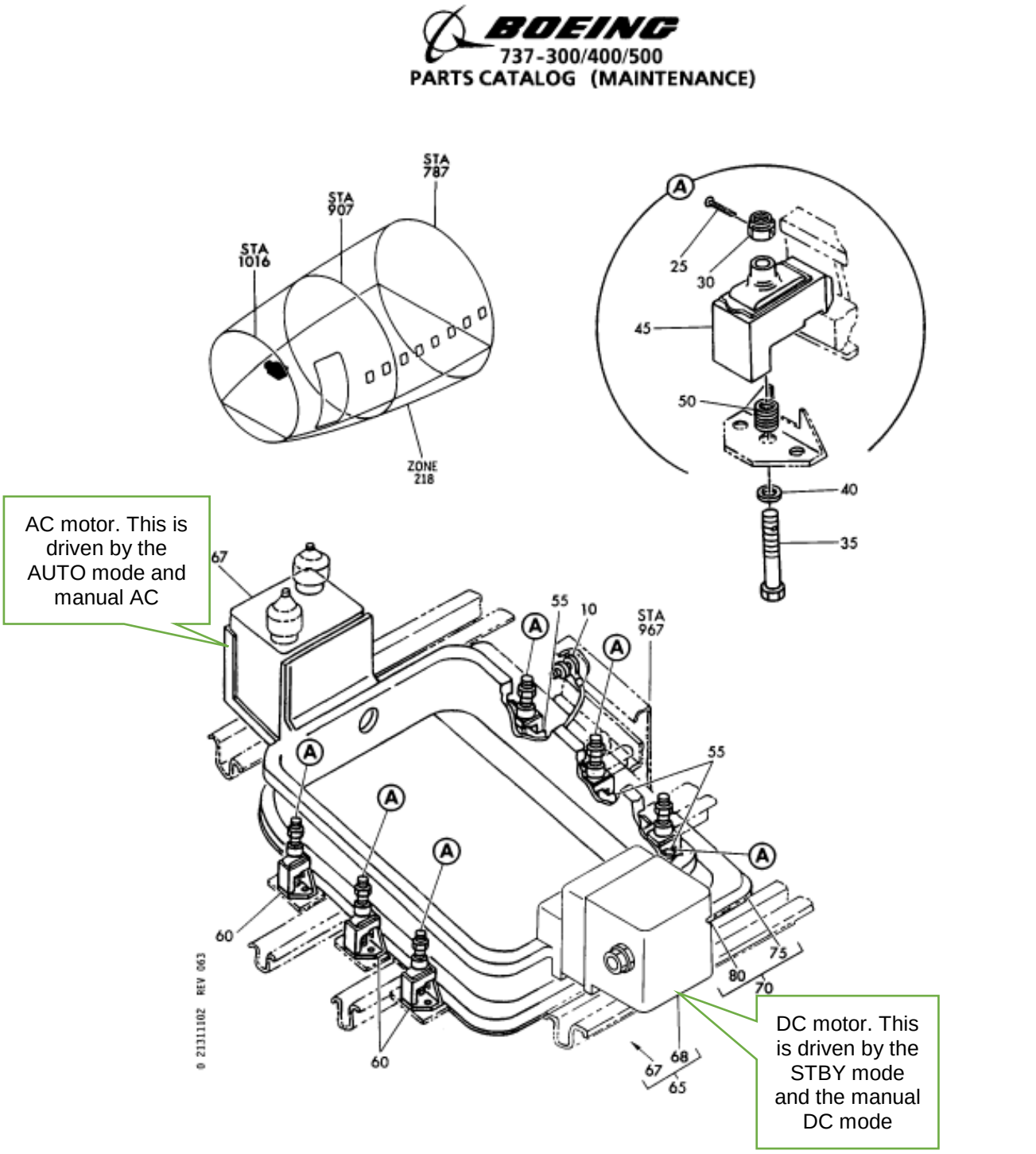
(Skyvector.com)

