ACCIDENT INVESTIGATION COMMISSION

FINAL REPORT

AIC 19 - 2002

Air Niugini Limited

P2-ANY

Fokker 70

Rapid depressurisation resulting in deployment of oxygen masks

51 nm NE Jacksons International Airport, Port Moresby

Papua New Guinea

21 November 2019

About the AIC

The Accident Investigation Commission (AIC) is an independent statutory agency within Papua New Guinea (PNG). The AIC is governed by a Commission and is entirely separate from the judiciary, transport regulators, policy makers and service providers. The AIC's function is to improve safety and public confidence in the aviation mode of transport through excellence in: independent investigation of aviation accidents and other safety occurrences within the aviation system; safety data recording and analysis; and fostering safety awareness, knowledge and action.

The AIC is responsible for investigating accidents and other transport safety matters involving civil aviation in PNG, as well as participating in overseas investigations involving PNG registered aircraft. A primary concern is the safety of commercial transport, with particular regard to fare-paying passenger operations.

The AIC performs its functions in accordance with the provisions of the *PNG Civil Aviation Act 2000 (As amended),* and the *Commissions of Inquiry Act 1951,* and in accordance with *Annex 13* to the *Convention on International Civil Aviation.*

The objective of a safety investigation is to identify and reduce safety-related risk. AIC investigations determine and communicate the safety factors related to the transport safety matter being investigated.

It is not a function of the AIC to apportion blame or determine liability. At the same time, an investigation report must include relevant factual material of sufficient weight to support the analysis and findings. At all times the AIC endeavours to balance the use of material that could imply adverse comment with the need to properly explain what happened, and why it happened, in a fair and unbiased manner.

About this report

On 21 November 2019, at about 16:00 local time (06:00UTC), the AIC became aware about an alleged occurrence earlier that afternoon, involving a Fokker 70 aircraft, registered P2-ANY, owned and operated by Air Niugini Limited. The AIC immediately attempted establishing contact with the Civil Aviation Safety Authority of Papua New Guinea, PNG Air Services Limited (PNGASL) and Air Niugini Limited to confirm the occurrence, however at that time they were not available.

On 22 November 2019, at 16:13, upon request of the AIC, PNGASL provided details of the occurrence. Subsequently, the AIC commenced an investigation and immediately dispatched a team of investigators to Air Niugini Limited head office to commence onsite activities.

This *Final Report* has been produced by the AIC pursuant to *ICAO Annex 13* and has been approved for public release.

The report is based on the investigation carried out by the AIC under the Papua New Guinea *Civil Aviation Act 2000 (As Amended),* and *Annex 13* to the *Convention on International Civil Aviation*. It contains factual information, analysis of that information, findings and contributing (causal) factors, other factors, safety actions, and safety recommendations.

Although AIC investigations explore the areas surrounding an occurrence, only those facts that are relevant to understanding how and why the accident occurred are included in the report. The report may also contain other non-contributing factors which have been identified as safety deficiencies for the purpose of improving safety.

Readers are advised that in accordance with *Annex 13* to the *Convention on International Civil Aviation*, it is not the purpose of an AIC aircraft accident investigation to apportion blame or liability. The sole objective of the investigation and the final report is the prevention of accidents and incidents (Reference: *ICAO Annex 13, Chapter 3, paragraph 3.1*). Consequently, AIC reports are confined to matters of safety significance and may be misleading if used for any other purpose.

Hubert Namani, LLB
Chief Commissioner
18 March 2021

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GLOSSARY OF ABBREVIATION

AIC	: Accident Investigation Commission
AEP	: Aerodrome Emergency Plan
AJTL	: Aeroplane and Journey Technical Log
AMM	: Aircraft Maintenance Manual
AMSL	: Above Mean Sea Level
AOM	: Aircraft Operating Manual
ARFF	: Airport Rescue and Fire Fighting Services
ATC	: Air Traffic Control
ATPL	: Airline Transport Pilot Licence
AVSEC	: Aviation Security
CA	: Civil Aviation
CAR	: Civil Aviation Rule
CERM	: Corporate Emergency Response Manual
CC	: Cabin Crew
CC2	: Cabin Crew 2
CLR	: Clear
CPC	: Control Pressure Controller
CPS	: Control Pressure Selector
CS	: Customer Services
CSM	: Customer Services Manager
CSMSM	: Corporate Safety Management System Manual
CSO	: Customer Services Officer
CVR	: Cockpit Voice Recorder
°C	: Degree Celsius
DETRESFA	: Distress phase
DMOC	: Duty Manager Operations Control
DME	: Distance Measuring Equipment
ECC	: Emergency Coordination Centre
EGPWS	: Enhanced Ground Proximity Warning System
ETA	: Estimated Time of Arrival
ETD	: Estimated Time of Departure
FAM	: Flight Administration Manual
FFCOM	: Fokker Flight Crew Operating Manual
FDR	: Flight Data Recorder
FIS	: Flight Information Services
ft	: Feet
FPM	: Feet per minute
GM	: General Manager
HF	: High Frequency (3 000 to 30 000 kHz)
hPa	: hectopascal (Pressure Unit)
HHMPI	: Hand-Held Multi-Purpose Interface
ICAO	: International Civil Aviation Organisation

IFR	: Instrument Flight Rules
IIC	: Investigator in Charge
ILS	: Instrument Landing System
Kg	: Kilogram(s)
Kt	: Knot(s)
L	: Left
LAME	: License Aircraft Maintenance Engineer
LED	: Light Emitting Diode
m	: Metres
MC	: Master Caution
MEL	: Minimum Equipment List
MFDU	: Multifunction Display Unit
MHz	: Megahertz
min	: Minutes
MW	: Master Warning
NAC	: National Airports Corporation
nm	: Nautical Miles
OC	: Operations Control
OOR	: Operations Occurrence Report
PA	: Public Address
PALT	: Pressure Altitude (ft)
PF	: Pilot Flying
PIC	: Pilot in Command
PM	: Pilot Monitoring
PNG	: Papua New Guinea
POV	: Primary Outflow Valve
PSU	: Passenger Service Unit
QNH	: Query: Nautical Height (atmospheric pressure at sea level)
QRH	: Quick Reference Handbook
SCC	: Senior Cabin Crew
SEPM	: Safety and Emergency Procedures Manual
SN	: Serial Number
SOV	: Secondary Outflow Valve
TCAS	: Traffic alert and Collision Avoidance System
TRM	: Training Reference Manual
UTC	: Coordinated Universal Time
VER	: Verify
VHF	: Very High Frequency
VFR	: Visual Flight Rules

INTRODUCTION

SYNOPSIS

On 21 November 2019, at 15:21 local time (05:21 UTC), a Fokker 70 aircraft, registered P2-ANY, owned and operated by Air Niugini Limited, while conducting a scheduled commercial air transport operation from Tokua Airport, East New Britain to Jacksons International Airport, Port Moresby, National Capital District had a rapid depressurisation event during a normal descent, about 51 nm North East of Jacksons.

There were four crew; two pilots and two cabin crew, and 41 passengers on board the aircraft.

The aircraft had undergone two unscheduled maintenance in relation to the pressure control system, two days preceding the day of occurrence, and certified as airworthy and released to services on each day.

On the day of the occurrence, the aircraft departed Tokua at 14:20, climbed to a cruising altitude of 32,000 ft. After commencing a normal descent into Port Moresby, passing about 23,600 ft, the Master Caution alert activated. The flight crew also received a fault message on the display unit relating to the aircraft's pressurisation system. The crew immediately commenced checklist action.

About 20 seconds after the Master Caution alert activated, at about 23,000 ft, the *'Excessive Cabin Altitude'* warning activated along with the Master Warning alert. The copilot called Jacksons Radar and requested a further descent. The flight crew donned their oxygen masks and carried out the *'Excessive Cabin Altitude'* emergency checklist. Jacksons Radar subsequently instructed P2-ANY to descend to 11,000 ft. The flight crew commenced an emergency descent at a descent rate of about 3,500 ft per minute and subsequently actioned memory items of the *Emergency Descent* checklist. The event was classed as a rapid depressurisation event.

In the cabin, the cabin crew and passengers were reported to have been experiencing discomfort in their ears. The cabin crew reported that the cabin suddenly became very cold and that they could hear sounds of what seemed to them like air rushing out from the air vents.

The cabin crew reported that from the forward crew station, they could also hear the flight crew breathing through their oxygen masks. They immediately secured themselves in their respective seats.

While passing 19,000 ft, during the emergency descent, the flight crew manually activated passenger oxygen masks.

The flight crew subsequently broadcast a PAN and requested for a descent to 10,000 ft. Jackson Radar authorised a descent to 10,000 ft and called the Airport Rescue and Fire Fighting services, requesting for their units to be on standby at the aerodrome for the arriving distress aircraft.

When the aircraft reached 10,000 ft, the crew levelled off and the pressure began to normalise (equalize with the ambient pressure). The flight crew advised Jacksons Radar that they were visual, and requested further clearance for approach. They were then cleared to overfly aerodrome and conduct a visual approach.

The flight crew removed their oxygen masks and recommenced the normal descent to establish the aircraft on its approach path. The fault warning automatically terminated indicating that the cabin pressure had returned to an acceptable level. When the aircraft became established overhead the aerodrome, the flight crew informed Jacksons Radar about the emergency and a 30 track-miles was requested to descent unpressurised. The crew also requested vectors for the runway 14L ILS. The aircraft tracked and established on the ILS, 10 nm North West of Jacksons. The crew advised Jacksons Tower that they were established on the ILS approach and confirmed that they were expecting a normal approach and landing.

P2-ANY landed at 15:47, and taxied to the parking bay where a normal disembarkation was conducted for all passengers and crew. There were no injuries or damage reported.

ARFF was advised by Jacksons Tower to stand down their services.

The occurrence was due to defect in the aircraft's pressure control system.

1 FACTUAL INFORMATION

1.1 History of the flight

On 21 November 2019, at 15:21 local time (05:21 UTC[1]), a Fokker 70 aircraft, registered P2-ANY, owned and operated by Air Niugini Limited, while conducting a scheduled flight from Tokua Airport, East New Britain to Jacksons International Airport, Port Moresby, National Capital District, had a rapid depressurisation event during a normal descent, about 51 nm North East of Jacksons.

The copilot was the designated pilot flying (PF)[2] for that sector. The Pilot in Command (PIC) was the pilot monitoring (PM)[3].

Figure 1: Depiction of the flight path from Tokua to Jacksons.

The aircraft departed Tokua Airport at 14:20, climbed to a cruising altitude of 32,000 ft and began tracking South West towards Port Moresby.

At 15:16:30, as the flight crew commenced a normal descent to their initially cleared descent altitude of 26,000 ft, Moresby Radar instructed them to continue descending to 23,000 ft. Moresby Radar further instructed the crew to maintain 23,000 ft and call Jacksons Radar on the 125.8 MHz radio frequency.

1 The 24-hour clock, in Coordinated Universal Time (UTC), is used in this report to describe the local time as specific events occurred. Local time in the area of the serious incident, Papua New Guinea Time (Pacific/Port Moresby Time) is UTC + 10 hours.

2 Pilot responsible for the flight path and airspeed control, and aircraft configuration. SOURCE: FOKKER FLIGHT CREW OPERATING MANUAL-VOLUME 1.

3 Pilot responsible for checklist reading and execution of the required actions. SOURCE: FOKKER FLIGHT CREW OPERATING MANUAL-VOLUME 1.

The Flight Data Recorder (FDR) data retrieved during the investigation indicated that at 15:20:44, as the aircraft was passing 23,600 ft, the Master Caution[4] (MC) alert activated. The flight crew confirmed during interview, that they then noticed a cabin pressurisation controller fault message on the Multifunction Display Unit (MFDU). The investigation determined that the fault observed and referred to by the crew was the *'CAB PRESS CTL'* fault message.

The crew stated that the MFDU also displayed instructions, identical to the *Fokker 70/100 Quick Reference Handbook (QRH) 'Cabin Pressurization Control Fault'* checklist *(see Appendix A, 5.1.2)*. They completed this checklist at 15:21:02. The second (last) action item required them to refer to and apply the *'Manual Cabin Pressure Control Procedure'* checklist *(see Appendix A, 5.1.3).*

The copilot stated in his interview that a few seconds after receiving the *'CAB PRESS CTL'* fault message, he observed the cabin rate of change indicator showing a cabin altitude increase rate of over 4,000 FPM. However, according to the *Fokker Aircraft Operating Manual (AOM)*, the scale on the rate of change indicator, shows a maximum of 2,000 FPM increase/decrease rate.

At 15:21:04, while levelling off at 23,000 ft, Jacksons Radar called to establish contact with the crew. The crew concurrently received an *'Excessive Cabin Altitude'* warning along with the Master Warning (MW)[5] alert (15:21:06). The copilot responded to Jackson Radar and asked them to standby, and about 10 seconds later called again stating that they required further descent.

The crew subsequently commenced the QRH *'Excessive Cabin Altitude'* emergency checklist *(see Appendix A, 5.1.3)* of which the first item required them to don their oxygen masks. The crew stated that this checklist was actioned from memory.

At 15:21:30, Jacksons Radar instructed P2-ANY to commence descent to 11,000 ft, not below the DME[6] steps with no speed restrictions and to expect a visual approach for runway 14L. The crew initiated the descent and maintained a descent rate of about 3,500 ft per minute. As the aircraft passed 22,000 ft the crew commenced and actioned the memory items[7] of the *QRH 'Emergency Descent'* checklist *(Appendix A, 5.1.3).*

The cabin crew stated during interview, that as the aircraft was descending, they started experiencing discomfort in their ears. The cabin crew 2 (CC2) reported that she was walking through cabin, making preparations for arrival when she started observing some passengers with their hands over their ears. She added that the cabin suddenly became very cold, and she could hear the sound of what she believed was air rushing out from the air vents. She immediately walked up to the senior cabin crew (SCC), at the forward crew station and informed her about her observations. While in discussion, they began hearing the sound of breathing through oxygen masks, coming from the cockpit. They immediately returned to their respective cabin crew stations and secured themselves in their seats. The CC2 stated that as she was walking through the cabin towards her seat, she observed that the seatbelt sign was not illuminated.

At 15:23:26, while passing 19,000 ft the flight crew manually activated passenger oxygen masks and the PIC subsequently, made a public announcement (PA) instructing the passengers and cabin crew to acquire oxygen masks.

At 15:23:45, while passing 18,000 ft, the PIC broadcast a PAN[8], reporting that they had a cabin pressure problem and requested for a radar monitored descent to 10,000 ft. Jackson Radar immediately gave a descent clearance of 10,000 ft to P2-ANY. The crew continued the emergency descent to the cleared altitude.

Air Traffic Control (ATC) recordings showed that Jacksons Radar declared a Distress Phase (DETRESFA)[9], at 15:25:02.

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4 Annunciation of level 2 alerts which requires immediate pilot awareness and subsequent corrective or compensatory action.

5 These are red flashing lights used as ATTENTION GETTERS. Together with aural signals, they enable the flight crew to detect failures which require immediate crew action.

6 Distance measuring equipment.

7 Checklist items are boxed and should be carried out before consulting the emergency checklist SOURCE: FOKKER FLIGHT CREW OPERATING MANUAL – VOLUME 1.

8 To be used to give notice of difficulties that compel an aircraft to land, without requiring immediate assistance. SORUCE: AIR NIUGINI LIMITED STANDARD OPERATING PROCEDURES MANUAL.

9 A situation wherein there is reasonable certainty that an aircraft and its occupants are threatened by grave and imminent danger or require immediate assistance. SOURCE: PNG ASL MANUAL OF AIR TRAFFICE SERVICES.

When the aircraft reached 10,000 ft, the flight crew levelled off and the pressure began to normalise (equalise with the ambient pressure). The PIC called Jacksons Radar and advised that they were visual, maintaining 10,000 ft and requested a visual approach. Jacksons Radar then instructed the crew to conduct the visual approach and asked the PIC if he preferred to track for left base or an overfly. The PIC acknowledged the visual approach and opted for an overfly.

The crew removed their oxygen masks and commenced a shallow descent to establish the aircraft on its approach path. The copilot called Jacksons Radar and reported that they were visual and they would overfly for a wide right down wind.

CVR data showed that at 15:27:43, as they continued the descent, the flight crew referred to the *QRH 'Manual Depressurisation Procedure (see Appendix A, 5.1.4)*, and completed checklist items that were required to be done before 9,000 ft, and waited for the cabin altitude[10] to reach 9,000 ft.

FDR data indicated that at 15:27:53, the excessive cabin fault warning automatically terminated indicating that the cabin pressure had equalised with ambient pressure (below 10,000 ft).

At 15:28:10, when the cabin altitude reached 9,000 ft and the pressure differential dropped below 1 psi, the flight crew switched the seatbelt/no smoking sign on as required by the *QRH 'Manual Depressurisation Procedure*. The PIC called the SCC and asked if the oxygen masks had deployed and she confirmed that the masks did deploy. The PIC then provided a briefing and advised the SCC to carry out her follow up duties. He then made a PA to passengers and briefly explained the emergency event that they had experienced, and informed them that a gradual descent and normal landing was expected.

