# AIRCRAFT SERIOUS INCIDENT

# FINAL REPORT

# SI 09/25

## Air Accident Investigation Bureau (AAIB)

## Ministry of Transport, Malaysia

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**Fixed Wing Aircraft Boeing 737-800,**

**Registration 9M-MXR at Bintulu Airport, Sarawak**

**on 21 October 2025**




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# AIR ACCIDENT INVESTIGATION BUREAU (AAIB)
# MALAYSIA
# REPORT NO: SI 09/25

| | |
|---|---|
| **OPERATOR** | **: MALAYSIA AIRLINES BERHAD** |
| **AIRCRAFT TYPE** | **: BOEING 737-800 (NG)** |
| **NATIONALITY** | **: MALAYSIA** |
| **REGISTRATION** | **: 9M-MXR** |
| **PLACE OF OCCURRENCE** | **: EN ROUTE TO BINTULU (BTU)** |
| **DATE AND TIME** | **: 21 OCTOBER 2025 AT 1010 LT** |

The sole objective of the investigation is the prevention of accidents and incidents. In accordance with Annex 13 to the Convention on International Civil Aviation, it is not the purpose of this investigation to apportion blame or liability.

All times in this report are Local Time (LT) unless stated otherwise. LT is UTC + 8 hours.

## INTRODUCTION

The Air Accident Investigation Bureau (AAIB) is the air accident and serious incident investigation authority in Malaysia and is responsible to the Minister of Transport. Its mission is to promote aviation safety through the conduct of independent and objective investigations into air accidents and serious incidents.

The AAIB conducts these investigations in accordance with Annex 13 to the Chicago Convention, the Civil Aviation Act of Malaysia 1969, and the Civil Aviation Regulations of Malaysia 2016.

It is inappropriate that AAIB reports should be used to assign fault or blame or determine liability since neither the investigations nor the reporting processes have been undertaken for that purpose.

In accordance with ICAO Annex 13 paragraph 4.1, notification of the Serious Incident was sent out on 23 October 2025 to the Civil Aviation Authority of Malaysia (CAAM) and the National Transportation Safety Board (NTSB) of the United States of America as the State of Design and Manufacture. The Preliminary Report for this Serious Incident was subsequently submitted to the CAAM and NTSB on 8 December 2025.

In accordance with ICAO Annex 13, Paragraph 6.3, a copy of the Draft Final Report was sent on 22 August 2026 to the CAAM as the State of Occurrence, Registry and Operator, the NTSB as the State of Design and Manufacture, and the Aircraft Operator, Malaysia Airlines Berhad, inviting their significant and substantiated comments on the report.

Unless otherwise indicated, recommendations in this report are addressed to the investigating or regulatory authorities of the State having responsibility for the matters with which the recommendations are concerned. It is for those authorities to decide what action is to be taken.

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# ABBREVIATIONS

| | |
|---|---|
| **A** | |
| AAIB | Air Accident Investigation Bureau |
| ACMS | Aircraft Condition Monitoring System |
| AMM | Aircraft Maintenance Manual |
| AOC | Air Operator Certificate |
| AOG | Aircraft on Ground |
| APU | Auxiliary Power Unit |
| ARP | Aerodrome Reference Point |
| ATC | Air Traffic Control |
| ATPL | Airline Transport Pilot Licence |
| **B** | |
| B737NG | Boeing 737 Next Generation |
| BITE | Built in Test Equipment |
| BTU | Bintulu Airport |
| **C** | |
| CAAM | Civil Aviation Authority of Malaysia |
| CoA | Certificate of Airworthiness |
| CoR | Certificate of Registration |
| CP | Cadet Pilot |
| CPL | Commercial Pilot Licence |
| CVR | Cockpit Voice Recorder |
| **D** | |
| DCPC | Digital Cabin Pressure Controller |
| DME | Distance Measuring Equipment |
| DVOR | Doppler VHF Omnidirectional Range |
| **E** | |
| ECS | Environmental Control System |
| **F** | |
| FCV | Flow Control Valve |
| FDR | Flight Data Recorder |
| FIM | Fault Isolation Manual |
| FL | Flight Level |
| fpm | feet per minute |
| FSM | Flight Safety Memo |
| ft | feet |
| **I** | |
| ICAO | International Civil Aviation Organization |

| | |
|---|---|
| IFR | Instrument Flight Rules |
| ILS | Instrument Landing System |
| **K** | |
| KUL | Kuala Lumpur International Airport |
| **L** | |
| LDA | Landing Distance Available |
| LT | Local Time |
| **M** | |
| MAB | Malaysia Airlines Berhad |
| METAR | Meteorological Aerodrome Report |
| MOR | Mandatory Occurrence Report |
| MOT | Ministry of Transport |
| MSN | Manufacturer Serial Number |
| **N** | |
| N1 | Low-Pressure Rotor Speed |
| NDB | Non-Directional Beacon |
| NG | Next Generation |
| NM | nautical mile |
| NTSB | National Transportation Safety Board |
| **P** | |
| PAPI | Precision Approach Path Indicator |
| PCN | Pavement Classification Number |
| PIC | Pilot in Command |
| PIU | Portable Interface Unit |
| PRSOV | Pressure Regulating and Shutoff Valve |
| PZTC | Pack Zone Temperature Controller |
| **Q** | |
| QNH | Altimeter Pressure Setting Referenced to Mean Sea Level |
| **R** | |
| RA | Radio Altimeter |
| **S** | |
| SCF-NP | System/Component Failure or Malfunction (Non-Powerplant) |
| SIC | Second in Command |
| SO | Safety Officer |
| SR | Safety Recommendation |