Appendix B



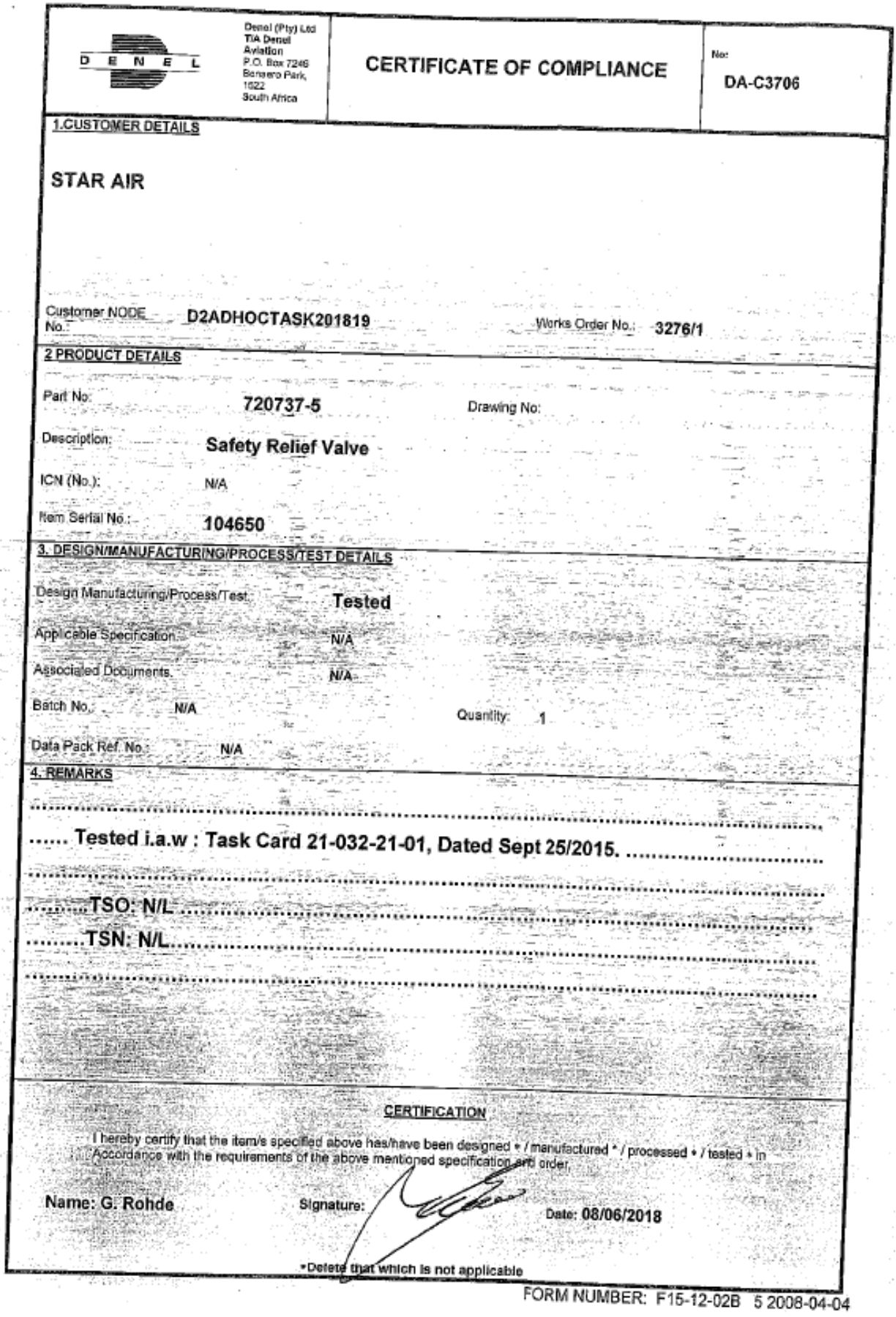
(Extract from the Boeing 737-300/400/500 Illustrated parts catalogue. The picture is for reference only and may not be of the latest revision)