As the crew continued the descent, the PIC reverted to the *QRH 'Excessive cabin altitude'* checklist and subsequently referred to the *'Emergency descent'* checklists, and realised that they had not actioned the item to set the transponder as required, which for this case was 7700 *(see Appendix A, 5.1.5)*.

At 15:31:07, Jacksons Radar called P2-ANY and requested for a status update. The copilot advised Jacksons Radar that they had a depressurisation and were currently unpressurised, passing 7,500 ft overhead and required 30 track miles to descend unpressurised. Jackson Radar instructed P2-ANY to descend towards the South West of the aerodrome and advise when they would be ready to turn inbound for landing. The copilot requested vectors for an instrument landing system (ILS) for runway 14L. Jacksons Radar cleared P2-ANY for the ILS approach and a descent to 2,500 ft.

At 15:34:05, while passing 7,000 ft the SCC reported to the PIC that the cabin was secured for landing. The PIC subsequently made a PA and advised the passengers that a normal approach and landing was imminent.

The crew subsequently received a clearance from Jacksons Radar for the ILS approach for runway 14L. At 15:42:50, about 10 nm North West of Jacksons, the PIC called and advised Jacksons Tower that they were established on the ILS for runway 14L, and confirmed that they were expecting a normal approach and landing.

The flight crew continued the approach and at 15:47:33, landed on runway 14L. After landing, the flight crew vacated runway and taxied to the parking bay, where all passengers and crew were reported to have disembarked safely.

10 See Section 1.18.1.

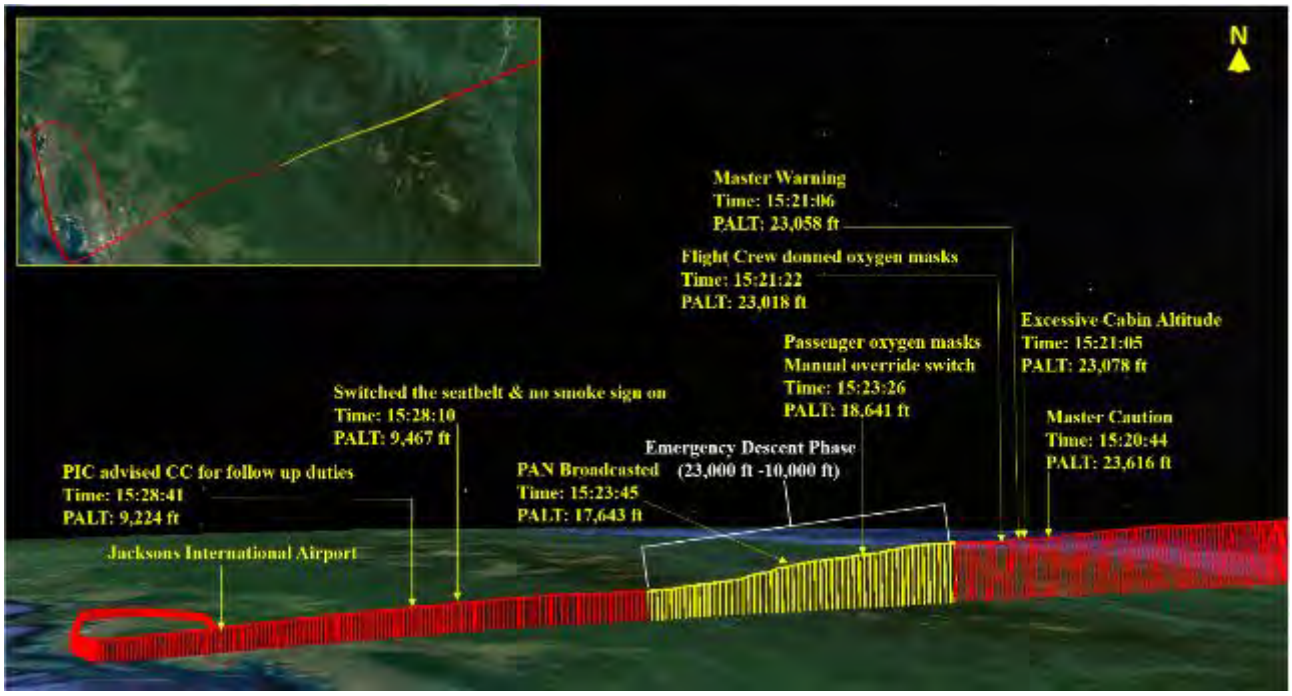


Figure 2: Depiction of the flight path from descent to landing phases.

1.2 Injuries to persons

Injuries	Flight crew	Passengers	Total in Aircraft	Others
Fatal	-	-	-	-
Serious	-	-	-	-
Minor	-	-	-	Not applicable
Nil Injuries	4	41	45	Not applicable
TOTAL	4	41	45	-

Table 1: Injuries to persons

1.3 Damage to aircraft

There was no damage sustained by the aircraft as a result of this occurrence.

1.4 Other damage

Not applicable.

1.5 Personnel information

1.5.1 Pilot in command (PIC)

Age	: 62
Gender	: Male
Nationality	: Australian
Type of license	: ATPL
Position	: Fokker 70/100 Captain
Route competency check valid to	: 14 July 2020
Type rating	: Fokker 70/100
Total flying time	: 21,223.00 hours
Total hours in command	: 16,557.00 hours
Total hours on type	: 707.72 hours
Total hours last 30 days	: 30.53 hours
Total hours last 7 days	: 15.23 hours
Total hours last 24 hours	: 5.24 hours
Hours on duty prior to occurrence	: 9.20 hours
Hours off duty prior to this duty	: 14.20 hours
Medical class	: One
Valid to	: 24 January 2020
Medical limitation	: Vision correction required

The personal records of the PIC showed that he had about 40 years of experience as a pilot. He was employed by Air Niugini Limited on 14 May 2018. The PIC's training records showed that his recent *Safety and Emergency Procedures* recurrent training was revalidated on 11 June 2019 and was valid to 11 June 2020.

The PIC stated that he was wearing his prescribed spectacles during the flight.

1.5.2 Copilot

Age	: 31
Gender	: Male
Nationality	: New Zealander
Type of license	: ATPL
Position	: Fokker 70/100 First Officer
Route competency check valid to	: 21 Oct 2020
Type rating	: Fokker 70/100
Total flying time	: 5,700.0 hours
Total hours on type	: 750.0 hours
Total hours last 30 days	: 26.0 hours
Total hours last 7 days	: 26.0 hours
Total hours last 24 hours	: 3.9 hours
Hours on duty prior to occurrence	: 7.0 hours
Hours off duty prior to this duty	: 15.0 hours

Medical class	: One
Valid to	: 21 November 2020
Medical limitation	: Spectacles

The personal records of the copilot showed that he had over 11 years of experience as a pilot. He commenced employment with Air Niugini Limited on 8 May 2018. The copilot's training records showed that his recent *Safety and Emergency Procedures* recurrent training was revalidated on 11 June 2019, and was valid to 11 June 2020.

The copilot stated that he was wearing his prescribed spectacles during the flight.

1.5.3 Senior Cabin Crew (SCC)[11]

Age	: 26
Gender	: Female
Nationality	: Papua New Guinean
Position	: Cabin Crew 1 (one)
Type of certificate	: Fokker 70/100 Emergency Procedures Certificate
Certificate valid to	: 30 July 2020
Annual competency checks valid to	: 27 April 2020
Type rating	: Fokker 70/100
Total flying time	: 3,074.85 hours
Total hours on type	: 2,082.57 hours
Total hours last 90 days	: 199.50 hours
Total hours last 7 days	: 10.48 hours
Total hours last 24 hours	: 5.48 hours

The personal records of the SCC showed that she had more than 5 years of experience as a cabin crew. The SCC's training records indicated that her recent *Safety and Emergency Procedures* recurrent training was revalidated on 30 January 2019, and was valid to 30 July 2020.

On the occurrence flight, the SCC occupied the forward crew station.

1.5.4 Cabin Crew 2 (CC2)

Age	: 22
Gender	: Female
Nationality	: Papua New Guinean
Position	: Cabin Crew 2 (two)
Type of certificate	: Fokker 100/70 Emergency Procedures Certificate
Certificate valid to	: 29 June 2020
Annual competency checks valid to	: 18 July 2020
Type rating	: Fokker 70/100
Total flying time	: 941.07 hours
Total hours on type	: 503.27 hours
Total hours last 90 days	: 227.13 hours

11 In-charge cabin crew member. *ICAO Doc 10062* definition: Cabin Crew leader who has overall responsibility for the conduct and coordination of cabin procedures applicable during operations and during abnormal and emergency situations for flights operated with more than one cabin crew member.

Total hours last 7 days	:	9.08 hours
Total hours last 24 hours	:	4.92 hours

The personal records of the CC2 showed that she had over a year of experience as a cabin crew. The CC2's training records showed that her recent *Safety and Emergency Procedures* recurrent training was revalidated on 18 January 2019, and valid to 18 July 2020.

On the occurrence flight, the CC2 occupied the aft crew station.

1.6 Aircraft Information

1.6.1 Aircraft data

Aircraft manufacturer	: Fokker
Model	: Fokker 70
Serial number	: 11551
Year of manufacture	: August 1995
Total airframe hours	: 40,585.59
Total airframe cycles	: 44,083.00
Registration	: P2-ANY
Certificate of Registration number	: 380
Certificate of Registration issued	: 1 March 2019
Name of the owner	: Air Niugini Limited
Name of the operator	: Air Niugini Limited
Certificate of Airworthiness number	: 380
Certificate of Airworthiness issued	: 1 March 2019
Certificate of Airworthiness valid to	: Non terminating

1.6.1.1 Engine data

Engine type	: Turbofan
Year of Manufacture	: 1995
Manufacturer	: Rolls-Royce
Model	: Tay 620-15

No. 1 engine (Left)

Serial number	: 17128
Total time since new	: 33,532.59 hours
Cycles since new	: 35,294

No. 2 engine (Right)

Serial number	: 17146
Total time since new	: 31,536.38 hours
Cycles since new	: 30,995

1.6.1.2 Fuel

The investigation determined that fuel was not a contributing factor to the serious incident.

1.6.1.3 Weight and balance

According to the weight and cargo distribution information provided by the Operator to the AIC, it was determined that the aircraft was within its weight and centre of gravity limits.

1.6.1.4 Minimum equipment list

There was no outstanding Minimum Equipment List (MEL) item at the time of the flight.

1.6.2 Pressure Control System

The pressure control system is the part of the cabin pressurisation system which controls or regulates the pressure of the aircraft cabin and the flight compartment.

Cabin pressurisation is integral to passenger safety and comfort when flying at high altitudes. This is achieved by maintaining a cabin pressure level (cabin altitude) to act as though the aircraft was flying at lower altitude; 10,000 ft or lower.

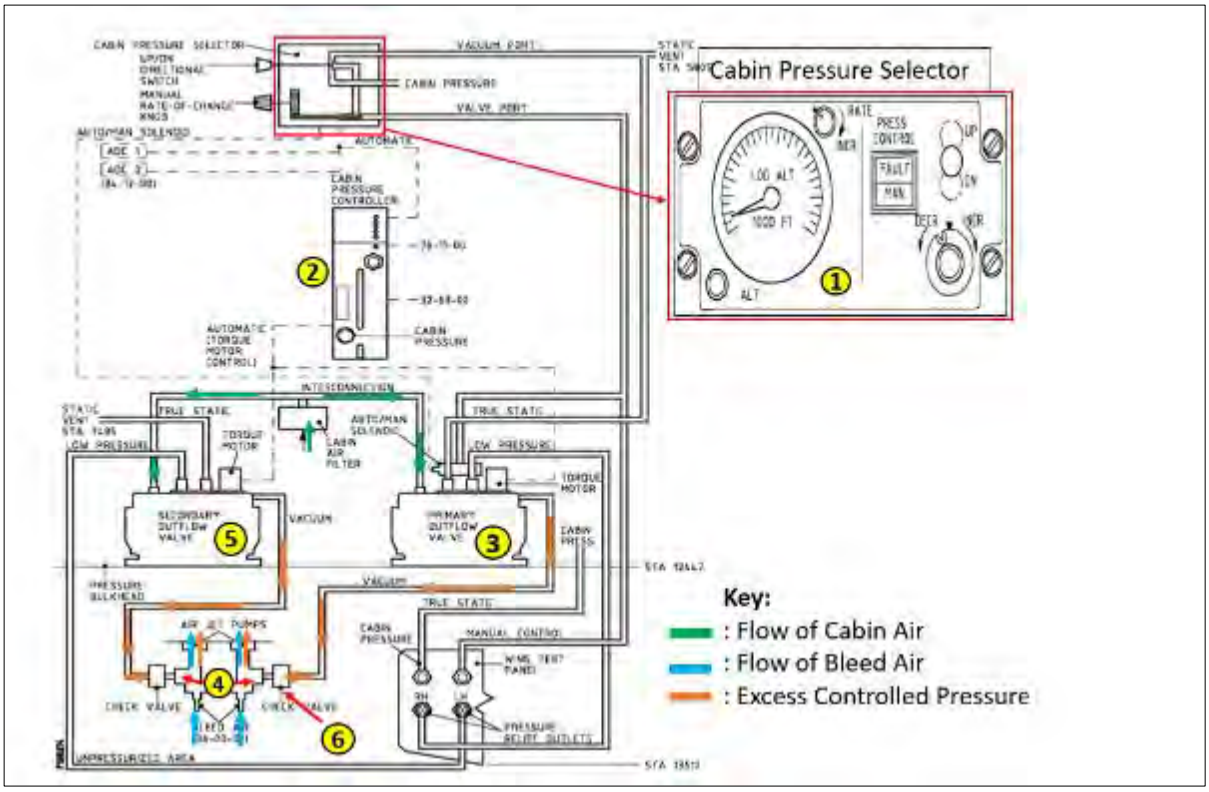


Figure 3: The Pressure Control system SOURCE: Fokker 70/100 AMM

As shown in Figure 3, the pressure control system is connected by pneumatic lines. During operation in automatic mode (normal), when pilots select pressure for a certain altitude (cabin altitude) on the Cabin *Pressure Selector (CPS)* (1), the signal is sent to the *Cabin Pressure Controller (CPC)* (2) which directly controls the *Primary Outflow Valve (POV)* (3). During operation in the manual mode, the CPC is bypassed by the CPS allowing it to send signals directly to the POV.

The POV operates by use of pressure differential across two chambers; the *control pressure chamber* and the *cabin pressure chamber*. The cabin pressure chamber represents the actual air pressure in the cabin while the control pressure chamber maintains the pressure value selected on the CPS, by the crew.

The *Secondary Outflow valve (SOV)* (5), operates the same way. There is an interconnection line between the POV and SOV to ensure that the selected pressure represented by the POV is also the same in the SOV.

Each outflow valve has its own vacuum line connected to a Jet Pump (4) which uses bleed air to create a vacuum. Along the line, there is a *Check Valve* (6) which ensures that the flow direction is towards the jet pump side of the line.

1.6.2.1 Defects

Pressure Control System components

The investigation determined that the depressurisation emergency event occurred due to a defective component within the *Pressure Control System*. According to the post-occurrence maintenance record provided by the Operator, the POV, CPC and SOV Check Valve, were replaced during the troubleshooting *(Refer to section 1.18.4).*

The investigation found that the steps taken by the engineers were not appropriate to the recorded result from the preceding step (refer to 1.18.4).

According to the result of the post-occurrence maintenance, the investigation was able to determine that the POV was not defective. However, the investigation was unable to determine the actual component (defect) within the system which caused the outflow valves to operate abnormally.

1.6.2.2 Maintenance

Maintenance records showed that prior to the occurrence, there were two unscheduled maintenance carried out on P2-ANY at different times.

The investigation found that all defects were reported on the *Aeroplane and Journey Technical Log (AJTL)* and maintenance were conducted in accordance with the *Fokker 70/100 Aircraft Maintenance Manual (AMM). See Table below.*

AJTL No	Defect Date	Defect	Rectification	Date of Rectification
K0003	19/11/2019	Cabin pressure control fault on descent	Replacement of CPC and checked ok *IAW AMM 21-31-02*	19/11/2019
J8970	20/11/2019	Cabin pressure control fault	CPC checked faulting 'valve' outflow valve sense lines check tightened, valves cleaned & exercised. air filter replaced & ops checked satisfactory *IAW AMM 21-31-00*	20/11/2019

Table 2: Pre-occurrence unscheduled maintenance

The LAME 1[12] stated during interview, that he attended to the defect as reported on the AJTL dated 19 November 2019. He conducted an operational check on the CPC and found that the NO FAULT LED[13] light was still illuminated on the CPC. He subsequently replaced the CPC and conducted a functional test in accordance with the *AMM*.