| | |
|---|---|
| **T** | |
| TOD | Top of Descent |
| **U** | |
| UTC | Coordinated Universal Time |
| **V** | |
| VDC | Volts Direct Current |
| VFR | Visual Flight Rules |
| **W** | |
| WBGB | Bintulu Airport ICAO Location Indicator |
| WBGG | Kuching International Airport ICAO Location Indicator |
| WDM | Wiring Diagram Manual |
| WMKK | Kuala Lumpur International Airport ICAO Location Indicator |

**Final Report SI 09/25**

## SYNOPSIS

On 21 October 2025, a Malaysia Airlines Boeing 737-800, registration 9M-MXR, operating Flight MH2742 from Kuala Lumpur International Airport (WMKK) to Bintulu Airport (WBGB), with 109 passengers and eight crew members on board, experienced an abnormal cabin pressurisation event while cruising at FL350.

During the flight, the cabin altitude began to increase abnormally. The No. 2 engine bleed system subsequently tripped, reducing the available bleed air supply for cabin pressurisation. As the cabin altitude exceeded 10,000 ft, the cabin altitude warning activated. The flight crew donned oxygen masks, carried out the applicable non normal procedures, declared an emergency and initiated an emergency descent to 10,000 ft. The Safety Pilot manually deployed the passenger oxygen masks. The cabin altitude reached approximately 15,000 ft before stabilising during the descent.

After reaching 10,000 ft, the cabin pressurisation condition stabilised and the aircraft continued to Bintulu Airport, where it landed safely without further incident. There were no injuries to the occupants and no damage to the aircraft.

Following the occurrence, a Mandatory Occurrence Report (MOR) was submitted to the Civil Aviation Authority of Malaysia (CAAM) and the Air Accident Investigation Bureau (AAIB), Malaysia, in accordance with the applicable reporting requirements. Following notification and classification of the occurrence as a Serious Incident, the AAIB commenced an investigation and deployed an investigation team to the operator’s facilities on 22 October 2025.

# 1.0 FACTUAL INFORMATION

## 1.1 History of the Flight

### 1.1.1 General

Malaysia Airlines flight MH2742 was a scheduled domestic passenger service from Kuala Lumpur International Airport to Bintulu Airport, Sarawak, operated by Boeing 737-800 aircraft 9M-MXR. The flight was conducted under the operator's normal commercial operating procedures and in accordance with the aircraft's maintenance release. There were 117 persons on board, comprising 109 passengers and 8 crew members.

The flight crew comprised three pilots: the PIC, a cadet pilot acting as SIC and a Safety Officer. The Safety Pilot was present to monitor and provide guidance to the cadet pilot, including during abnormal and emergency situations. The crew had completed the required rest period before the flight, and the aircraft was reported to be airworthy for the intended operation.

### 1.1.2 Cruise and onset of abnormal pressurisation

The aircraft climbed to cruise altitude and established in cruise at approximately FL350. The flight data plots reviewed during the investigation show the aircraft operating at high cruise altitude for an extended period before the abnormal pressurisation event. The occurrence took place approximately 2 hours and 15 minutes after departure and about 40 nautical miles before the planned top of descent.

During cruise, the flight crew noticed that the cabin pressure condition was abnormal. The cabin rate of climb increased to approximately 1,200 fpm and the cabin altitude continued to rise. The PIC selected the pressurisation mode to MANUAL and commanded the outflow valve closed in accordance with the applicable procedure. Despite this action, the cabin altitude continued to increase.

At about the same phase of the event, the BLEED TRIP OFF indication for the No. 2 engine bleed system illuminated. This indication is associated with bleed air system protection logic and indicates that the bleed system has been automatically shut off

due to abnormal pressure or temperature conditions. Loss of the right engine bleed source reduced the available air supply to the pressurisation system.

### 1.1.3 Emergency descent and oxygen deployment

As the cabin altitude exceeded 10,000 ft, the cabin altitude warning activated. The flight crew donned oxygen masks and carried out the applicable non-normal checklist. The PIC initiated an emergency descent to 10,000 ft and coordinated with air traffic control. The Safety Pilot manually deployed the passenger oxygen masks. The cabin altitude reached approximately 15,000 ft before stabilising during the descent.

The emergency descent was conducted in a controlled manner. The crew prioritised flight path control, checklist accomplishment, communication and passenger oxygen availability. Once the aircraft reached 10,000 ft and the pressurisation condition stabilised, the flight crew reset the tripped bleed system. Cabin pressurisation returned to normal, and the aircraft subsequently continued to Bintulu.

### 1.1.4 Landing and post-flight condition

The aircraft landed safely at Bintulu Airport. There were no injuries to passengers or crew, and no aircraft structural damage was reported. An evacuation was not required. Airport Rescue and Fire Fighting Services were available in accordance with the emergency response procedures but were not required to intervene.

After landing, the aircraft was held at Bintulu for maintenance troubleshooting. The operator contacted Boeing for technical assistance under AOG priority. Boeing reviewed flight data and other technical information and provided troubleshooting recommendations relating to the left ECS pack FCV, connector D488, pack switch and right engine bleed components.