Appendix C



(Extract from the Boeing 737-300/400/500 Illustrated parts catalogue. The picture is for reference only and may not be of the latest revision)

Appendix D



Denel (Pty) Ltd
T/A Denel Aviation
P.O. Box 7246
Bonaero Park, 1622
South Africa

CERTIFICATE OF COMPLIANCE

No: DA-C3706

1.CUSTOMER DETAILS

STAR AIR

Customer NODE No.: D2ADHOCTASK201819 Works Order No.: 3276/1

2 PRODUCT DETAILS

Part No: 720737-5 Drawing No:

Description: Safety Relief Valve

ICN (No.): N/A

Item Serial No.: 104650

3. DESIGN/MANUFACTURING/PROCESS/TEST DETAILS

Design Manufacturing/Process/Test: Tested

Applicable Specification: N/A

Associated Documents: N/A

Batch No.: N/A Quantity: 1

Data Pack Ref. No.: N/A

4. REMARKS

..... Tested i.a.w : Task Card 21-032-21-01, Dated Sept 25/2015. .....

.....TSO: N/L .....

.....TSN: N/L.....

CERTIFICATION

I hereby certify that the item/s specified above has/have been designed * / manufactured * / processed * / tested * in Accordance with the requirements of the above mentioned specification and order.

Name: G. Rohde Signature: Date: 08/06/2018

*Delete that which is not applicable

FORM NUMBER: F15-12-02B 5 2008-04-04

DENEL Denel (Pty) Ltd T/A Denel Aviation P.O. Box 7266 Boksburg Park, 1522 South Africa	**CERTIFICATE OF COMPLIANCE**	No: **DA-C3707**

1.CUSTOMER DETAILS

STAR AIR

Customer NODE No.: **D2ADHOCTASK201819** Works Order No.: **3276/2**

2 PRODUCT DETAILS

Part No: **720737-5** Drawing No:

Description: **Safety Relief Valve**

ICN (No.): N/A

Item Serial No.: **860957**

3. DESIGN/MANUFACTURING/PROCESS/TEST DETAILS

Design/Manufacturing/Process/Test: **Tested**

Applicable Specification: N/A

Associated Documents: N/A

Batch No.: N/A Quantity: 1

Data Pack Ref. No.: N/A

4. REMARKS

..... Tested i.a.w : Task Card 21-032-21-01, Dated Sept 25/2015. .....

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Name: G. Rohde Signature: Date: **08/06/2018**