12 License aircraft maintenance engineer. Refer to *Appendix C, Section 5.2.2* for LAME 1 and LAME 2 personnel information.

13 Light emitting diode

The *TASK 21-31-02-400-814-B Install the Cabin Pressure Controller* states:

8(E) Do an operational check of the cabin pressure controller

Action

3. Push the VER/CLR[14] pushbutton on the front of the cabin pressure controller

Result

- *The cabin pressure controller starts a built-in-test.*
- *On the front of the cabin pressure controller, all five LED come on.*
- *After the built-in-test the red LED go off and the green NO FAULT LED stays on for 30 seconds more.*
- *After the 30 seconds, the green NO FAULT LED goes off.*

The CPC check was found satisfactory.

The *AMM 21-31-00* describes the *FAULT ISOLATION* of the *cabin pressure control system*. In the *FAULT ISOLATION* section, the *TASK 21-31-00-811-841-B.*

The investigation found that the *FAULT ISOLATION* procedure was not carried out during the maintenance, however the engineer complied with the *REMOVAL/INSTALLATION* procedure in accordance with *TASK 21-31-02 CABIN PRESSURE CONTROLLER* of *AMM.* This action rectified the defect at that time.

The LAME 2 stated, during interview that he attended to the defect as reported on the AJTL dated 20 November 2019. He conducted the troubleshooting on the CPC by first doing the operational check and it indicated the *Valve Fault*, red LED display. Basing on that fault display, with reference to the *Troubleshooting of the Pneumatic Control of the Cabin Pressure Control System*, he conducted physical operational check on the two outflow valves and found them to be serviceable. In addition, the sense lines, connectors of the outflow valves and the surrounding connections were cleaned and the air filter was replaced which is required in procedure 7 of the *AMM TASK 21-31-00-811-841-B* which states;

(7.) Disconnect the cabin air filter.

Do both outflow valves close?
(a) If Yes, replace the cabin air filter and continue with step (1).

> *NOTE: In this condition all vacuum control to the outflow valves is disconnected and positive air goes into the outflow valves via the opening of the cabin air filter. Therefore, the POV and SOV should close under spring force.*

He then carried out an operational check on the CPC and there was no fault indication on it as it was before. Finally, the aircraft was pressurised and system checked satisfactory at that time and the aircraft was released to service.

The investigation could not determine the completion of the fault isolation procedure which involved other components.

1.6.3 Collision avoidance system

The aircraft was fitted with a Traffic Alert and Collision Avoidance System (TCAS) and Enhanced Ground Proximity Warning System (EGPWS). Collision avoidance system was not a factor in this occurrence.

14 Verify / Clear

1.7 Meteorological information

1.7.1 Terminal Aerodrome Forecast (Source: PNG National Weather Service)

The PNG National Weather Service Aerodrome Forecast for Major Port (Port Moresby Jacksons International Airport) was issued at 08:00 on 21 November 2019 and was effective from 10:00 on 21 November 2019 to 10:00 on 22 November 2019 as follows:

Wind : variable winds at 3 kt

Weather : Good visibility

Cloud : 1,800 ft – Few clouds 4,000 ft – Broken clouds at 4,000 ft

From 12:00 on 21 November 2019, there is a change in weather forecast as follows -

Wind : 210°/7 kt

Weather : Good visibility with light showers and rain

Cloud : 1,800 ft – Scattered clouds 4,000 ft – Scattered clouds

Temperature : 28°C, 30°C, 29°C, 27°C respectively (six-hourly interval from 10:00 on 21 November 2019 to 10:00 on 22 November 2019)

QNH : 1010, 1009, 1006, 1007 hPa respectively (six-hourly interval from 10:00 on 21 November 2019 to 10:00 on 22 November 2019)

1.8 Aids to navigation

Ground-based navigation aids, on-board navigation aids, and aerodrome visual ground aids and their serviceability were not a factor in this serious incident.

1.9 Communications

All radio communication between the crew of P2-ANY and Air Traffic Services was done on Very High Frequency (VHF). Communication was normal prior to and during the emergency.

1.10 Aerodrome information

Name of aerodrome : Jacksons International Airport

Location indicator : AYPY-PORT MORESBY

Airport operator : National Airports Corporation (NAC)

Latitude : 09 26.509 S

Longitude : 147 13.144 E

Elevation : 129 ft (39 m)

Jacksons International Airport has a Category 8[15] Rescue and Fire Fighting services available and has three fire tenders on stand-by at the station. The operational hours begin at 03:00 and ends at 19:00 or is extended as required to cater for late flights.

15 The highest category for Jacksons International Airport, where it can cater for a Boeing 767 aircraft. SOURCE: ICAO DOC 9137 PART 1 _ AEROPLANE CLASSIFICATION BY AIRPORT CATERGORY

1.11 Flight recorders

The aircraft was fitted with a cockpit voice recorder (CVR) and a separate flight data recorder (FDR). Following the Serious Incident, the FDR data was downloaded by the Operator and a datafile was provided to AIC. The CVR data was downloaded by AIC using the Hand-held Multi-Purpose Interface (HHMPI) device at the AIC Flight Recorder Laboratory.

CVR information:

- Manufacturer: Honeywell
- Model: SSCVR
- Part Number: 980-6022-01
- Serial Number: 0209

The CVR had Five (5) audio input channels. These channels and their recording durations are as follows;

- Captain (30 minutes),
- First Officer (30 minutes),
- Passenger Address (30 minutes),
- Cockpit Area Microphone (120 minutes), and
- Mixed Band Channel (120 minutes)

FDR information:

- Manufacturer: Honeywell
- Model: SSFDR
- Part Number: 980-4700-003
- Serial Number: 1662

The FDR had a recording duration of more than 25 hours and was recording data at a rate of 128 words per second. The FDR recorded parameters pertinent to the investigation were as follows; Master Caution, Master Warning, Excessive Cabin Altitude Warning, Vertical Speed and Pressure Altitude.

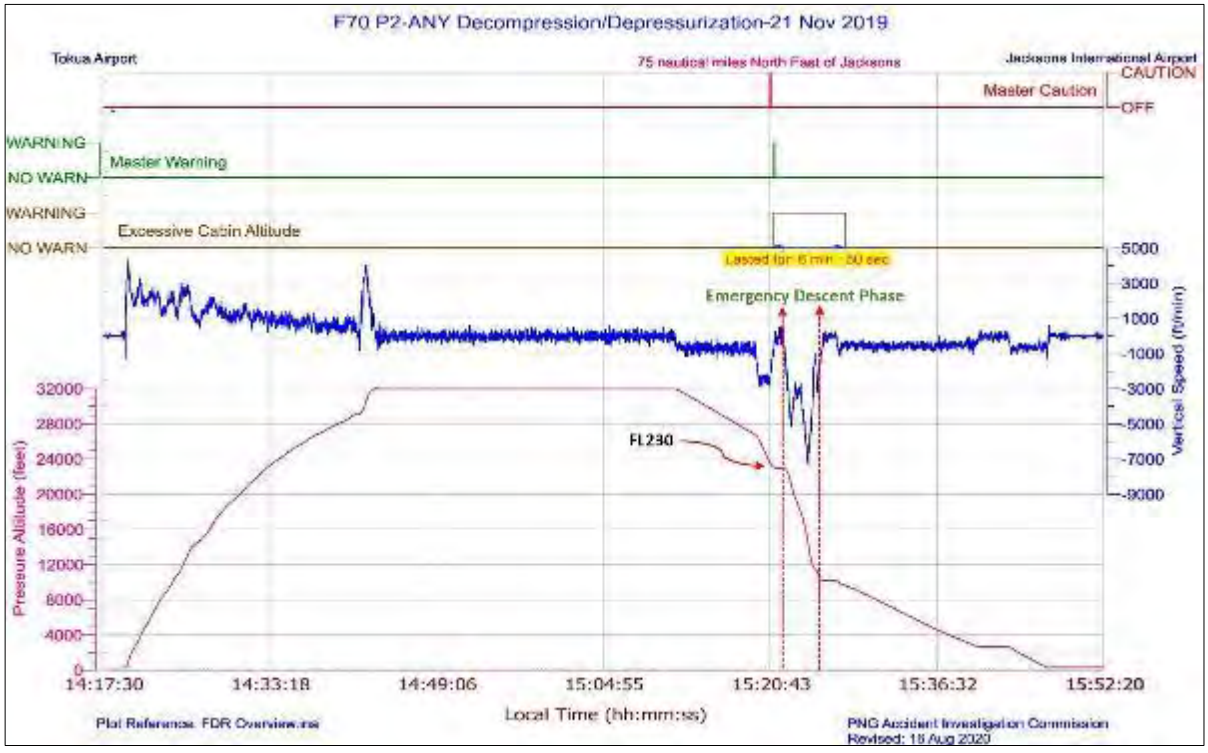


Figure 4: Overview of FDR data

1.12 Wreckage and impact information

Not applicable.

1.13 Medical and pathological information

Not applicable.

1.14 Fire

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

1.15 Survival Aspects

1.15.1 Cabin

According to the Operator's *SEPM volume 3, Section 2.16,* indications of a decompression emergency, in the cabin includes;

1. *Warning systems at 10,000 ft cabin altitude:*
   B. Cabin
   (1) "No smoking – Fasten Seat Belt" illuminate – Chimes will sound ….
2. *Warning systems at 14,000 ft cabin altitude:*
   B. Cabin
   (1) Oxygen masks will drop.
   (2) General overhead lighting illuminates automatically.
   (3) The PIC makes his announcement, "Attention! Attention! Emergency descent."

The cabin crew stated that although no prior warnings or indications as stated in *SEPM volume 3* were received, they initiated their decompression drill upon hearing the sound of what they believed was the flight crew breathing oxygen through their masks.

The Operator's *SEPM volume 3 Section 2.16 (3), 'Decompression Drill – Cabin Crew'* states*;*

Immediate Actions:

Sit down and strap in
Fit nearest passenger type mask
Check oxygen is flowing

When the PIC makes his announcement "Will the Cabin Crew carry out their follow-up duties"

Transfer to a portable O_2 bottle or use spare masks
Check crew and toilets
Attend to passengers
Report to CC1
CC1 to report to PIC

CVR data indicated that when the oxygen masks deployed in the cabin, the PIC made a PA instructing passenger to acquire their oxygen masks. Some passengers who had woken up from sleep at that time, looked confused when they saw the deployed oxygen masks. Subsequently, the SCC made another PA advising all passengers to pull down and don their oxygen masks.

The SCC stated that a child who was seated alone, at seat G of row 4 (4G) had difficulty in donning his oxygen mask. Subsequently, she walked over to his seat and assisted him with his mask, as the PIC had not done his PA at that time. The investigation found that he was travelling with his mother and sister who were seated at seats A and B of row 3 (3A and 3B), and the two seats adjacent to his seat (4E and 4F), were vacant.

CVR data showed that when the aircraft was passing 9,000 ft, the PIC called the SCC and instructed her to carry out her *follow-up duties.* The CC2 reported that she used the handset at her crew station to listen in as the PIC gave instructions to the SCC.

The SCC stated during interview that she transferred to a portable oxygen bottle, checked the lavatory before commencing checks on passengers from row 3 and moved towards the aft of the cabin.

The CC2 stated that she checked the lavatory and started checking passengers from row 15 and moved towards the forward cabin. She reported that during the checks, she assisted a mother and her infant to don their oxygen masks, as they had not done so earlier. Before reaching the mid cabin area, the CC2 realised that the SCC was using a portable oxygen bottle and she was not on oxygen. She subsequently returned to her crew seat and donned her oxygen mask. The cabin crew reported that passengers seemed well and did not require first aid assistance, and that oxygen masks in the lavatories, attendant (cabin crew) stations and passengers service units (PSUs), above each seat, had deployed.

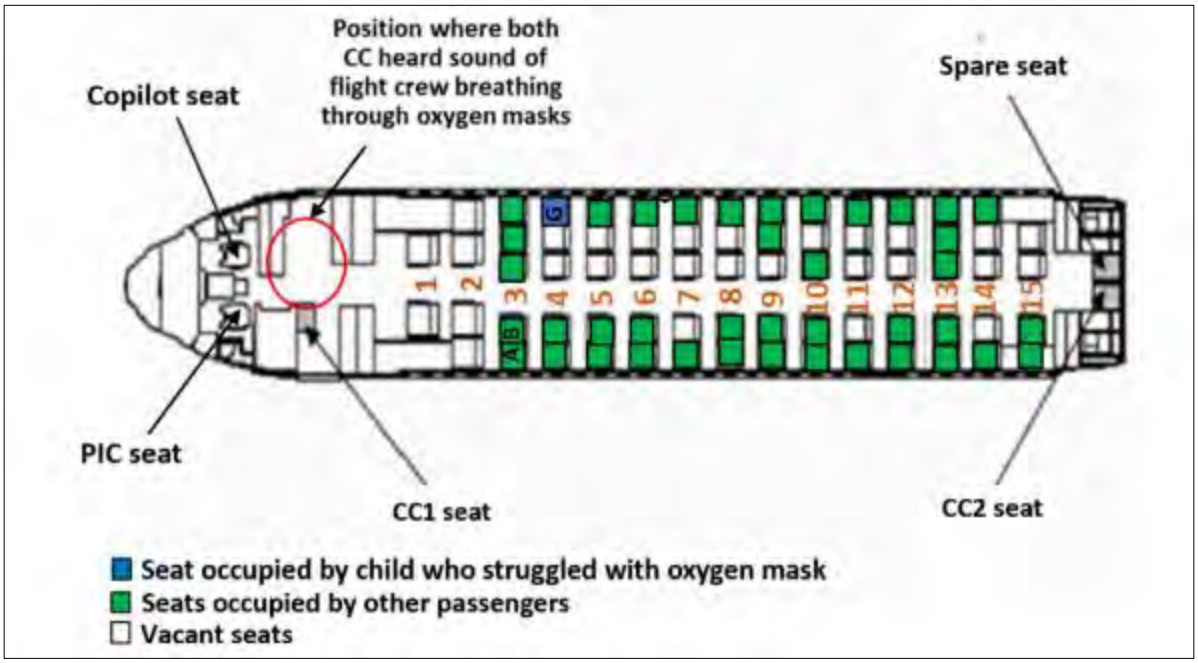


Figure 5: Cabin layout including crew and passenger seating arrangements

1.15.2 Aviation Rescue and Fire Fighting

At 15:29, the Aviation Rescue and Fire Fighting (ARFF) services personnel were alerted by Jacksons Tower about P2-ANY's emergency, and asked them to initiate their Aerodrome Emergency Plan (AEP).

The ARFF subsequently deployed to their standby position at the aerodrome.

At 15:47:55, the ARFF was advised by Jacksons Tower to stand down their services after the aircraft landed on runway 14L.

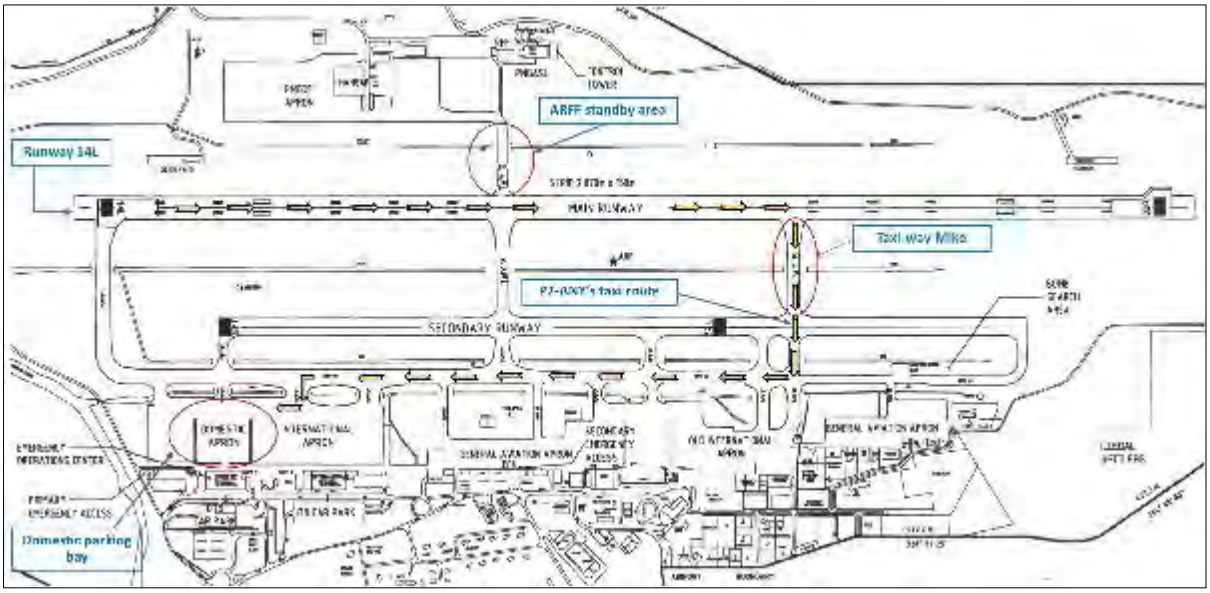


Figure 6: Jacksons International Airport map SOURCE: NATIONAL AIRPORTS CORPORATION AEP MANUAL

1.16 Tests and research

Not applicable.