### 1.1.5 Sequence of significant events

| Phase | Event |
|---|---|
| **Pre-flight** | Aircraft released for the scheduled KUL–BTU operation with 117 persons on board. |
| **Cruise** | Aircraft established on cruise at approximately FL350. |

| | |
|---|---|
| **Abnormal pressurisation** | Flight crew observed an abnormal increase in cabin rate of climbing and rising cabin altitude. |
| **Crew response** | Pressurisation mode was selected to MANUAL, and the outflow valve was commanded closed. |
| **System event** | The No. 2 BLEED TRIP OFF indication illuminated, reducing the available bleed-air supply for cabin pressurisation. |
| **Cabin altitude warning** | Cabin altitude exceeded 10,000 ft and the CABIN ALTITUDE WARNING activated. |
| **Emergency response** | Flight crew donned oxygen masks and carried out the applicable non-normal procedures. The Safety Officer manually deployed the passenger oxygen masks. |
| **Emergency descent** | An emergency descent was initiated and the aircraft descended to 10,000 ft. |
| **Stabilisation** | Cabin pressurisation condition stabilised during the descent and after reaching 10,000 ft. |
| **Continuation and landing** | The aircraft continued to Bintulu Airport and landed safely with no injuries and no aircraft damage. |

*Table 1: Phase and Event*

## 1.2 Injuries to Persons

| Injuries | Crew | Passengers | Others | Total |
|---|---|---|---|---|
| **Fatal** | NIL | NIL | NIL | NIL |
| **Serious** | NIL | NIL | NIL | NIL |
| **Minor** | NIL | NIL | NIL | NIL |
| **None** | 8 | 109 | NIL | 117 |

*Tabel 2: Injuries to Persons*

### 1.3 Damage to Aircraft

No damage to the aircraft was reported. The occurrence did not involve an impact, hard landing, structural failure, fire or external damage. Post-flight maintenance inspection did not identify structural damage attributable to the occurrence.

### 1.4 Other Damage

No other damage was reported. There was no reported damage to airport property, ground equipment, cargo, passenger property or third-party property.

### 1.5 Personnel Information

#### 1.5.1 Flight Crew

The flight crew held the required licences and medical certificates for the operation. The PIC held an Airline Transport Pilot Licence, while the Safety Pilot and cadet pilot held Commercial Pilot Licences. The crew rest period since the last flight was recorded as 12 hours for each pilot.

| Status | Pilot in Command (PIC) | Co-Pilot 1(SO) | Co-Pilot 2 (CP) |
|---|---|---|---|
| Nationality | Malaysian | Malaysian | Malaysian |
| Age | 53 | 32 | 30 |
| Gender | Male | Male | Male |
| License Type | ATPL | CPL | CPL |
| License Validity | 28.02.26 | 31.01.2026 | 31.03.2026 |
| Total Hours on Type | 13669 | 1202.11 | 18.32 |
| Total Flying Hours | 18193 | 1262.11 | 178.32 |
| Rest Period Since Last Flight | 12 Hours | 12 Hours | 12 Hours |
| Medical Certificate Class | Class 1 | Class 1 | Class 1 |

| | | | |
|---|---|---|---|
| Medical Expiry Date | 28.02.26 | 31.01.2026 | 31.03.2026 |

*Table 3: Pilot Information*

The presence of the Safety Pilot provided additional monitoring and support during the abnormal pressurisation event. This was beneficial because the event required simultaneous management of aircraft control, checklist actions, passenger oxygen deployment and ATC coordination.

## 1.6 Aircraft Information

1.6,1 The Boeing 737-800 Next Generation (NG) aircraft in Malaysia Airlines Berhad (MAB) fleet features a standard wingspan for the type, design features a wingspan of 34.32 meters (augmented by advanced winglets to significantly reduce drag), and an overall length of 39.50 meters for maximum operational efficiency. Power is provided by two dependable CFM56-7B turbofan engines, each producing 117 kN of thrust. These capabilities enable the aircraft to cruise efficiently at Mach 0.79 (460 knots), operate with a high service ceiling of 41,000 feet, and achieve a substantial maximum range of up to 2,000 nautical miles.