*Delete that which is not applicable

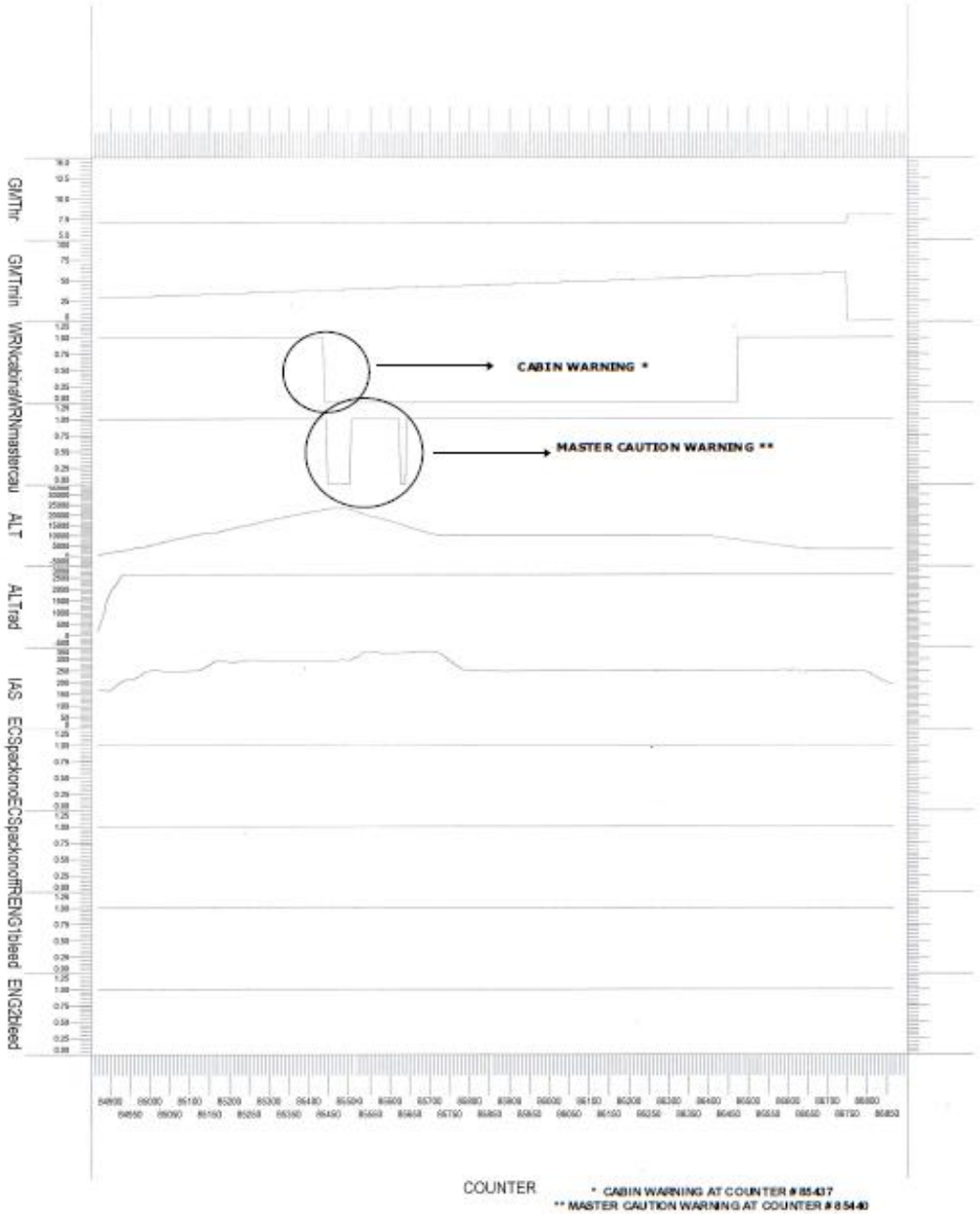
FORM NUMBER: F15-12-02B 5 2008-04-04

Appendix E

FOQA_Event_452018.tsc

FOQA Event 4/5/2018

May 21, 2018 09:25 AM
Star Air Cargo



* CABIN WARNING AT COUNTER # 85437
** MASTER CAUTION WARNING AT COUNTER # 85440

AIRCRAFT REGISTRATION: ZS-VDP
EVENT DATE: 04/05/2018
REPORT EXTRACTED BY: P. GIDISH
GATEKEEPER

WORK REQUIREMENT / DEFECT	SIGNATURE & STAMP	DATE
BENCH TEST.	019	08 JUN 2018
PRELIMINARY TEST / ANALYSIS OF DEFECT	**SIGNATURE & STAMP**	**DATE**
VALVE TESTED, CRACK PRESSURE TO HIGH. ACTUAL 8,6 PSI	019	08 JUN 2018
ACTION TO BE TAKEN	**SIGNATURE & STAMP**	**DATE**
VALVE TO BE CLEANED BEFOR TEST. CRACK PRESSURE TO HIGH, "8,6 PSI"	019	08 JUN 2018
ACTION TAKEN	**SIGNATURE & STAMP**	**DATE**
VALVE CLEANED FOR TEST. VALVE TESTED CRACK PRESSURE ADJUSTED INTO LIMITS. "ACTUAL 8,3 PSI"	019	08 JUN 2018
DIRECTIVES INCORPORATED (MOD's, STI's, AD's, SL's, SI's etc)	**SIGNATURE & STAMP**	**DATE**