1.17 Organisational and management information

1.17.1 Operator

Air Niugini Limited is a state owned enterprise, with its headquarters office in Air Niugini Haus on the property of Jacksons International Airport, Port Moresby, PNG. Its main operational base and maintenance base is located at Jacksons International Airport at 7 Mile, Port Moresby. Air Niugini operates domestically and internationally.

1.17.1.1 Emergency Response

Cabin depressurisation, according to the Operator's *Corporate Emergency Response Manual (CERM), section 2.4*, would be referred to as an *'Operational Emergency'*, that is, not requiring a corporate response and does not require Emergency Coordination Centre activation. Such emergencies are to be managed by relevant Department Heads/managers, coordinating their efforts in their normal operational roles as a procedure which must be documented in a relevant departmental manual. This is because the situation can be resolved through a small number of senior company managers operating in conjunction at a department level.

CERM, Section 1.7.3, Operations Control (OC), 'Note' states that the OC has the authority to carry out this responsibility, including making an assessment as to whether an emergency is an *'operational emergency'* or requires a corporate emergency response. The Operator's *Operations Manual (OM), Section 2.3.2.2* states that the Duty Manager Operations Control (DMOC), is responsible to activate emergency response in the event of an emergency that endangers the safety of the aircraft or person, notify appropriate authorities, assist the PIC by furnishing required information and advice senior management.

The investigation found that about seven minutes after the emergency event, the PIC initially notified Ops Control about the depressurisation event, and after landing, as the aircraft was taxing in, the copilot requested OC to ensure that customer services (CS) personnel meet the passengers on arrival. The DMOC's statement, provided to the AIC, showed that immediately after radio communication with the PIC, relevant senior management personnel of Maintenance Watch, Kilo Charlie (Ramp coordination), Ground Operations and Aviation Security (AVSEC) were briefed about the situation. Specific instructions were given to CS to contact St. Johns Ambulance and AVSEC to provide transport, if required.

The DMOC's statement showed that the General Manager Ground Operations (GMGO) instructed the Executive Manager Domestic Airport Operations (EMDAO) to ensure the passengers were met on arrival and assisted where required. The EMDAO, later in a response to GMGO, reported that all passengers disembarked with no concerns raised and that she was also advised by cabin crew management personnel that both cabin crew were doing well, and they would conduct an internal follow up action on their well-being. During interview with the AIC, the CS Officer (CSO) who met the flight, stated that she was unaware of the occurrence until all passengers had disembarked and that she was later advised about the emergency event by one of the cabin crew of the occurrence flight.

The DMOC's statement also indicated that the flight crew of P2-ANY were initially rostered to operate a later flight, however they were stood down as they needed to submit an incident report to management. The investigation found that before arriving at the parking bay, the PIC requested to be stood down from additional flights to complete the incident report.

The investigation found that the Operator's *Airport Services Manual* contained a detailed emergency response procedure in relation to *'operational emergency'.*

The investigation also found that although the Operator's *Flight Administration Manual* stated that Manager Safety and Compliance is the department's responsible person for any *'operational emergency'*, he was not included in the DMOC's briefing. The flight crew stated that they resumed flying duties the next day, without attending medical checks.

The investigation also found that the Operator's *Cabin Crew Administration Manual* did not have a documented procedure in relation to emergency response. The cabin crew stated, during interview, that they had completed medical checks the following day, and were cleared as medically fit to resume flying duties.

The investigation determined that the Operator's emergency response procedures at the departmental level was either inadequate, or not consistent with its corporate emergency response policy.

1.17.1.2 Access to aircraft

The *Civil Aviation Act 2000 (As Amended), Section 246 (3)(c)* states;

> *3) Without limiting the generality of the powers conferred by Section 222 or Section 245, for the purpose of exercising any of its functions, duties, or under this Commission and any person authorized in writing for the purpose by the Commission shall have power to do the following:*
>
> > *c) where necessary to preserve or record evidence, or to prevent the tampering with or alteration, mutilation, or destruction of any aircraft, place, aeronautical product, or any other thing involved in any manner in an accident or incident, to prohibit or restrict access of persons or classes of persons to site of any accident or incident.*

The AIC was unable to exercise its powers under this provision, as the Operator had already tampered with the evidence before the investigators accessed the aircraft.

Following the serious incident, P2-ANY was relocated to the Operator's maintenance hangar. On the 23 November 2019, the AIC investigation team boarded the aircraft to conduct site inspections and found that maintenance work had already commenced on the aircraft.

In accordance with the Operator's *Corporate Safety Management Systems Manual (CSMSM) Section 11.1.4.5,* a*' Decompression*[16] *or emergency descent'* is categorised as *'Any other incidents',* which is an occurrence associated with the operation of an aircraft that is not an accident and affects or could affect the safety of the operation.

The investigation also found that the Operator's *Flight Administration Manual 7.1.5* states;

> *Where an accident occurs to a company aircraft in Papua New Guinea territory, the aircraft shall be deemed to be in the custody of the Civil Aviation Safety Authority and no person shall access, interfere with, or remove, the aircraft or its content except with the permission of the Director.*

The investigation found that the Operator's procedures for *FAM 7.1.5* was not updated in accordance with the *CA Act 2000, Section 246 (3),* and *CAR Part 12,* where applicable.

1.17.1.3 Cabin Emergency Warning Systems & Procedures

During interview, the cabin crew stated that there was no pre-recorded PA heard in the cabin, as stated in the Operator's *Safety and Emergency Procedures Manual (SEPM), Volume 1, Section 5.5.3* which states;

1. *On aircraft fitted with a tape recorder, the Decompression Emergency Warning Announcement will be made automatically should the cabin pressure altitude ever exceed 14,000 ft.*

   Note: *Any PA announcement will override the decompression emergency warning announcement.*

2. *On aircraft not fitted with a tape recorder or if the auto announcement is inoperative or fails to operate, the Pilot Monitoring (PM) or designated Flight Deck crew member will make an announcement using the PA system:*

   This is an emergency pull an oxygen mask down – place the mask over your nose and mouth – breathe normally – remain seated with your seat belt fastened.

The Operator's Maintenance personnel confirmed that there was a pre-recorded tape fitted at the forward crew station, for cabin crew use, which contained boarding music and all cabin crew PAs. The Operator could not verify if P2-ANY was fitted with the tape recorder containing the decompression emergency warning announcement, as stated in *SEPM volume 1, Section 5.5.3 (1).*

The *Fokker 70 Aircraft Operating Manual (AOM), Section 1.03.01)* states;

> *The music reproducer provides pre-recorded announcements and boarding music. A pre-recorded emergency message is automatically presented when the passenger oxygen system is activated (either automatically or manually); see section Oxygen.*

The Manufacturer stated that according to their document management system, the *Service Bulletin SBF100-23-045 App.04 (see Appendix C, 5.2.3)* had been accomplished on P2-ANY. The existing Music and Pre-recorded Announcement Reproducer was replaced with a Becker DP-4100[17] digital player. The new system does not contain an automatic decompression warning announcement.

The investigation found that the Operator's active AOM did not have amendments consistent with the modification. For Operators who had implemented the applicable Appendix to *Service Bulletin SBF100-23-045,* the manufacturer's AOM incorrectly described the capability and operation of the system. The investigation also found that there had been no amendment or update prepared for the manual in that specific regard.

16 Depressurisation.

17 A solid-state solid state digital music producer.

1.18 Additional information

1.18.1 Altitude and Cabin pressurisation

According to various studies on human physiology in the air environment, above 10,000 ft of altitude in the Standard Atmosphere, the use of supplementary oxygen is anticipated to avoid adverse physiological effects that could occur as a result of human exposure to the decrease in atmospheric pressure and lower concentrations of oxygen.

Aircraft equipped with pressurisation systems, even when physically operated at altitudes well above 10,000 ft, have the capacity to maintain an internal pressure as though it were flying at 8,000 ft or lower, which allows normal human performance without the need for supplementary oxygen.

In the event of a cabin depressurisation during flight, the occupants of the aircraft are exposed to the existing conditions at the physical altitude in which the aircraft is flying, hence the use of supplementary oxygen becomes necessary to avoid adverse physiological effects.

When the aircraft reaches a safer altitude, at 10,000 ft or less the cabin altitude would still be lagging and eventually descrease to 10,000 ft after some time.

1.18.2 Oxygen systems

In accordance with the Operator's *Training Reference Manual (TRM),* there are two independent oxygen systems installed on the Fokker 70 aircraft;

1. Passenger and cabin crew oxygen, and
2. Flight crew oxygen.

Passenger and cabin crew oxygen system

This system is supplied by individual chemical generators located in each passenger service unit (above passenger seats), attendant and lavatory service units.

The oxygen masks deploy automatically once the cabin altitude exceeds 14,000 ft. They can be manually deployed by the flight crew.

When a deployed mask is pulled, the chemical generator activates and oxygen flows for a duration of 12 minutes. Activated generators cannot be shut off.

According to the Fokker Aircraft Maintenance Manual, the outflow valves have a cabin altitude limit control setting of 13,500 ft. When the cabin altitude exceeds this limit, the outflow valves will close to prevent further increase of cabin altitude.

The PIC stated during interview that at the time the oxygen masks were deployed, he recalled observing the cabin altitude indicator reading had risen to approximately 15,000 ft. As part of its design, the oxygen masks would deploy automatically under those circumstances. The copilot stated during interview that, as part of checklist action items, they activated the passenger oxygen masks manual override.

Flight crew oxygen

The flight crew oxygen system is a gaseous, diluted-demand system with individual masks and regulator for each Flight Crew. This system provides more than adequate oxygen for the flight crew to maintain normal sustained flight during a decompression emergency. The masks are located at each flight crew station and each of them is connected to an oxygen outlet and has a built-in communication.

1.18.3 Notification & Investigations

1.18.3.1 Notification of Incident

PNG CAR Part 12.55 (a) states;

> *A holder of a certificate issued in accordance with the following Parts must notify the authority as soon as practicable of any associated incident if the certificate holder is involved in the incident and the incident is a serious incident or an immediate hazard to the safety of aircraft operations: —*

The Operator's *Flight Administration Manual (FAM) section 7.1* states;

> *Should there be any accidents or incidents involving company aircraft, the company or Pilot in Command shall notify the Civil Aviation Authority of the Accident or incident as soon as practicable. ACT 289, CAR Part 12.51 and 55.*

The PIC, during interview stated that he had advised the Chief Pilot less than an hour after he had disembarked the aircraft. The AIC established that the PIC, nor the Operator notified the Authority of the serious incident as soon as practicable.

The *FAM Section 7.1.8* also stated that;

> *When an incident occurs to a company aircraft the Pilot in Command and the company shall provide CASA with the occurrence details within three (3) working days of the incident on an Air Niugini Operations Occurrence Report (OOR) form.*

The investigation found that the OOR form was provided to CASA on the day after the occurrence. On the same day, details of the serious incident were provided to the AIC by CASA PNG.

1.18.4 Post Occurrence maintenance

Following the occurrence, the Operator's engineers began maintenance action on the aircraft, before the AIC was notified. The AIC acquired the post-occurrence maintenance records from the day of the occurrence up to 26 November 2019 to support its investigation.

The maintenance technical log records showed that during the troubleshooting process, the following components were replaced; Primary Outflow Valve, Cabin Pressure Controller, and the Check Valve to the Secondary Outflow Valve.

The log showed that the POV and SOV were 'stuck closed' and then opened until *'step 3'* of the *AMM TASK 21-31-00-811-841-B (Appendix B, 5.2.1) 'Troubleshooting of the Pneumatic Control of the Cabin Pressure Control System'* procedure was carried out, that is when the vacuum line was disconnected from the torque motor. However, according to the procedure, to get to *step 3*, the POV and SOV would have to been observed in the open position in *steps 1* and *2*.

If the procedure is followed correctly, to get to step 3, the outflow valves would have been open. If the valves were observed in the closed position in step 1 or 2, the procedure would have directed the engineers to step 9.

The investigation believes that it was more likely that the engineers commenced at step 3 where the valves would have been closed, by default, due to spring force.

After conducting step 3 of the procedure, the outflow valves opened. The maintenance records showed the engineers replaced the POV following step 4. However, the result of the test in step 3 (outflow valves open) directed the engineers to conduct step 5.

Step 5 required the disconnection of the connector to the torque motor to the check valve operation. It also contains a NOTE stating *'If the valves do not close, probably the torque motor of the SOV leaks.'* The investigation found that step 5 of the procedure was never conducted. After replacing the POV, a pressurisation test was carried out but there was no response when the engineers selected the rate control. Subsequently, they replaced the CPC. An operational check was then carried out and found that the check valve connecting to the SOV was not operating correctly and was replaced.

After this, another pressurisation check was carried out, and the defect was still present. The engineer then cleaned the SOV's electrical plug and the sense lines. According to the interview, the engineer stated that the operational check of the outflow valves was carried out and found satisfactory at that time. The aircraft pressurisation check was carried out and result yielded no fault as it was before.

Due to the error made in number of components replaced during the troubleshooting procedure and the maintenance conducted on the surrounding system, the investigation could not narrow down the cause of the fault.

1.18.5 Threat and Error Management (TEM)

In its Doc. 9683, Human Factors Training Manual, ICAO provides reference to Threat and Error Management (TEM), and specifically refers to threats and errors as follows:

Threats impact on the crew's ability to manage a safe flight. An event or factor is qualified as a threat only if it is external to the flight deck, i.e. if it originates outside the influence of the crew. Crews must deal with threats while pursuing commercial objectives that underlie airline operations. Threats are not necessarily deficiencies in the aviation system, but external events that increase the complexity of flight operations and therefore hold the potential to foster error. Threat management in flight operations is needed in order to sustain performance in demanding contexts. The total elimination of threats would only be possible by not flying at all. What is important is that the crews recognize threats and can apply countermeasures to avoid, minimize or mitigate the effect on flight safety.

Within the TEM concept, flight crew operational error is defined as an action or inaction by the crew that leads to deviations from organizational or flight crew intentions or expectations. Operational errors may or may not lead to adverse outcomes.

Within the five categories of operational errors defined by ICAO, a procedural error is explained as a *deviation in the execution of regulations and/or operator procedures. The intention is correct but the execution is flawed. This also includes errors where the crew forgot to do something.*

The investigation found that the second action item of the *Fokker QRH Cabin Pressurization Control Fault checklist "*manual cabin pressure control procedure – apply", required the flight crew to refer to the *Fokker 70/100 QRH Manual Cabin Pressurization* checklist and that item was read out by the PIC, but the second checklist was never actioned. Considering that two seconds after the read out by the PIC there were two simultaneous events, a call from ATC and the activation of the Excessive Cabin Altitude Warning, the attention of the flight crew could have been diverted towards those two events, interrupting the sequence to complete the appropriate action items and leading to a procedural error by not referring to the second checklist applicable for this case.

1.19 Useful or effective investigation techniques

The investigation was conducted in accordance with the Papua New Guinea *Civil Aviation Act 2000 (As Amended),* and the Accident Investigation Commission's approved policies and procedures, and in accordance with the Standards and Recommended Practices of *Annex 13* to the Chicago Convention on International Civil Aviation.

2 ANALYSIS

2.1 General

The analysis section of this report discusses relevant facts which contributed to the on-set of the emergency and subsequent serous incident.

The investigation determined that there were no issues with the aircraft and its systems apart from the defect in the pressure control system. The analysis will therefore focus on the following issues but not necessary under separate headings:

- Operational aspects
- Maintenance, and
- Survival aspects

2.2 Operational aspects

2.2.1 Flight operations

Besides the procedural error of the flight crew by not referring to the *Manual Cabin Pressurization* checklist when requested by the second action item of the *Cabin Pressurization Control Fault* checklist, the investigation also found that during the emergency descent, the flight crew only actioned the memory items of the *Emergency Descent* checklist, but they did not go through the non-memory items during that manoeuvre. However, some of the non-memory items of the *Emergency Descent* checklist were activated when executing the *Excessive Cabin Altitude* checklist. No readout or confirmation of the *Emergency Descent* checklist was done until about 10 minutes later when, according to the CVR data, the flight crew reviewed the checklist.

Therefore, a number of action items from the *Emergency Descent* checklist were not actioned at the appropriate times and circumstances. These included turning the 'seatbelt sign/no smoking sign' on, 'notifying ATC', and setting the 'transponder' squawk code.

The crew were heard referring to the checklist after completing the emergency descent, however, the checklist is intended to be actioned when an emergency descent is decided by the crew.

The checklist required the seat belt/no smoking sign to be turned on. This is to command and ensure cabin occupants remain seated with their seatbelts securely fastened to avoiding injury during the rapid descent phase which in this case reached a rate of descent of about 7,000 ft/min.