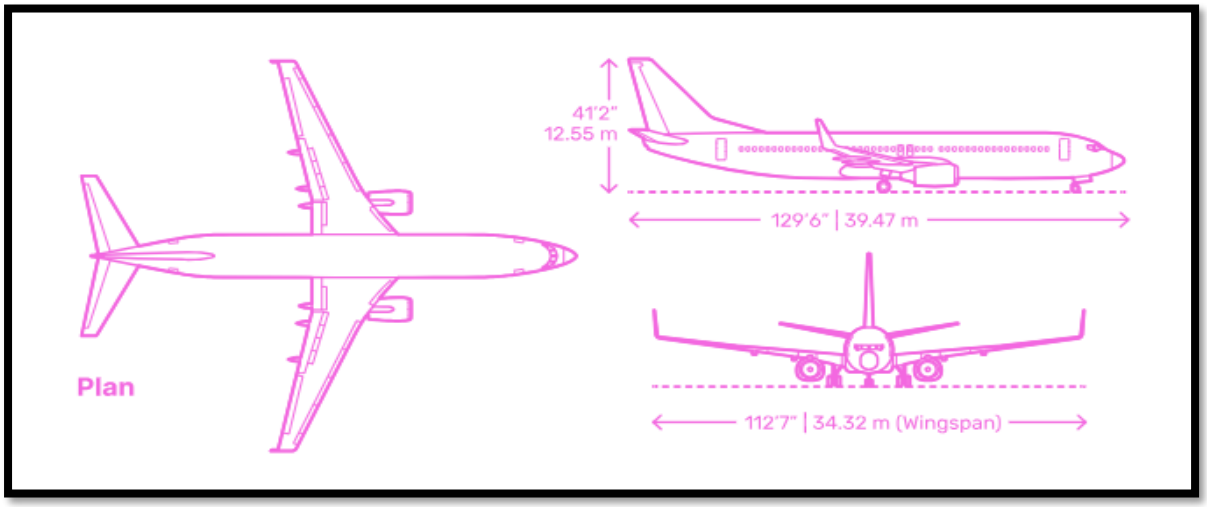



*Figure 1: Three views of the aircraft*

1.6,2 The aircraft flown that day was in airworthy condition.

| | |
|---|---|
| Aircraft Type | Boeing 737-8H6 |
| Manufacturer | The Boeing Company |
| Year of Manufacturer | 2014 |
| Aircraft Owner | Malaysia Airlines |
| Aircraft Operator | Malaysia Airlines |
| Registration No. | 9M-MXR |
| Aircraft Serial No. | 40155 (MSN) |
| C of R Validity Period | 24/01/2027 |
| C of A Validity Period | 30/01/2026 |
| Insurance Validity Period | 30/11/2026 |
| Total Flying Hours | 33766 |
| Engine Type and Model | CFM56-7B26E |
| Engine Serial No. | 962319 / 960204 |
| Total Engine Cycles | 16559 / 19074 |

*Table 4: Aircraft Data*

The aircraft had valid registration and airworthiness documentation. The maintenance records reviewed for the preliminary investigation indicated that the aircraft was equipped and maintained in accordance with the applicable regulations and approved procedures. No structural discrepancy was identified following the occurrence.

## 1.7 Meteorological Information

At the time of departure from Kuching International Airport (WBGG), the prevailing weather was characterised by light and variable surface winds, visibility of 6 km, light rain, few clouds at 200 ft, scattered clouds at 2,000 ft, an air temperature of 24°C, a dew point of 24°C, and a QNH of 1010 hPa. Although light rain and low cloud were present in the vicinity of the aerodrome, the weather conditions remained within

operational limits for departure, and the flight crew did not report any weather-related difficulties.

*METAR WBGG 210410Z VRB02KT 6000 -RA FEW002 SCT020 24/24 Q1010 NOSIG*

The occurrence took place during the cruise phase at FL350, where the aircraft was operating in generally stable atmospheric conditions. There was no indication of turbulence, icing, convective weather, or any other adverse meteorological phenomenon that could have caused or contributed to the abnormal cabin pressurisation event.

The aircraft subsequently landed safely at Bintulu Airport (WBGB) under routine visual meteorological conditions, characterised by good visibility, light surface winds, and normal tropical weather. The investigation determined that meteorological conditions at the departure aerodrome, during the en-route phase, and at the destination did not contribute to the occurrence or influence its outcome.

### 1.8 Aids to Navigation

Aids to navigation were not relevant to the occurrence. No navigation system malfunction was reported, and the aircraft continued to Bintulu Airport (BTU) without navigation difficulty following the emergency descent.

### 1.9 Communications

All communication frequencies were reported to be operating normally. The flight crew declared an emergency and coordinated the descent with air traffic control. Communication while wearing oxygen masks can be more challenging due to mask microphone use, increased cockpit workload and checklist coordination however, the available information indicates that the crew maintained effective communication during the event.

### 1.10 Aerodrome Information

Bintulu Airport (WBGB/BTU) is a public aerodrome located approximately 5 km southwest of Bintulu town, Sarawak, at an elevation of about 75 ft above mean sea

level. The airport supports both IFR and VFR operations and is served by Bintulu Tower, Ground and Approach Control services.

The airport has a single asphalt runway designated Runway 17/35, measuring 2,745 m by 45 m, with a pavement strength of PCN 79/F/C/X/T. Runway 17 is equipped with a Category I instrument approach, while visual approach guidance is provided by PAPI for both runway directions. Available navigation aids include ILS, DME, NDB and DVOR/DME. The aerodrome is also equipped with runway and taxiway lighting, secondary electrical power, and Category VI rescue and fire-fighting services suitable for Boeing 737 operations.




*Figure 2: Bintulu Airport (WBGB/BTU)*

## 1.11 Flight Recorders

### 1.11.1 Recorder equipment

The aircraft was equipped with an FDR and CVR. Following the occurrence, the operator's maintenance personnel downloaded both recorders using a Portable Interface Unit (PIU), P/N 17TES0043, S/N 000673835, in accordance with the applicable AMM procedures. The FDR data were successfully recovered and used for the investigation.

The CVR download was completed, but the occurrence recording was unavailable because it had been overwritten during subsequent maintenance activity. Consequently, the investigation relied primarily on FDR data, supported by maintenance records, technical information and crew interviews.