A notification to ATC provides them with the proper information to commence appropriate coordination to assist during emergencies and also alert the appropriate authorities to allow preparations to be made at the earliest for rescue firefighting and medical assistance. Furthermore, it would alert other aircraft on the same radio frequency about the emergency, and ground preparation and coordination of the emergency.

The checklist also required the transponder to be set to the appropriate squawk code which, under those circumstances, would have been 7700 signifying an emergency. This is intended to ensure appropriate authorities are aware that an emergency situation exists and appropriate preparations are made on the ground to assist the aircraft in distress.

The investigation found that even when the emergency started at about 23,600 ft, and the aircraft entered an emergency descent, the flight crew only made a PAN call when the aircraft was passing through 18,000 ft.

Additionally, the copilot stated in his interview that a few seconds after receiving the fault message, he observed an increase rate of over 4,000 FPM in the cabin rate of change indicator. However, such an indication is out of the scale of the gauge, according to the Fokker Aircraft Operating Manual (AOM), which allows for a maximum of 2,000 FPM of increase/decrease rate. Therefore, the inaccurate indication referred by the copilot could have been as a result of him misreading or misinterpreting the information from the gauge, or due to an erroneous recollection of the information during the interview.

2.2.2 Cabin Emergency warning system

As provided in their emergency procedures, the cabin crew should have had to receive a pre-recorded emergency PA or the rapid decompression emergency PA from the flight crew to become aware of the situation and the appropriate actions to take. However, neither PA eventuated. The cabin crew, therefore, were unaware of the emergency situation.

The investigation found that the aircraft was not fitted with the pre-recorded tape capable of announcing the emergency. The Operator's *Safety and Emergency Procedures Manual (SEPM), Volume 1, Section 5.5.3* states that, if a pre-recorded tape is not fitted, the Pilot Monitoring or designated flight crew should make the PA announcement. Originally, there was a pre-recorded tape installed. However, since the implementation of the Manufacturers Service Bulletin SBF100-23-045 App.04, the tape was replaced with a solid-state digital music reproducer, which is not capable of announcing the emergency in the cabin.

The information in the AOM related to the automated pre-recorded tape was not up-to-date. This has the potential to present a false sense of security to pilots. Pilots may, due to workloads associated with emergencies, rely on automated systems to take care of certain tasks without knowing that the system is no longer available.

The earliest PA the investigation found was at the point where the oxygen masks were deployed, after the aircraft had already descended about 5,000 ft under emergency conditions, telling passengers and cabin crew to acquire oxygen. The investigation determined that the general flight crew communication with cabin crew were not consistent with the Operator's emergency communication requirements and the rapid depressurisation procedures.

2.2.3 Air traffic control

The depressurisation occurred during the approach into Jacksons Airport and ATC facilitated the crews' requests without delay.

Upon the crews request for further descent, ATC instructed them to conduct a normal descent with a restriction from going below the DME steps. The investigation found that the normal descent instruction was issued because at that time, ATC was not aware of the pilots' intentions for an emergency descent.

ATC was only made aware of the emergency situation by the crew when, about two minutes after the above referred clearance, the flight crew broadcast a PAN call, while passing through 17,000 ft. Immediately following the PAN call, ATC declared a Distress Phase. The Aerodrome Emergency Procedures were activated by ATC, and the Aviation Rescue Fire Fighting services were advised to stand by at taxiway golf. On final approach at 10 miles, the pilot advised the tower that they were expecting a normal approach and landing. After the aircraft touched down safely, the ARFF were advised to stand down their services.

2.3 Aircraft

2.3.1 Cabin Pressure Control System

The cabin pressure control system fault was first observed and reported by the flight crew on 19 November 2019. The Cabin Pressure Controller was checked by the Operator's engineers and found faulty. Subsequently, the CPC was replaced and tested and found to be serviceable. It was believed that the defect had been rectified so the aircraft was then released back to service on the same day.

However, the same fault was observed again during a flight on 20 November 2019, the next day. The engineers carried out an operational check on the outflow valve and the results, to them, were satisfactory. After replacing the air filter, the fault did not appear to exist anymore. The aircraft was therefore, released back to service.

On 21 November 2019, the same fault was observed a third time, and on this occasion, a rapid depressurisation occurred along with an associated warning activation. An emergency descent was conducted from 23,000 ft to 10,000 ft as a result.

The investigation determined that the defect associated with the depressurisation event was probably the same defect that caused the fault activations in the two preceding days. The defect was never identified and rectified before the occurrence flight. The investigation believes that the system may have either been malfunctioning intermittently or, the flight conditions simulated on the ground during maintenance may not have been representative of the actual flight conditions resulting in false readings being received by the engineers.

The investigation was unable to conclusively determine the cause of the cabin pressure control system fault due to the post occurrence troubleshooting and maintenance action errors, which resulted in difficulty to narrow the fault identification.

The investigation determined that this kind of inadequate maintenance practice may have also contributed to the misdiagnosis which occurred during maintenance prior to the occurrence.

2.4 Survivability aspects

The investigation determined that the cabin crew initiated and actioned their decompression drill actions in a timely manner due to the fact that they were in the forward crew station when they heard what they believed to be the sound of flight crew breathing through their oxygen masks. This was following the initial observations they made including; discomfort in their ears, rushing air from the air vents and cabin suddenly becoming very cold.

According to their safety emergency procedures, the SCC was required to remain in her seat until the aircraft had reached a safer altitude and the PIC had made a PA for cabin crew to carry out their follow up duties, however she still assisted the child at seat 4G with his oxygen mask. Although this action was taken before the emergency descent, it is vital for the Cabin Crew to be secured in their seats during the emergency phase to ensure that they are safe in order to assist and care for passengers, post emergency.

The investigation determined that had the child been seated next to an adult or closer to his family, the SCC would not feel obliged to leave her seat to assist the child during the emergency phase.

3. CONCLUSIONS

3.1 Findings

3.1.1 Aircraft

a) The aircraft was certified and equipped in accordance with existing regulations and approved procedures.

b) The aircraft had a valid Certificate of Airworthiness.

c) The aircraft was certified as being airworthy when dispatched for the flight.

d) The mass and the centre of gravity of the aircraft were within the prescribed limits.

e) There was no evidence of airframe failure or system malfunction prior to the serious incident.

f) The aircraft was structurally intact prior to landing.

3.1.2 Flight crew / cabin crew

a) The PIC was licensed and qualified for the flight in accordance with existing regulations.

b) The copilot was licensed and qualified for the flight in accordance with existing regulations.

c) The flight crew were medically fit and adequately rested to operate the flight.

d) The flight crew and cabin crew were in compliance with the flight and duty time regulations.

3.1.3 Flight operations

a) The flight was conducted in accordance with the procedures in the company Operations Manual.

b) The flight crew did not use the correct QRH procedure as follow up for the Cabin Pressurization Control Fault procedure.

c) The flight crew did not refer to the *'Emergency descent'* checklist during the emergency.

d) The flight crew did not use the correct emergency PAs in accordance with the Operator's approved procedures.

3.1.4 Operator

a) The presentation of the operator's Emergency Checklist was adequate for use under conditions of stress.

b) The flight crew maintained good flight deck communication.

c) The Operator's oversight on the emergency response procedures at the departmental level was not consistent with the its corporate emergency response policy.

3.1.5 Air traffic services and airport facilities

a) ATC provided prompt and effective assistance to the flight crew.

3.1.6 Flight recorders

a) The aircraft was equipped with a flight data recorder (FDR) and a cockpit voice recorder (CVR); as required by regulation.

3.1.7 Medical

a) There was no evidence that incapacitation or physiological factors affected the flight crew performance.

3.1.8 Survivability

a) The serious incident was survivable.

b) The flight crew donned their oxygen masks at the onset of the emergency.

c) The flight crew manually deployed passenger and cabin crew oxygen masks.

d) The cabin crew assisted a child and a mother and her infant with donning of their oxygen masks.

e) There were no reported injuries.

f) The distress phase was declared immediately upon receipt of the PAN call.

g) ARFF were on standby prior to P2-ANY landing. They stood down their services after P2-ANY landed.

3.2 Causes [Contributing factors]

The defect in the Pressure Control System.

3.3 Other factors

Maintenance work had commenced on the aircraft resulting in evidence being tampered with, before AIC commenced their onsite activities.

The flight crew did not establish communication with cabin crew using the appropriate method, nor did they switch on the fasten seatbelt/no smoking sign, or set the transponder to 7700 as required by the *Emergency Descent* checklist, at the appropriate time.

During the emergency, the SCC assisted the child in seat 4G when she was required to be secured in her seat. The investigation determined that in an event of severe rapid depressurisation, the SCC would have been exposed to more risks.

4. RECOMMENDATIONS

4.1 Recommendations

As a result of the investigation into the serious incident involving the Fokker 70 aircraft, registered P2-ANY, which experienced a rapid depressurisation event during a normal descent, 51 nm North East of Jackson the Papua New Guinea, the Accident Investigation Commission issued the following recommendations to address concerns identified in this report.

4.1.1 Recommendation number AIC 20-R30/19-2002 to Air Niugini Limited

Date Issued: 2 October 2020

The PNG Accident Investigation Commission recommends that Air Niugini Limited should ensure that the use of abnormal/emergency QRH checklists, is reinforced for flight crews to ensure that relevant checklist items are referred to and actioned in a timely manner.

Action requested

The AIC requests that Air Niugini Limited note recommendation *AIC 20-R30/19-2002*, and provide a response to the AIC within 90 days of the issue date, and explain (including evidence) how Air Niugini Limited has addressed the safety deficiency identified in the safety recommendation.

Closing statement

Air Niugini Limited (ANL) provided a response to the recommendation AIC 20-R30/19-2002 which stated that:

> *As per Company Standard Operating Procedure 17.3.2, in case of emergency, the flight crew members are expected to carry out immediate actions of memory and after attaining a safe situation; they shall refer and carry out emergency actions as per QRH.*
>
> *This is the CASAPNG and OEM approved procedure, and the procedure as followed by the crew:*(refer to attachments 1, 2 and 3).

Attachment 1

17.3.2 Non-Normal Checklists

Non-normal checklists are provided to manage non-normal situations. In a non-normal checklist there may be memory/ recall items and reference items. Memory items are boxed.

Non-normal checklist actions are to be carried out once the aircraft flight path and configuration are properly established. Only a few situations require an immediate response (e.g. stall warning, GPSW pull-up warning, TCAS RA, and rejected takeoff). Usually, time is available for assessment before corrective action is initiated. All actions should then be co-ordinated under the Captain's supervision and performed in a deliberate, systematic manner. Under no circumstances should flight path control be compromised.

When a non-normal situation is evident, at the PF's command, each crew member systematically and without delay accomplishes recall action items (if any) in their area of responsibility.

Non-Normal Procedures Version 12.0 1-May-19

Page 17-2 Document Owner: General Manager Flight Operations

Attachment 2

NOTE: The crew member responsible for carrying out the actions on irreversible items **prior to accomplishing that action** must have a verbal confirmation that the correct selection has been made of any:

- **Thrust lever.**
- **Fuel control.**
- **Fire handle.**
- **Fire switch.**
- **IDG/CSD disconnect switch.**
- **IRS**

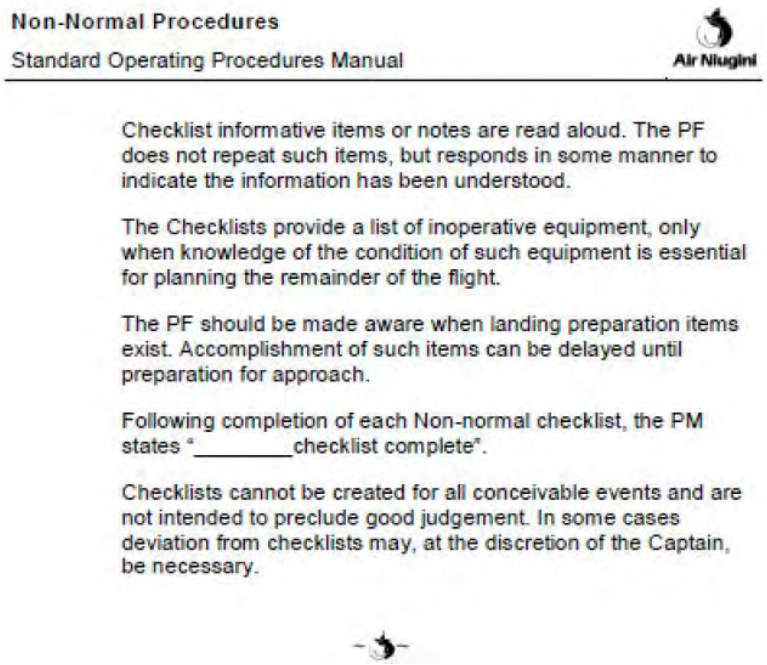
For those checklists which contain only reference items or a combination of recall and reference items, the PF calls for the checklist when the flight path is under control, the aircraft is not in a critical stage of flight (e.g., takeoff, landing) and recall items (if any) are complete.

The PM will then read aloud in sequence each checklist item, including the response. Recall (boxed) items will be rechecked to ensure that the challenged action, i.e., switch position, instrument configuration, etc. has been accomplished.

The checklist reference actions items are read aloud, with appropriate action being taken by the PM. After accomplishing the checklist item, the PM states the checklist response. If a checklist item cannot be completed at that point, the checklist must be held until the required step is completed. When holding the checklist the PM should state, "HOLDING AT_____".

The PF may also direct reference action items to be accomplished by recall, if no hazard is created by such action or if conditions do not permit reference to a checklist. The PF then calls for the appropriate checklist.

Attachment 3



Non-Normal Procedures

Standard Operating Procedures Manual

Air Niugini

Checklist informative items or notes are read aloud. The PF does not repeat such items, but responds in some manner to indicate the information has been understood.

The Checklists provide a list of inoperative equipment, only when knowledge of the condition of such equipment is essential for planning the remainder of the flight.

The PF should be made aware when landing preparation items exist. Accomplishment of such items can be delayed until preparation for approach.

Following completion of each Non-normal checklist, the PM states "_____checklist complete".

Checklists cannot be created for all conceivable events and are not intended to preclude good judgement. In some cases deviation from checklists may, at the discretion of the Captain, be necessary.

The information provided by Air Niugini Limited in response to the safety recommendation was considered against the findings and relevant factual information included in the investigation. It was found that, despite the efforts of the operator to justify the actions of the flight crew, the response does not address the underlying safety deficiency that gave origin to the safety recommendation. Particularly, during the investigation it was clearly identified that the flight crew did not timely and adequately refer to the applicable checklists, hence the importance of ensure that the use of abnormal/emergency QRH checklists is reinforced for flight crews to ensure that relevant checklist items are referred to and actioned in a timely manner. Moreover, the information provided by Air Niugini Limited confirms the importance of the safety recommendation as the *Safety Operating Procedure Manual, Section 17.3.2 Non-Normal Procedures* indicates that Non-normal checklist actions, which by the definition provided under the same Section includes memory/recall items and reference items, are to be carried out once the aircraft flight path and configuration are properly established and later explains that for those checklists like the ones applicable at the onset of the occurrence of interest, the PF calls for the checklist when the flight path is under control, the aircraft is not in a critical stage of flight and recall items are complete. Therefore, according to AIC assessment, Air Niugini Limited response does not address the safety issues and safety deficiencies identified during the investigation.

Therefore, the AIC assigned Air Niugini Limited response as *unsatisfactory* and recorded the **Status of the AIC recommendation: CLOSED RESPONSE NOT ACCEPTED.**

4.1.2 Recommendation number AIC 20-R31/19-2002 to Fokker Services

Date Issued: 2 October 2020

The PNG Accident Investigation Commission recommends that Fokker Services should ensure that its information relating to *Emergency Communication* (type of pre-recorded tape) is updated in the AOM.

Action requested

The AIC requests that Fokker Services note recommendation *AIC 20-R31/19-2002*, and provide a response to the AIC within 90 days of the issue date, and explain (including evidence) how Fokker Services has addressed the safety deficiency identified in the safety recommendation.

Closing Statement

Fokker Services initiated a corrective action to update the AOM section 1.03.1 page 3 in the following manner:

A new version of the F28Mk0070 AOM section 1.03.1 page 3 will be created for aircraft on which SBF100-23-045 has been accomplished. In this new version, the description of the Passenger Address system will be without the text: "A pre-recorded emergency message is automatically presented when the passenger oxygen system is activated (either automatically or manually); see section oxygen"

On 16 February 2021, Fokker Services confirmed that this amendment is planned to be incorporated and published in F28Mk0070 AOM General Revision of 01 July 2021 and after formal publication, a digital copy of the subject AOM page will be submitted to the AIC.

According to AIC assessment, corrective action plan addresses the safety issues identified. However, the safety deficiency will remain until effective actions are implemented.

Therefore, assigned Fokker Services as *satisfactory intent* and recorded the **Status of the AIC recommendation: MONITOR.**

4.1.3 Recommendation number AIC 20-R32/19-2002 to Air Niugini Limited

Date Issued: 2 October 2020

The PNG Accident Investigation Commission recommends that Air Niugini Limited should ensure that passengers seating arrangement are managed prior to departure of each flight to ensure that passengers with special needs, or minors flying unattended are able to receive assistance from adjacent passengers.

Action requested

The AIC requests that Air Niugini Limited note recommendation *AIC 20-R32/19-2002*, and provide a response to the AIC within 90 days of the issue date, and explain (including evidence) how Air Niugini Limited has addressed the safety deficiency identified in the safety recommendation.

Closing statement

Air Niugini Limited (ANL) provided a response to the recommendation *AIC 20-R32/19-2002*, and included evidence about the actions adopted by the operator to address the safety deficiency identified.

In its response, Air Niugini explained that:

> *The port staff failed to carry out procedures in ASM: 6.3.1 – Flight Editing. The procedure outlines all actions to be taken by the port staff before the flight is opened for check-in. In this case pre-seating of families was not done.*
>
> *The Sabre Sonic Check-In System (SSCI) has the capability for group check-in and individual check-in for the system to seat passengers with the same surname and group bookings with one PNL to be seated side by side in the same seat row. The passengers (family) were checked in the system individually ex RAB by the traffic officer as per system records. From analysis of the flight documents, the mother was checked in first and the system allocated seat 3B in row three (3), which all the seats in row three (3) were occupied. The child was checked in after thus the system allocating the next closest vacant seat in row 4 (4G) was allocated to the child when he was checked into the DCS system. With the individual check-in action, the system link was severed where the system allocated separate seats. In such cases, the check-in officer is required to check available seat rows and reallocate the family to be seated side by side in the same seat row which the officer failed to action.*

On 17 February 2021, Air Niugini Limited amended the relevant parts of Sections 6.3.1 and Section 6.18.20 of the *Airport Services Manual* including requirements for:

- all flights to be available in the DCS system 72 hours prior to their schedule departure times and that each flight is to be edited,
- families with children and Group travel must be seated side by side in the same rows,
- clarification on the definitions of 'infant' and 'child',
- children must be seated side by side in the same rows with their parents or guardians for their safety observation,
- reference for unaccompanied minors handling procedures,
- revised section title to be specific to infants and children seating,
- emphasis on why children must be seated side by side on the same rows, with their parents or guardians, and
- clarification on the definition of a 'child' that must be seated on their own (not nursed).

A copy of the approved ASM version 15.2 was provided to the AIC *(Refer to attachments 1, 2 and 3 for relevant amendments, highlighted).*

Attachment 1

6.3.1 Flight Editing

All flights are available in the DCS system 72 hours prior to their schedule departure times. Flights are to be edited before being opened for passenger check-in at least 24 hours prior to schedule departure time.

The format for editing shall be

- Pre-allocating seat numbers.
- Entering comments into passenger record as required for special handling.

Editing shall be completed for the following range of passengers:

1. VVIP/VIP/CIP/Executive Club members.
2. Family and common interest groups. Families with children and Group travel passengers must be seated side by side in the same seat rows.
3. Other passengers with differing surnames travelling together linked by a group indicator.
4. Special handling passengers, e.g. WCHR/UMNRs, etc.
5. Positioning Crew and other Air Niugini staff on duty travel.
6. Set Inventory Authorised Counts for any sector restrictions
7. Check seat plan in DCS is correct version according to aircraft type
8. check to ensure PNL is showing in the system
9. Other passengers as required.

The Duty Manager and/or Airport Supervisors (PNG Domestic) shall allocate staff to perform editing duties when compiling their daily worksheets and shall monitor to ensure tasks are completed satisfactorily.

All special handling passengers seating requirements must be observed as per each aircraft type. Refer to Ground Handling and Weight and Balance Manual for each aircraft type section: 4.2.1 – Customer Seating Information.

6.4 Service at Check-In

As it is essential that passenger processing and handling staff provide the best possible service, the following guidelines should be followed. Staff should:

1. Present a smart appearance by being properly uniformed
2. Smile pleasantly
3. Greet the passenger by name, obtained from flight coupon
4. Possess a sound knowledge of ticketing
5. Possess a sound knowledge of the travel regulations relating to the flight concerned.
6. Possess the ability to work fast and efficiently

Attachment 2

6.18.20 Infants and Children

Definitions:

Infant is a minor who has not yet reached his/her second (2nd) birthday, who is nursed and does not occupy a seat.

'Child' is a passenger who has reached his or her second (2nd) birthday but not his or her twelveth (12th) birthday. **Infant'** means a passenger who has not reached his or her second (2nd) birthday.

6.18.20.1 Carriage of Infants and Children Regulations

An infant may be carried in the arms or on the lap of an adult passenger or in a basinet. This is providing the basinet is restrained so as to prevent it from moving under the maximum accelerations to be expected in flight and in an emergency alighting. Precautions are to be taken to ensure that at the times seat belts are required to be worn, the infant will not be thrown from the basinet under these accelerations.

When an infant is carried in the arms or on the lap of a passenger in accordance with the above paragraph, the seat belt, when required to be worn, shall be fastened around the passenger carrying or nursing the infant, but not around the infant.

When an infant is carried in the arms or on the lap of a passenger in accordance with the above paragraph, or an aircraft engaged in charter or regular public transport operations, the name of the infant shall be bracketed on the passenger list with the name of the person carrying or nursing the infant."

Children who have reached their third (3rd) birthday must have a ticket, and are allocated a seat. Children must be seated side by side on the same seat rows with their parents or guardians. With circumstances where Unaccompanied Minors are travelling, must be allocated a seat in the forward cabin of the class of travel at an aisle seat next to an adult passenger. This safety procedure is to ensure that children are easily assisted by adult passengers and cabin crews should an emergency situation arise during a particular flight. Check-in agents must observe this procedure when processing passengers during check-in of passengers. Further Unaccompanied Minors handling requirements, refer to ASM 6.18.19 to 6.18.19.3.

Cabin Crews and Flight Crews are anxious to help Station Staff out of temporary difficulties wherever they can, and they do, but acting illegally as per CASA Regulations, they cannot condone.

Cabin Crews and Flight Crews are quite entitled to request correction of any situation they find out conforming to the regulations, and Station Staff should not put them in the position of having to refuse to allow the nursing of oversize children. Some of the requests recently have been to nurse children who fall outside of the Infant category by many years.

NOTE: Upon boarding the passenger will need to advise gate check officer of the baby stroller. Boading officer mjust tag the stroller and hand to ramp officer than advice of weight to the load controller for weight and balance accountability.

Attachment 3

6.18.20.2 Seating

The maximum number of infants allowed per aircraft is limited by the number of supplemental oxygen masks available on the aircraft. However, consideration can be given to include the number of infant life jackets and seat belts carried. Restrictions apply to one (1) infant per adult passenger.

An adult carrying and nursing an infant MUST never be seated in an emergency exit row. Children must occupy an individual passenger seat but MUST not be seated in emergency exit row seats. Their seat belts are to be securely fastened for the duration of the flight to ensure safety observations.

Children must be seated side by side on the same seat rows with their parents or guardians. With circumstances where Unaccompanied Minors are travelling, must be allocated a seat in the forward cabin of the class of travel at an aisle seat next to an adult passenger. This safety procedure is to ensure that children are easily assisted by adult passengers and cabin crews should an emergency situation arise during a particular flight. Check-in agents must observe this procedure when processing passengers during check-in of passengers

Infant Bassinet is not provided on the aircraft. Bassinets carried on board by passengers must be stowed away and the infant nursed by the adult throughout the flight. Strollers are not allowed in aircraft cabin. It can be collapsed before boarding and loaded in cargo hold or check-in as baggage.

6.18.20.3 Child Nursing

Child Nursing on flights is deemed ILLEGAL.

The following instructions are for all staff to follow and adhere to:

- Children who have reached their third (3rd) birthday but not their fifteenth (15th) birthday MUST have a ticket and be allocated a seat to travel.
- To this end, under NO circumstances should that child be nursed. The child either travels on his/her own ticket or NO TICKET – NO RIDE. This is NOT NEGOTIABLE.

NOTE: All staff must follow this instruction, as this practice is against the Air Niugini Policy, and is not safe. Such practice can hinder emergency evacuation, leading at the worst case to loss of life.

Children have been nursed by their parents at the request of Station staff, some of them obviously too big to be comfortable

This is strictly against Air Niugini policy, and is an unsafe practice, as such a practice can hinder emergency evacuation leading, at the worst case, to loss of life, and therefore it is not allowed.

According to AIC assessment, the corrective action adopted by Air Niugini Limited addresses the Safety deficiency and therefore, assigned a rating as *satisfactory* and recorded the **Status of the AIC recommendation: CLOSED RESPONSE ACCEPTED.**

4.1.4 Recommendation number AIC 20-R33/19-2002 to Air Niugini Limited

Date Issued: 2 October 2020

The PNG Accident Investigation Commission recommends that Air Niugini Limited should ensure that its emergency response procedures at the departmental level are adequate and consistent with its Corporate Emergency Response Policy, and are understood by the staff.

Action requested

The AIC requests that Air Niugini Limited note recommendation *AIC 20-R33/19-2002*, and provide a response to the AIC within 90 days of the issue date, and explain (including evidence) how Air Niugini Limited has addressed the safety deficiency identified in the safety recommendation.

Closing statement

In their response, Air Niugini Limited (ANL) stated that, in their view, the safety recommendation had been found to be already complied with on the date of the occurrence.

Notwithstanding ANL's views with regard to compliance with the safety recommendation, in their response they informed AIC that they had planned to impart training/briefing to all its Customer Services staff regarding attending to aircraft arriving with different emergencies so as to prepare themselves with appropriate arrangements to attend to the situation, which was part of the safety deficiency identified by the AIC as in the investigation it was found that the Customer Services Officer who met the flight was unaware of the occurrence, and was later advised by one of the cabin crew, only after all passengers had disembarked. On 21 January 2021, ANL provided records of one table-top exercise which was conducted on 12 November 2020, indicating that only part of their customer services staff attended this exercise.

In addition to the above mentioned and contrary to ANL's response that their Airport Services Manual (ASM) does not contain a detailed *'operational emergency'* procedure, the AIC found that section 12 of the ASM includes a departmental emergency response plan which is to be carried out in situations where no corporate emergency has been declared. This procedure clearly meets the criteria of an operational emergency, as described in ANL's Corporate Emergency Response Manual.

According to AIC assessment, Air Niugini Limited response does not address the safety issues and the safety deficiencies identified during the investigation. Therefore, the AIC assigned Air Niugini Limited response a rating of *unsatisfactory* and recorded the Status of the AIC recommendation: **CLOSED RESPONSE NOT ACCEPTED.**

4.1.5 Recommendation number AIC 20-R34/19-2002 to Air Niugini Limited

Date Issued: 2 October 2020

The PNG Accident Investigation Commission recommends that Air Niugini Limited should ensure that their procedures relating to access to aircraft in the event of an accident or serious incident consider the level of involvement of the AIC as per its mandate under the *Civil Aviation Act 2000 (As Amended)* and *PNG Civil Aviation Rule Part 12*, as applicable.

Action requested

The AIC requests that Air Niugini Limited note recommendation *AIC 20-R34/19-2002*, and provide a response to the AIC within 90 days of the issue date, and explain (including evidence) how Air Niugini Limited has addressed the safety deficiency identified in the safety recommendation.

Closing statement

Air Niugini Limited (ANL) provided a response to the recommendation AIC 20-R34/19-2002 which stated;

> *The incident occurred on 21 Nov 2019 and the same was reported to CASA PNG through Operations Occurrence Report (OOR) on the same day, as per CASA PNG Rule Part 12.55. Air Niugini received notification regarding the order of constituting an investigation into the incident on 22 Nov 2019 at 1734 hours on 22 Nov 2019.*
>
> *Neither Part 1 nor Part 12 define this as either an accident nor as a serious incident. Hence, neither CASA PNG Rule Part 12.101 (access to aircraft involved in accident) nor Rule Part 12.103 (preservation of records of aircraft involved in serious incident) were applicable to this occurrence. However, as per Civil Aviation Act section 246 (3) (c) quoted in this safety recommendation, Air Niugini fully cooperated with AIC in its investigation from the time the official notification of investigation by AIC was received, or in fact, even before that when five investigators arrived onto the aircraft for investigation.*
>
> *Hence, as Air Niugini had no noncompliance relating to the reported tampering of the evidence, we recommend withdrawing this safety recommendation.*

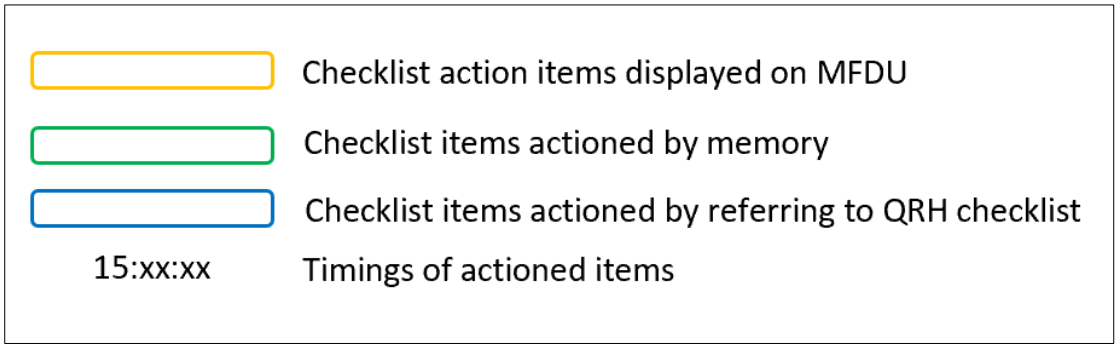
Based on their response, Air Niugini Limited is of the view that the occurrence did not meet the criteria of a serious incident and, therefore, there was no reason to address the safety recommendation. It is important to consider that in accordance with the *CASA PNG Advisory Circular AC 12-1 Appendix A 1,* which in this particular case is aligned with *Annex 13* to the *Convention on International Civil Aviation,* events requiring the emergency use of oxygen by the flight crew' are considered serious incidents. The AIC assessment identified that Air Niugini Limited's response does not address the safety deficiencies identified.

Therefore, the AIC assigned Air Niugini Limited response a rating *unsatisfactory* and recorded the **Status of the AIC recommendation: CLOSED RESPONSE NOT ACCEPTED.**

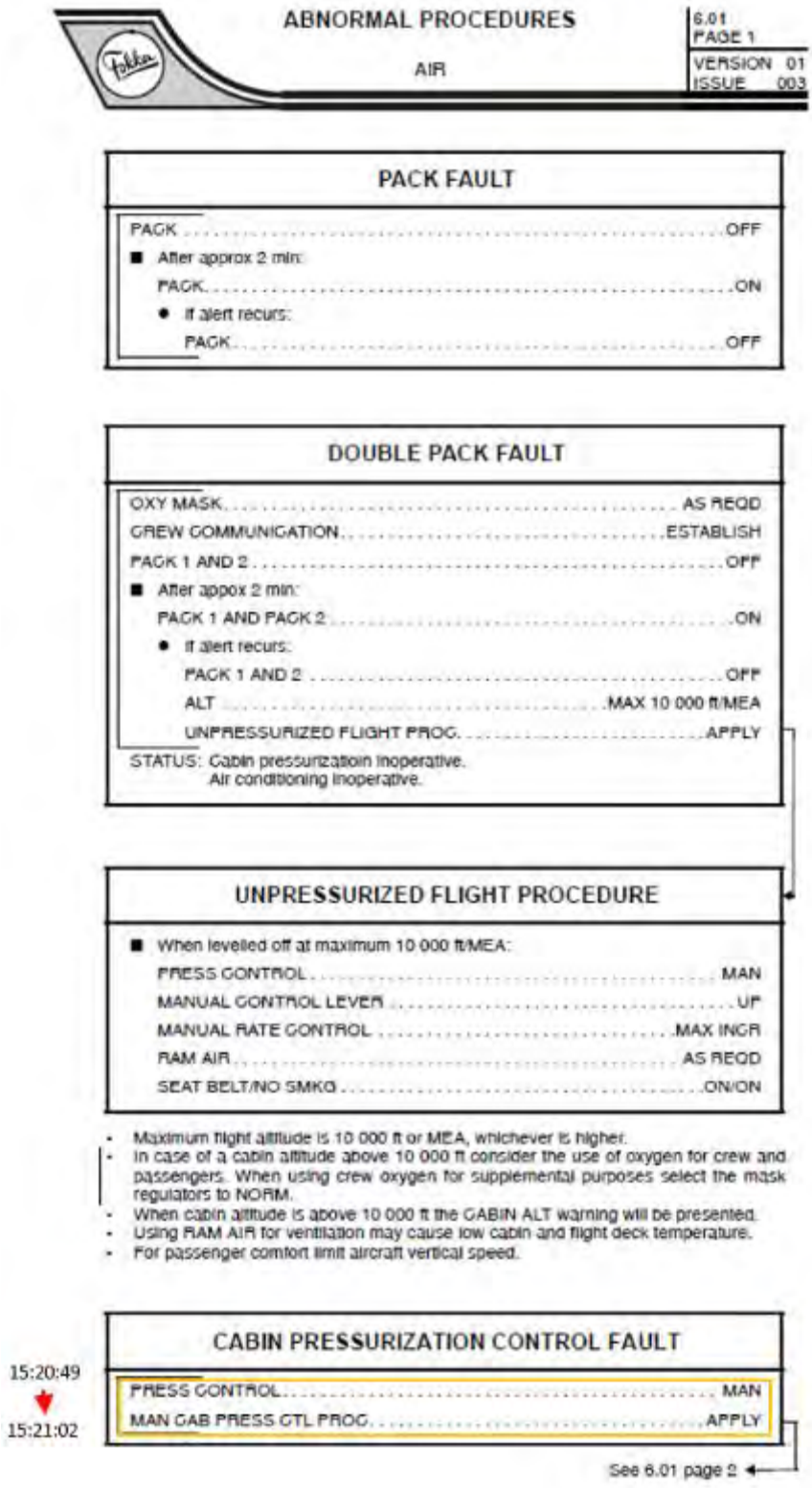
5 APPENDICES

5.1 Appendix A: Flight Operations

5.1.1 Key



5.1.2 Fokker 70/100 QRH *Cabin pressurization control fault* procedures



ABNORMAL PROCEDURES

AIR

6.01
PAGE 1
VERSION 01
ISSUE 003

PACK FAULT

PACK ..... OFF

■ After approx 2 min:

PACK ..... ON

● If alert recurs:

PACK ..... OFF

DOUBLE PACK FAULT

OXY MASK ..... AS REQD

CREW COMMUNICATION ..... ESTABLISH

PACK 1 AND 2 ..... OFF

■ After appox 2 min:

PACK 1 AND PACK 2 ..... ON

● If alert recurs:

PACK 1 AND 2 ..... OFF

ALT ..... MAX 10 000 ft/MEA

UNPRESSURIZED FLIGHT PROC. ..... APPLY

STATUS: Cabin pressurizatioin inoperative.
Air conditioning inoperative.