### 1.11.2 FDR parameters reviewed

The investigation reviewed selected FDR parameters to reconstruct the sequence of events and assess the aircraft operating and Environmental Control System (ECS) conditions during the occurrence. The parameters included aircraft pressure altitude and selected altitude, left and right engine N1, engine ECS configuration codes, cabin altitude warning status, master caution status, and the ON/OFF and flow indications for the left and right ECS packs.

The pressure altitude data showed the aircraft operating at approximately 35,000 ft during cruise, followed by a descent after the selected altitude was reduced. Correlation of pressure altitude and selected altitude provided the investigation with the aircraft vertical profile from cruise through the descent and subsequent approach phase.

The CABIN ALTITUDE >10,000 ft parameter and master caution status were reviewed to establish the timing of the cabin altitude warning condition and the associated cockpit caution indication. These discrete parameters provided the timing of the warning condition but did not record the actual cabin altitude value.

The left and right engine N1 parameters were used to establish the engine operating condition and changes in thrust during the cruise, descent and approach. The corresponding ECS configuration codes were also reviewed to identify changes in the recorded pneumatic/ECS configuration during the flight.

Attention was given to the ECS pack parameters. The left ECS Pack ON/OFF parameter recorded a value of 0, corresponding to the left pack/FCV closed indication, while the left pack flow parameter provided the corresponding recorded flow state. The right ECS pack ON/OFF, and flow parameters were compared with the left pack parameters to assess the availability and operating condition of the ECS packs throughout the event.

These data were subsequently correlated with Boeing's technical review and troubleshooting information in assessing the abnormal left pack/FCV condition.

Correlation of the FDR parameters enabled the investigation to establish the relationship between the aircraft flight profile, cabin altitude warning, master caution, engine operating condition and ECS pack status during the occurrence.

| Parameter group | Investigation use |
|---|---|
| Pressure altitude / Selected altitude | Established the cruise altitude, change in selected altitude, descent profile and subsequent approach. |
| Cabin altitude >10,000 ft / Master caution | Established the timing and duration of the cabin altitude warning condition and associated master caution indication. |
| Engine 1 and Engine 2 N1 | Provided the engine operating and thrust context during cruise, descent and approach. |
| Engine 1 and Engine 2 ECS configuration codes | Identified changes in the recorded ECS/pneumatic configuration during the flight. |
| Left ECS Pack ON/OFF | Assessed the recorded status of the left pack/FCV, including the Pack ON parameter indicating 0. |
| Left ECS Pack Flow | Correlated the recorded left pack flow state with the left pack/FCV indication. |
| Right ECS Pack ON/OFF and Flow | Assessed the operating status and recorded flow condition of the right ECS pack for comparison with the left pack. |

*Table 5: FDR Parameters Used for Technical Analysis*

The recorded parameters formed an important part of the technical analysis of the pressurisation event.