UNPRESSURIZED FLIGHT PROCEDURE

■ When levelled off at maximum 10 000 ft/MEA:

PRESS CONTROL ..... MAN

MANUAL CONTROL LEVER ..... UP

MANUAL RATE CONTROL ..... MAX INCR

RAM AIR ..... AS REQD

SEAT BELT/NO SMKG ..... ON/ON

- Maximum flight altitude is 10 000 ft or MEA, whichever is higher.
- In case of a cabin altitude above 10 000 ft consider the use of oxygen for crew and passengers. When using crew oxygen for supplemental purposes select the mask regulators to NORM.
- When cabin altitude is above 10 000 ft the CABIN ALT warning will be presented.
- Using RAM AIR for ventilation may cause low cabin and flight deck temperature.
- For passenger comfort limit aircraft vertical speed.

15:20:49

15:21:02

CABIN PRESSURIZATION CONTROL FAULT

PRESS CONTROL ..... MAN

MAN CAB PRESS CTL PROC. ..... APPLY

See 6.01 page 2

5.1.3 Fokker 70/100 QRH *Manual Cabin Pressurization Control Procedure*

MANUAL CABIN PRESSURIZATION CONTROL PROCEDURE

- GLIMB:
  - MANUAL CONTROL LEVER ..... UP
  - MANUAL RATE CONTROL ..... AS REQD
  - When reaching target CAB ALT:
    - MANUAL CONTROL LEVER ..... MID POS
- DESCENT:
  - MANUAL CONTROL LEVER ..... DN
  - MANUAL RATE CONTROL ..... AS REQD
  - When cabin altitude reaches landing altitude:
    - MANUAL CONTROL LEVER ..... MID POS
- BEFORE LANDING:
  - MANUAL CONTROL LEVER ..... UP

CRUISE ALT (ft)	18 000	20 000	22 000	24 000	26 000
TARGET CAB ALT (ft)	0	1000	2100	3100	4000
CRUISE ALT (ft)	28 000	29 000	31 000	33 000	35 000
TARGET CAB ALT (ft)	5000	5500	6400	7200	8000

REDUCED CABIN PRESSURE DIFFERENTIAL PROCEDURE

DESCEND IF REQD (MAX ALTITUDE 25 000 ft or MEA, whichever is higher)
PRESS CONTROL ..... MAN

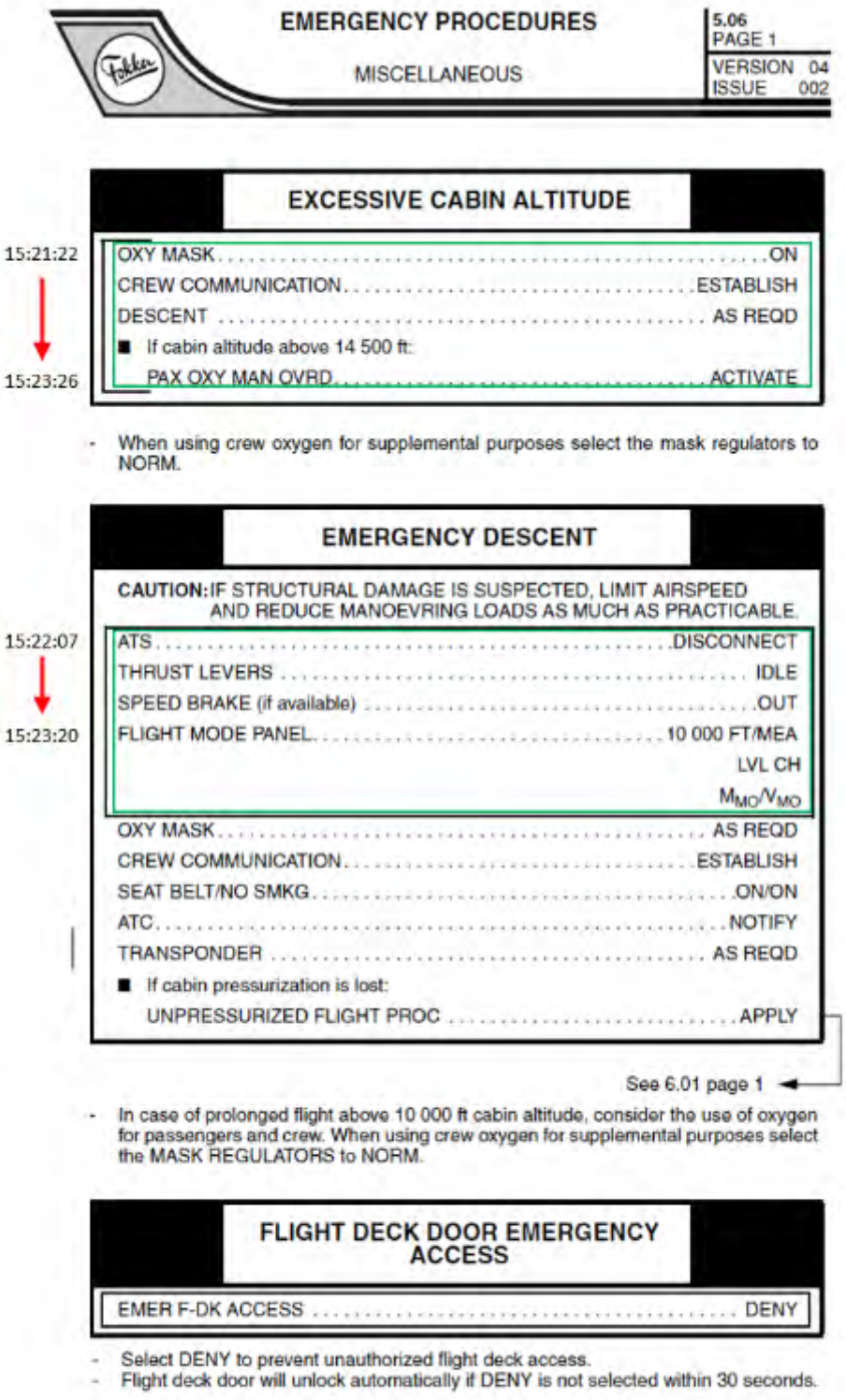
- GLIMB:
  - MANUAL CONTROL LEVER ..... UP
  - MANUAL RATE CONTROL ..... AS REQD
  - MONITOR CABIN PRESS DIFFERENTIAL ..... < 5.5 PSI
  - When reaching target CAB ALT:
    - MANUAL CONTROL LEVER ..... MID POS
- DESCENT:
  - MANUAL CONTROL LEVER ..... DN
  - MANUAL RATE CONTROL ..... AS REQD
  - MONITOR CABIN PRESS DIFFERENTIAL ..... < 5.5 PSI
  - When reaching target CAB ALT or landing altitude:
    - MAN CONTROL LEVER ..... MID POS
- BEFORE LANDING:
  - MANUAL CONTROL LEVER ..... UP

CRUISE ALT (ft)	=<12 000	14 000	16 000	18 000	20 000	22 000	24 000	25 000
TARGET CAB ALT (ft)	0	1000	2500	3800	5000	6500	7500	8000

NOTE: If MEA above 25 000 ft, maintain 5.5 PSI CABIN PRESS DIFFERENTIAL.

- Monitor cabin pressure differential and cabin vertical speed during climb and descent.
- If MEA above 25 000 ft cabin altitude may exceed 10,000 ft
- When cabin altitude is above 10 000 ft the CABIN ALT warning will be presented.
- In case of a cabin altitude above 10 000 ft consider the use of oxygen masks for crew and passengers. When using crew oxygen for supplemental purposes select the mask regulators to NORM.

5.1.4 Fokker 70/100 QRH *Excessive cabin altitude* and *emergency descent* procedures



EMERGENCY PROCEDURES

MISCELLANEOUS

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EXCESSIVE CABIN ALTITUDE

15:21:22

OXY MASK ..... ON
CREW COMMUNICATION ..... ESTABLISH
DESCENT ..... AS REQD
■ If cabin altitude above 14 500 ft:
PAX OXY MAN OVRD ..... ACTIVATE

15:23:26

- When using crew oxygen for supplemental purposes select the mask regulators to NORM.

EMERGENCY DESCENT

CAUTION: IF STRUCTURAL DAMAGE IS SUSPECTED, LIMIT AIRSPEED AND REDUCE MANOEVRING LOADS AS MUCH AS PRACTICABLE.

15:22:07

ATS ..... DISCONNECT
THRUST LEVERS ..... IDLE
SPEED BRAKE (if available) ..... OUT
FLIGHT MODE PANEL ..... 10 000 FT/MEA
LVL CH
M_{MO}/V_{MO}

15:23:20

OXY MASK ..... AS REQD
CREW COMMUNICATION ..... ESTABLISH
SEAT BELT/NO SMKG ..... ON/ON
ATC ..... NOTIFY
TRANSPONDER ..... AS REQD
■ If cabin pressurization is lost:
UNPRESSURIZED FLIGHT PROC ..... APPLY

See 6.01 page 1

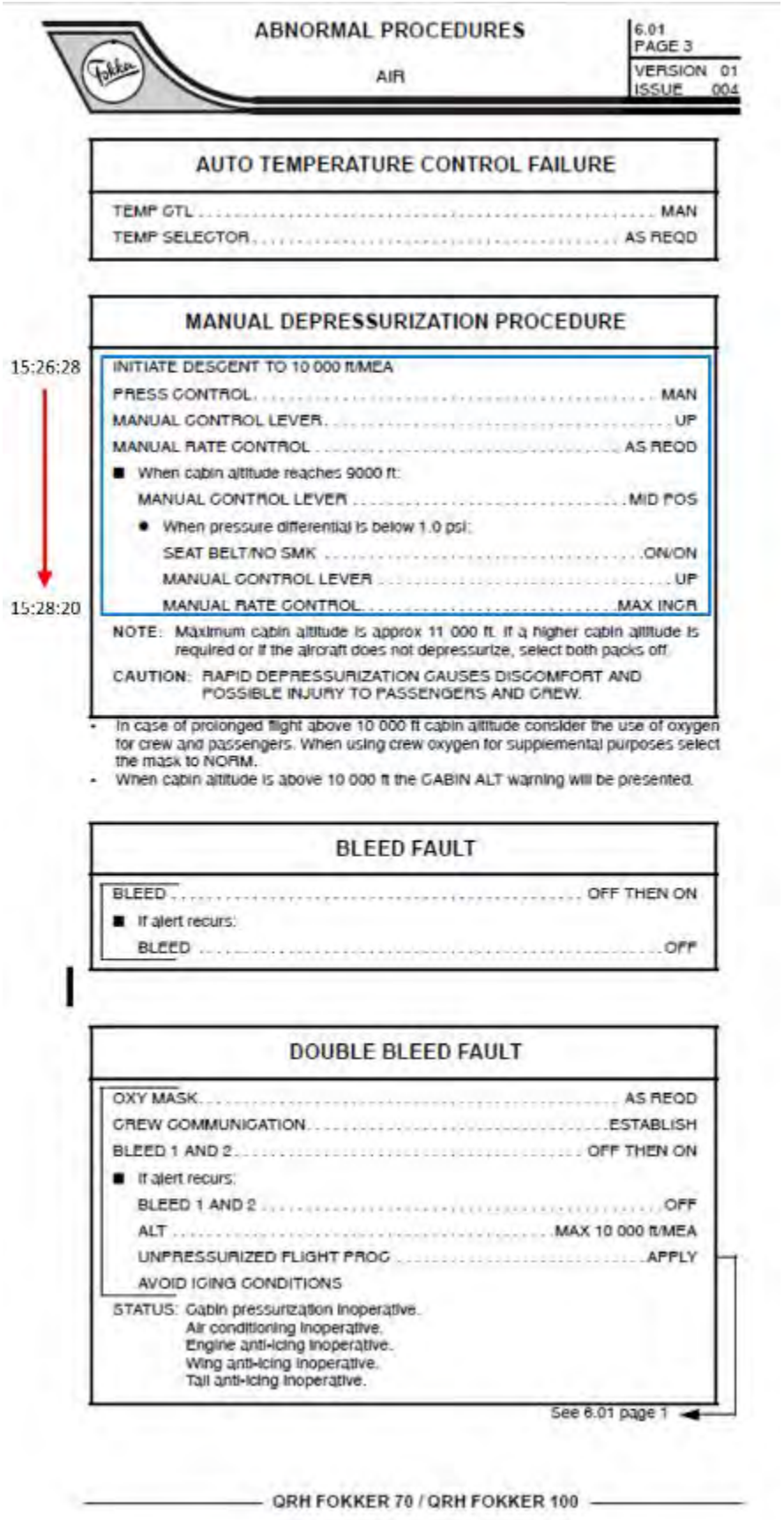
- In case of prolonged flight above 10 000 ft cabin altitude, consider the use of oxygen for passengers and crew. When using crew oxygen for supplemental purposes select the MASK REGULATORS to NORM.

FLIGHT DECK DOOR EMERGENCY ACCESS

EMER F-DK ACCESS ..... DENY

- Select DENY to prevent unauthorized flight deck access.
- Flight deck door will unlock automatically if DENY is not selected within 30 seconds.

5.1.5 Fokker 70/100 QRH *Manual depressurization* procedure



ABNORMAL PROCEDURES

AIR

6.01
PAGE 3
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ISSUE 004

AUTO TEMPERATURE CONTROL FAILURE

TEMP CTL ..... MAN
TEMP SELECTOR ..... AS REQD

MANUAL DEPRESSURIZATION PROCEDURE

15:26:28

INITIATE DESCENT TO 10 000 ft/MEA
PRESS CONTROL ..... MAN
MANUAL CONTROL LEVER ..... UP
MANUAL RATE CONTROL ..... AS REQD
■ When cabin altitude reaches 9000 ft:
MANUAL CONTROL LEVER ..... MID POS
● When pressure differential is below 1.0 psi:
SEAT BELT/NO SMK ..... ON/ON
MANUAL CONTROL LEVER ..... UP
MANUAL RATE CONTROL ..... MAX INCR

15:28:20

NOTE: Maximum cabin altitude is approx 11 000 ft. If a higher cabin altitude is required or if the aircraft does not depressurize, select both packs off.

CAUTION: RAPID DEPRESSURIZATION CAUSES DISCOMFORT AND POSSIBLE INJURY TO PASSENGERS AND CREW.

- In case of prolonged flight above 10 000 ft cabin altitude consider the use of oxygen for crew and passengers. When using crew oxygen for supplemental purposes select the mask to NORM.
- When cabin altitude is above 10 000 ft the CABIN ALT warning will be presented.