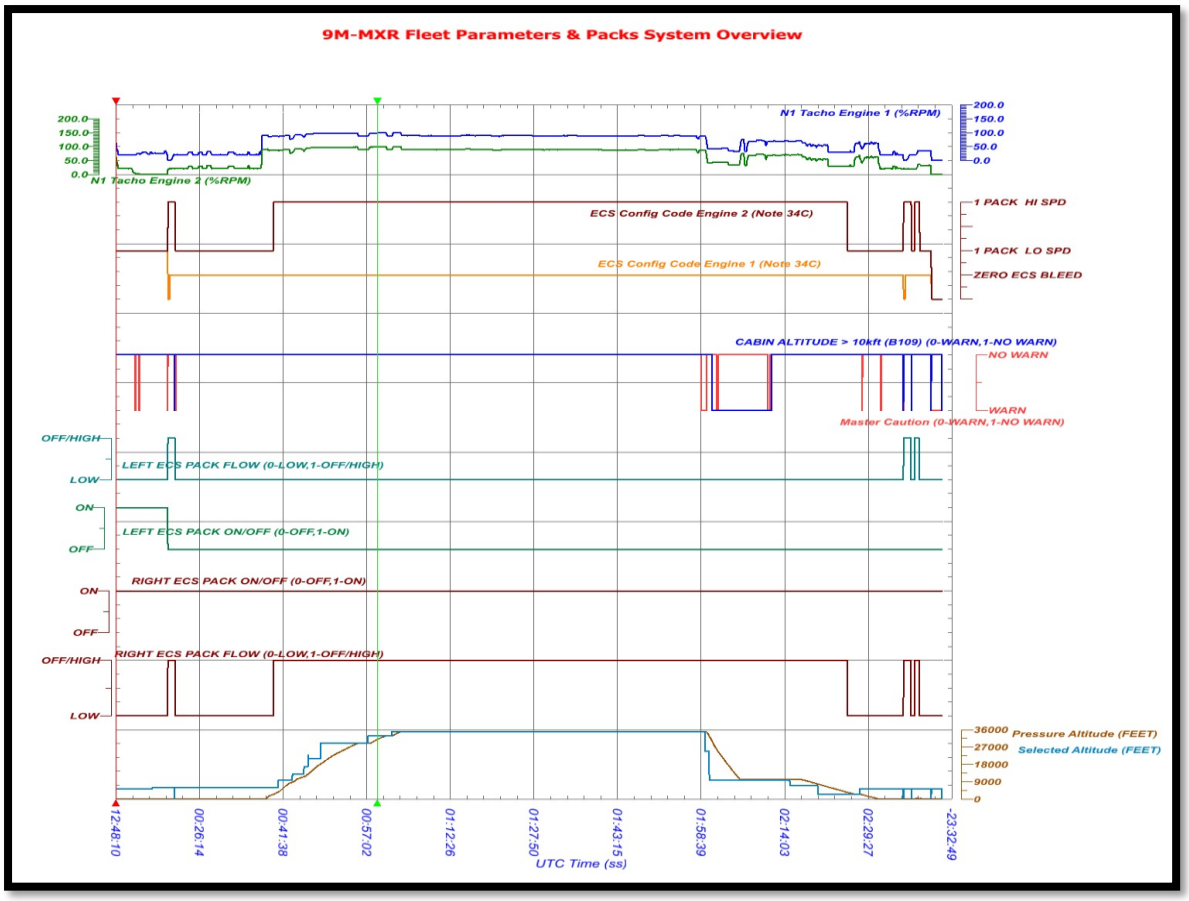



*Figure 3: FDR Data Plot of Selected Parameters During the Occurrence*

## 1.12 Wreckage and Impact Information

Not applicable. The occurrence did not involve an impact sequence, aircraft breakup, runway excursion or damage. The aircraft remained under control throughout the event and landed safely.

## 1.13 Medical and Pathological Information

The PIC underwent post occurrence screening. The urine drug test was negative for substance abuse, and the blood alcohol screening was negative for alcohol. There was no evidence of flight crew medical incapacitation or impairment.

## 1.14 Fire

There was no fire. No smoke, fumes or fire indications were reported in the flight deck or cabin. Airport emergency services were available at the destination but were not required to intervene.

## 1.15 Survival Aspects

The occurrence did not involve an impact or evacuation. Survival considerations were primarily associated with protection against hypoxia during the elevated cabin altitude condition.

Following activation of the cabin altitude warning, the flight crew used supplemental oxygen and initiated the emergency procedures. Passenger oxygen masks were manually deployed by the Safety Pilot, and the aircraft descended to 10,000 ft. The cabin altitude reached approximately 15,000 ft before stabilising during the descent.

The oxygen systems functioned as intended, and the cabin crew managed the passengers throughout the event. There were no reported injuries or loss of consciousness, and no evacuation was required after landing.

## 1.16 Tests and Research

### 1.16.1 Maintenance Troubleshooting

Following the occurrence, the aircraft remained at Bintulu Airport while maintenance personnel from MAB Engineering Services carried out troubleshooting, inspections, component replacements and functional testing of the cabin pressurisation, pneumatic and Environmental Control System (ECS). The work was conducted in accordance with the applicable Aircraft Maintenance Manual (AMM), Fault Isolation Manual (FIM), Wiring Diagram Manual (WDM) and Boeing technical recommendations.

### 1.16.2 Initial Pressurisation-System Troubleshooting

Initial troubleshooting included BITE checks of DCPC 1 and 2. The recorded fault history included cabin altitude threshold exceedances at 10,000 ft and 13,500 ft, low inflow and high leakage, cabin pressure switch activation and manual mode selection. Boeing clarified that the recorded DCPC codes did not necessarily indicate a cabin pressure control system failure.

Inspection of the cargo door seals, pack bellows, clamps and duct joints identified no abnormality or leakage. Pack confidence checks were satisfactory, and single-pack operation maintained approximately 4.1 to 3.9 psi cabin differential pressure. A leak-

down test recorded a reduction from 4.0 psid to 2.5 psi in 135 seconds and was assessed as satisfactory.

### 1.16.3 Boeing Technical Review and Recommendations

Following the incident, Boeing reviewed the available flight data and identified the same abnormal left ECS pack condition on two earlier flights and on the occurrence flight. The Left ECS Pack ON parameter indicated 0, consistent with the FCV being in the closed condition.

Boeing advised that the DCPC fault codes did not necessarily indicate a cabin pressure control system failure and that the closed FCV condition might not generate a specific flight deck indication or PZTC fault.

Boeing recommended troubleshooting the right engine bleed system and checking the electrical supply to the left FCV. The review also indicated that the abnormal left pack/FCV condition existed before the occurrence flight and was likely pre-existing and intermittent.

### 1.16.4 Aft Outflow Valve Replacement

During the post occurrence inspection and rectification, maintenance personnel replaced the aft outflow valve assembly as part of the pressurisation system troubleshooting. The removed valve, part number 21230-10BA, serial number 1391521, was replaced with a serviceable valve of the same part number, serial number 13115157.

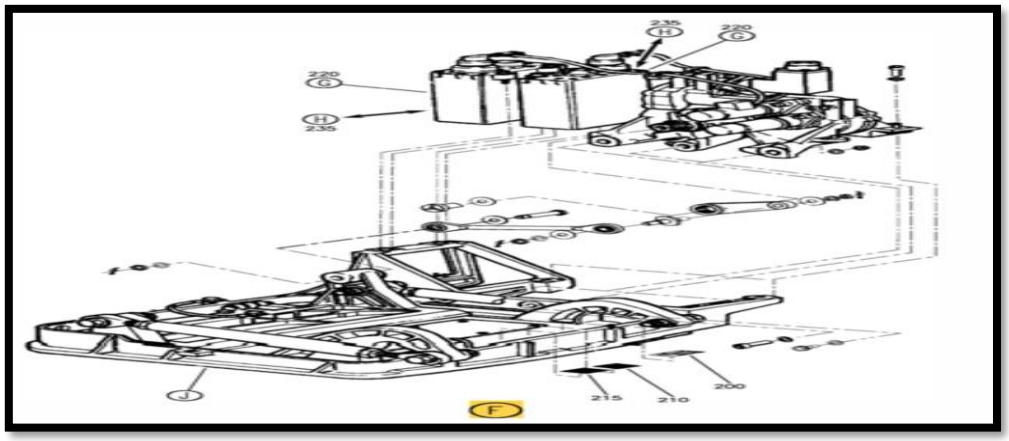


*Figure 4: Aft Outflow Valve Assembly*

Following replacement, post-installation and bonding resistance tests were carried out and the results were satisfactory.

### 1.16.5 Left ECS Flow Control and Shutoff Valve

During the post occurrence inspection and rectification, maintenance personnel checked the electrical supply to the left FCV. The supply remained stable while a side load was applied to the left pack switch, indicating that the command circuit and pack-switch supply were functioning normally. Based on these findings, the left FCV was identified for replacement, while no replacement of the pack switch or P5-10 panel was considered necessary.

Following replacement of the left Flow Control and Shutoff Valve, the installation was inspected and found secure. A leak test identified no leakage, the Pack Zone Temperature Controller BITE test recorded no fault, and a post-installation voltage check measured 26.53 VDC and was assessed as satisfactory.

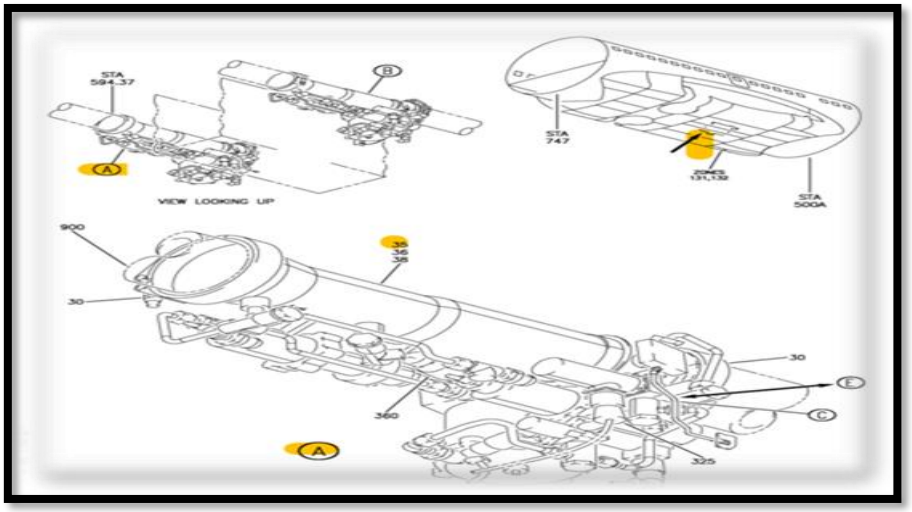



*Figure 5: Left ECS Flow Control and Shutoff Valve*

### 1.16.6 No. 2 Engine Precooler Control Valve

During the post occurrence inspection and rectification, maintenance personnel also inspected the No. 2 engine Precooler Control Valve and found excessive free play. The valve, part number 63292146-1, serial number 11927, was subsequently replaced with a serviceable valve of the same part number, serial number 8575.

Following the replacement, the installation was checked and a reverse-flow leak test identified no leakage. An engine ground run was then conducted up to approximately 80% N1, during which the valve operated smoothly, the bleed-air system functioned normally, and the duct-pressure indications remained within the applicable limits.

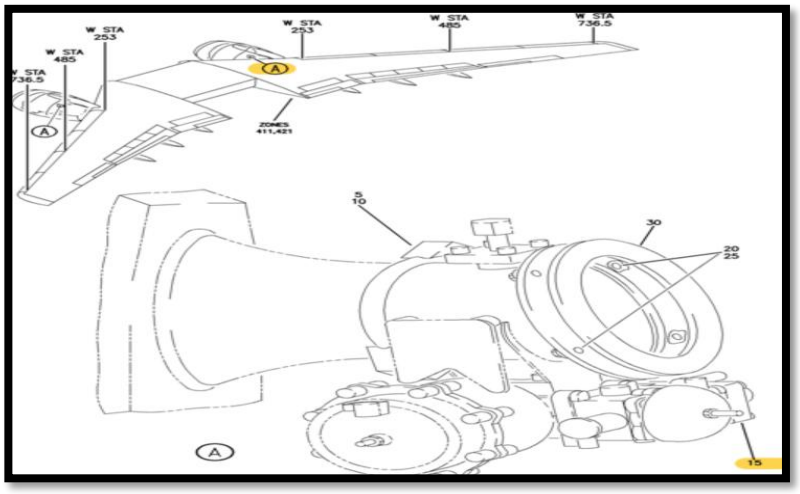



*Figure 6: No. 2 Engine Precooler Control Valve*

N1, the valve operated smoothly, the bleed-air system functioned normally, and the duct-pressure indications remained within limits.