BLEED FAULT

BLEED ..... OFF THEN ON
■ If alert recurs:
BLEED ..... OFF

DOUBLE BLEED FAULT

OXY MASK ..... AS REQD
CREW COMMUNICATION ..... ESTABLISH
BLEED 1 AND 2 ..... OFF THEN ON
■ If alert recurs:
BLEED 1 AND 2 ..... OFF
ALT ..... MAX 10 000 ft/MEA
UNPRESSURIZED FLIGHT PROG ..... APPLY
AVOID ICING CONDITIONS

STATUS: Cabin pressurization inoperative.
Air conditioning inoperative.
Engine anti-icing inoperative.
Wing anti-icing inoperative.
Tail anti-icing inoperative.

See 6.01 page 1

5.1.6 FCOM *Emergency Descent* Procedure

4.10.11.2 Procedure

	PF	PM
Emergency Descent	Command: ***"Emergency Descent".*** Disconnect ATS, thrust levers idle. Speed brake out. At FMP select: • 10,000/MEA • LVLCH • MMO/VMO	"Fasten seat belt" and "No smoking" signs ON. Transponder 7700. Inform ATC.

5.2 Appendix B: Engineering

5.2.1 Pneumatic control of the cabin pressure control

TASK 21-31-00-811-841-B - Troubleshooting of the Pneumatic Control of the Cabin Pressure Control System
EFFECTIVITY: 001999

NOTE: Do this TASK when there are pressure surges in the cabin pressure control system.

1. Prerequisites

FOR A/C: 011011

A. Set the conditions
(1.) Use the APU to supply bleed air to the aircraft (Refer to Task 49-00-00-710-815 for more data).
(2.) Make sure that the cabin pressure system is in automatic mode.
(3.) On the Cabin Pressure Selector (CPS) panel, make sure that the cabin pressure system is in automatic mode.
(4.) On the Air Conditioning Control-Panel (ACP)
(a) Push the BLEED 1 and BLEED 2 pushswitches to make sure that each white OFF legend goes off.
(b) Set the FLIGHT DECK temperature selector to the middle position.
(c) Set the CABIN temperature selector to the middle position.
(5.) On the CPS panel, make sure that the UP/DN directional control lever is in the middle position.
(6.) Remove the access panel(s) 270 to get access to the Cabin Pressure Controller (CPC).
(7.) In the forward cargo compartment, get access to both outflow valves (Refer to Task 06-30-01-ZZ1-810 for more data).
(8.) Examine if both outflow valves are open.

2. Fault Isolation

FOR A/C: 011011

A. (Refer to Fig. 21-31-00-990-021-B00)
(Refer to Fig. 21-31-00-990-031-B00)

NOTE: This procedure is applicable to Fokker 70 aircraft with a single CPC

NOTE: Do this procedure to make sure that the operation of the vacuum supply and the torque motors is correctly.

Fault Isolation:
(1.) Make sure that both outflow valves are fully open.
(a) If both outflow valves are fully open, continue with step (2).
(b) If both outflow valves are not fully open, continue with step (9).
(2.) Disconnect the connector P 1172B (J1) from the torque motor of the Primary Outflow Valve (POV) (Refer to H0W98 WM Part 2, 21-31-03 for more data).
Do both outflow valves close?
(a) If Yes, reconnect the connector P 1172B and continue with step (9).

NOTE: If the POV or SOV (Secondary Outflow Valve) was replaced at step (4) or (8) continue with step (9).

NOTE: If there is a CPC fault, then push the PRESS CONTROL on the CPC to MANUAL and then to AUTO.

(b) If No, continue with step (3).
(3.) Disconnect the vacuum supply line from the torque motor of the POV.
Do both outflow valves close?
(a) If Yes, continue with step (4).
(b) If No, continue with step (5).
(4.) Replace the POV (Refer to Task 21-31-03-000-814 for more data) and (Refer to Task 21-31-03-400-814 for more data)
Continue with step (1).

NOTE: Do this to verify correct operation of the vacuum supply and the torque motors.

(5.) Disconnect the connector P 1173B from the torque motor of the SOV (Refer to H0W98 WM Part 2, 21-31-03 for more data).
Do both outflow valves close?
(a) If Yes, continue with step (9).
(b) If No, continue with step (6).

NOTE: If both outflow valves do not close, probably the torque motor of the SOV leaks.

(6.) Disconnect the vacuum supply line from the torque motor of the SOV.
Do both outflow valves close?
(a) If Yes, continue with step (8).
(b) If No, continue with step (7).
(7.) Disconnect the cabin air filter.
Do both outflow valves close?
(a) If Yes, replace the cabin air filter and continue with step (1).
(b) If No, positive air cannot go into the chambers of the outflow valves. Find the blockage. Continue with step (1).

TASK 21-31-00-811-841-B - Troubleshooting of the Pneumatic Control of the Cabin Pressure Control System
EFFECTIVITY: 001999

NOTE: In this condition all vacuum control to the outflow valves is disconnected and positive air goes into the outflow valves via the opening of the cabin air filter. Therefore the POV and SOV should close under spring force.

(8.) Replace the SOV (Refer to Task 21-31-04-000-814 for more data) and (Refer to Task 21-31-04-400-814 for more data) .
Continue with step (1).

(9.) Install vacuum meters (0 - 5 psi) to measure the vacuum of the jetpumps at the location as shown in the illustration, (Refer to Figure 21-31-00-990-021-B00).
Use unions and air hoses to make an airtight connection to the vacuum meter, because this measurement is done during the operation of the Cabin Pressure System.
The values below are reference values to show the ratios of vacuum between the four positions. The values can vary per aircraft and per jetpump/outflow valve combination.

(a)

NOTE: These pneumatic values are applicable if a -4 cabin air filter is installed.

The pneumatic measured vacuum values should meet the values that follow:
- A > 1.70 psi
- B > 0.19 psi
- C > 0.10 psi.

NOTE: If the measured value A is < 1.70 psi, then examine the bleed pressure at the wing test panel connection AIR SUPPLY. The measured value at the connection AIR SUPPLY must be > 19 psi.

(b) If the AIR SUPPLY is > 19 psi and A < 1.70 psi, then inspect the check valve and clean or replace the jetpump. (Refer to Task 21-31-05-000-814 for more data) and (Refer to Task 21-31-05-400-814 for more data) .
Repeat step (b). If A < 1.70 psi, then continue with step (10), else continue with step (e).

(c) If the measured value A - B is > 1.51 psi, then continue with step (10).

(d) If the measured value B - C is < 0.09 psi with -4 cabin air filter installed, then replace the cabin air filter (Refer to Task 21-31-07-000-814 for more data) and (Refer to Task 21-31-07-400-814 for more data) . .
Repeat step (d). If B - C is < 0.09 psi with -4 cabin air filter installed, then continue with step (10), else continue with step (e).

(e) If the values meet the specified values as mentioned at step (a), then continue with step (13).

(10.) Use Air Data test set ADTS505 or equivalent to examine the leak rates of the pneumatic lines 1, 2, 3, 4, 5 and 6 of the cabin pressure control system (Refer to Figure 21-31-00-990-031-B00)

(a) Use correct unions and hoses to connect the pneumatic line to the Air Data test set ADTS505 or equivalent.

(b) Measure the leak rate of the pneumatic line. The measured leak rate should be the same as mentioned in the table (Refer to Figure 21-31-00-990-031-B00).

(c)

NOTE: If the leak rate is incorrect, then examine the pneumatic lines and connections for damage. If necessary, replace the defective parts.

Continue with step (13).

(11.) On the wing test panel, make sure that the blank cap installed at the manual control line is tightened.
Was the blank cap tightened?

(a) If Yes, continue with step (12).

(b) If No, tighten the blank cap and continue with step (1).

NOTE: Do this to verify correct operation of the vacuum supply and the torque motors.

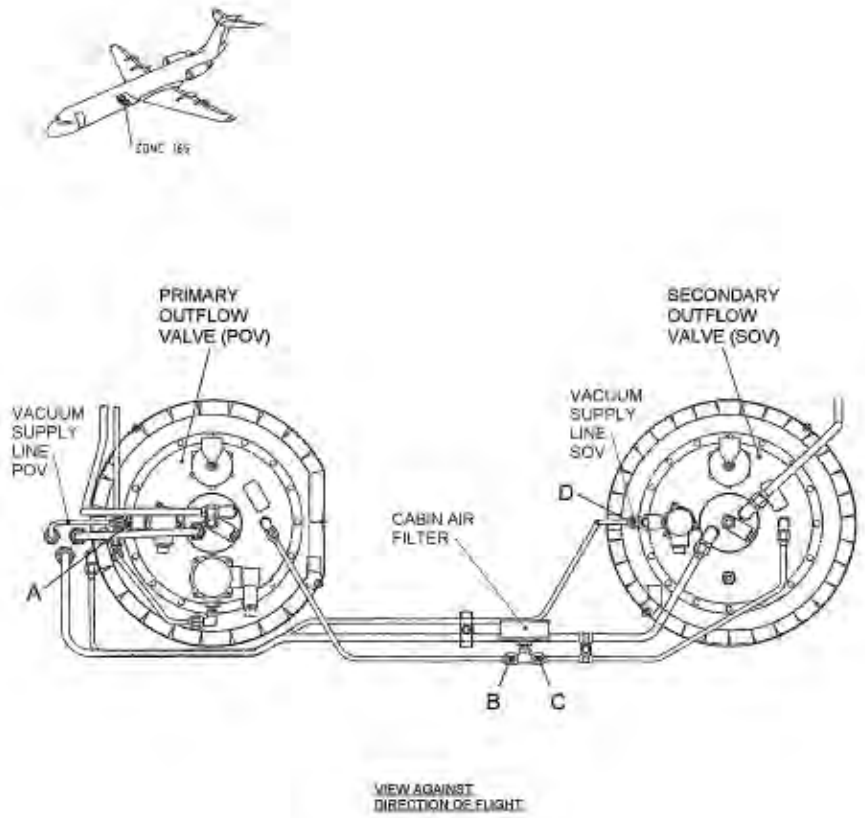
(12.) On the POV, disconnect the Valve Port Connection and put a blank cap at the connection on the POV.
Do both outflow valves fully open?

(a) If Yes, continue with step (10).

(b) If No, continue with step (9).

(13.) Do a cabin pressurization check (Refer to Task 21-31-00-780-812 for more data) and (Refer to Task 21-31-00-780-822 for more data) .

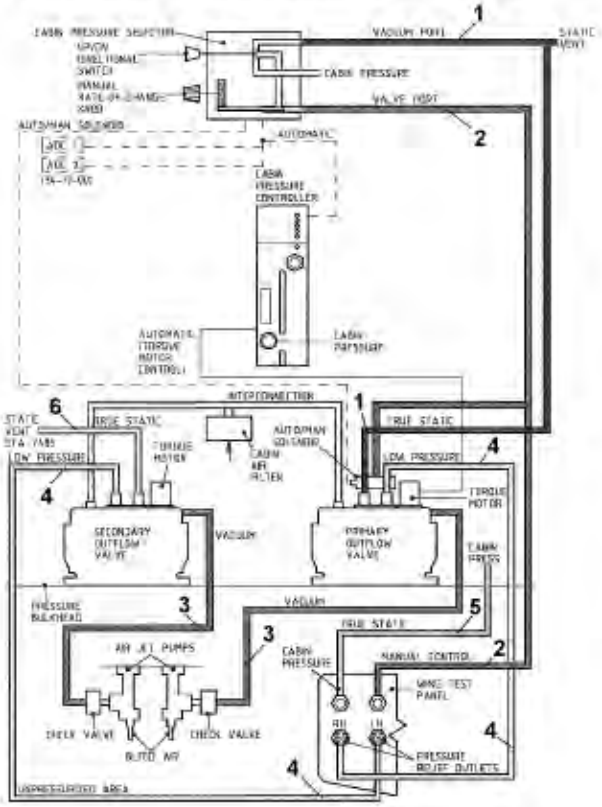
TASK 21-31-00-811-841-B - Troubleshooting of the Pneumatic Control of the Cabin Pressure Control System
EFFECTIVITY: 001999



Locations to verify control vacuum at Outflow Valves (Typical)
Figure 21-31-00-990-021-B00

TASK 21-31-00-811-841-B - Troubleshooting of the Pneumatic Control of the Cabin Pressure Control System
EFFECTIVITY: 001999

Following pneumatic lines are checked for leakages:



LEAK RATE OF LINE 1 IS APPROXIMATELY 0 KTS/MIN AT 200 KTS
LEAK RATE OF LINE 2 IS APPROXIMATELY 0 KTS/MIN AT 200 KTS
LEAK RATE OF LINE 3 IS APPROXIMATELY 0 KTS/MIN AT 200 KTS
LEAK RATE OF LINE 4 IS APPROXIMATELY 0 KTS/MIN AT 200 KTS
LEAK RATE OF LINE 5 IS APPROXIMATELY 0 KTS/MIN AT 200 KTS
LEAK RATE OF LINE 6 IS APPROXIMATELY 0 KTS/MIN AT 200 KTS

Leak rates of the Cabin Pressure Control System (Typical)
Figure 21-31-00-990-031-B00

FOR A/C: 011011

5.2.2 LAME personnel information

5.2.2.1 LAME 1

Age	: 36
Gender	: Male
Nationality	: Papua New Guinean
Position	: LAME
Type of license	: Avionics
Type rating	: F28-MK 70/100, DH 8 100-300, B737 600-900
Issuing Authority	: CASA PNG
Competency F70 Type Rating	: 21 April 2020 (Last refresher: 21 April 2017)

5.2.2.2 LAME 2

Age	: 31
Gender	: Male
Nationality	: Papua New Guinean
Position	: LAME
Type of license	: Mechanical
Type rating	: F28 MK 70/100
Issuing Authority	: CASA PNG
Competency F70 Type Rating valid to	: 21 March 2020 (Last refresher: 4 March 2017)

5.2.3 Service bulletin F100-23-045

STORK Fokker

Service Bulletin
Fokker 70/100

Proforma

COMMUNICATION

Passenger Entertainment - The Introduction of a Digital Music and Announcement Player

1. Planning Information

A. Effectivity

(1) F28 Mark 0070/0100 aircraft serial numbers: 11244 thru 11585.

B. Concurrent Requirements

(1) Not applicable.

C. Reason

(1) The digital music (and announcement) player is a solid state digital player for MP3 format compressed data. The digital technology offers less maintenance costs and easy operation. The audio is stored on memory cards and can be read and written with a standard personal computer.

Page	1	2	3	4												
Revision	-	-	-	-												

D. Description

(1) An Appendix to this Proforma Service Bulletin will tell you how to:
- Remove the existing music and announcement reproducer (If applicable).
- Rework the aircraft wiring.
- Install the new digital music player.
- Test the system.

E. Compliance

(1) Optional.

F. Approval

(1) The technical content of this document is approved by EASA or under the authority of DOA nr. EASA.21J.059.

(2) Specific configurations may be subject to separate approval, which will be covered by the applicable appendix.

G. Manpower

(1) Approximately 15 man-hours are necessary to do this modification on one aircraft. The elapsed time will be 8 hours for 2 man (men)
Both mentioned figures are rough estimates. More detailed manpower information will be included in an Appendix to this Proforma Service Bulletin.

H. Weight and Balance

(1) Will be part of the Appendix.

I. Electrical Load Data

(1) Will be part of the Appendix.

J. Software Accomplishment Instructions

(1) Not applicable

K. References

(1) The modification is covered by Fokker internal reference ECR 015515 and ECR 015552.

L. Publications Affected

(1) This SB affects the publications listed below:

(a) Maintenance Documentation

- Fokker 70/100 Aircraft Maintenance Manual (AMM) chapter 23-32
- Fokker 70/100 Wiring Manual (WM) chapter 23-32
- Fokker 70/100 Illustrated Parts Catalog (IPC) chapter 23-32
- Fokker 70/100 Trouble Shooting Schematics Manual (TSSM).

(b) Maintenance Programs

Not affected.

(c) Special Instructions for Continued Airworthiness (ICA)

Will be part of the Appendix.

(d) Operational Documentation

Not affected.

(2) For incorporation of this Service Bulletin in your documentation refer to SBF100-00-001 (Service Bulletin Introduction, section 4 "Incorporation of Service Bulletins in Documentation of Fokker Services").

M. Interchangeability or Intermixability of Parts

(1) Will be part of the Appendix.

2. Material Information

A. Material – Price and Availability

(1) On request we will supply you a customized modification proposal including prices and lead-times.

(2) A customized modification proposal will include an EASA approved Appendix, mod kit(s) and revisions of the affected documentation (if applicable)

(3) You can contact your Fokker Services Account Manager for such a modification proposal

B. Material Required

(1) Will be part of the Appendix.

C. Tooling - Price and Availability

(1) Will be part of the Appendix.

D. Drawings Required

(1) Will be part of the Appendix.

3. Accomplishment Instructions

A. Because this is a Proforma Service Bulletin, we do not include the "Accomplishment Instructions". They will be included in an Appendix to this Proforma Service Bulletin.