### 1.16.7 No. 2 Engine Pressure Regulator and Shutoff Valve

During the post occurrence inspection and rectification, maintenance personnel also found that the No. 2 engine Pressure Regulator and Shutoff Valve intermittently remained partially open. The valve, part number 3214552-6, serial number 15501, was replaced with a serviceable valve of the same part number, serial number 7724.

Following replacement, the reverse-flow check identified no leakage, and the engine ground run confirmed normal bleed-system operation with duct-pressure indications within acceptable limits.

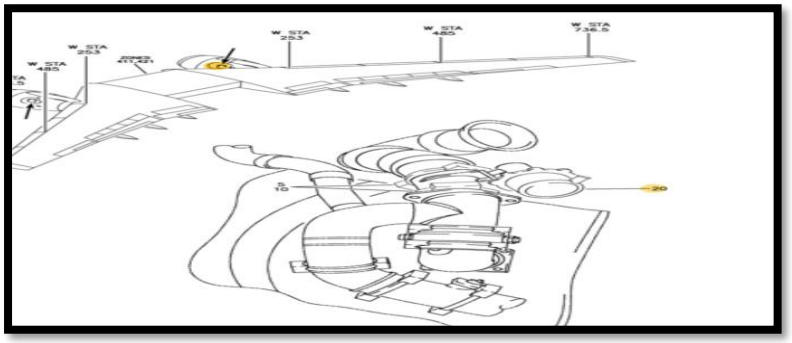


*Figure 7: No. 2 Engine Pressure Regulator and Shutoff Valve*

### 1.16.8 No. 2 Engine Bleed Air Regulator

The No. 2 engine bleed-air regulator was replaced because it was suspected of contributing to the intermittent movement of the No. 2 PRSOV. The removed regulator, part number 107492-6, serial number 5980, was replaced by a regulator of the same part number, serial number 5174.

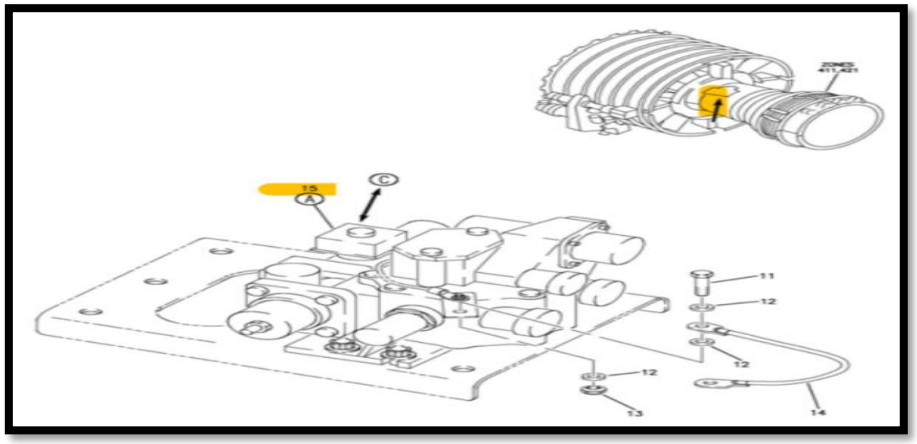


*Figure 8: No. 2 Engine Bleed-Air Regulator*

Post installation checks included an inspection of installation security, a reverse-flow leak check, an engine ground run and an electrical bonding check. No leakage was detected, the bleed system operated normally, the duct-pressure indications remained within limits, and the bonding resistance was satisfactory at 0.64 milliohm.

### 1.16.9 No. 1 Engine High Stage Shutoff Valve

The No. 1 engine high-stage shutoff valve exhibited sticky movement and was replaced. The removed valve, part number 3214446-4, serial number 7842, was replaced by a valve of the same part number, serial number 13624.

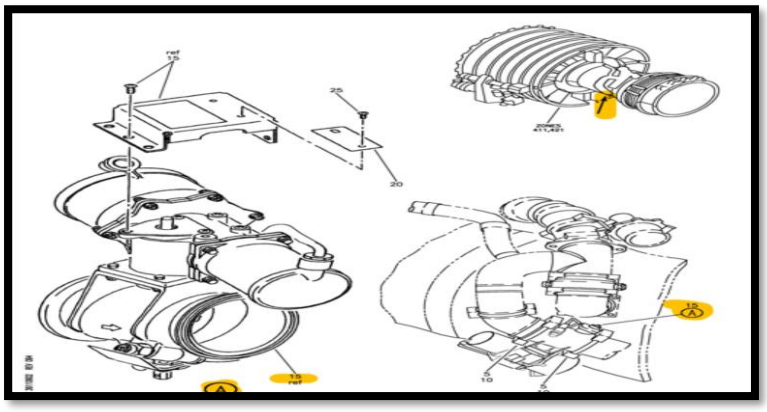


*Figure 9: No. 1 Engine High-Stage Shutoff Valve*

An APU reverse-flow leak check identified no leakage, and the valve operated satisfactorily during the subsequent engine ground run.

### 1.16.10 No.1 Engine High Stage Regulator

As part of the maintenance rectification following the occurrence, the No. 1 engine high-stage regulator was replaced as it was suspected of contributing to the sticky movement of the high-stage shutoff valve. The removed regulator, part number 107484-7, serial number 11914, was replaced with a serviceable regulator of the same part number, serial number 20186.

Following replacement, the installation and leak checks were satisfactory, and the regulator operated normally during the subsequent engine ground run.

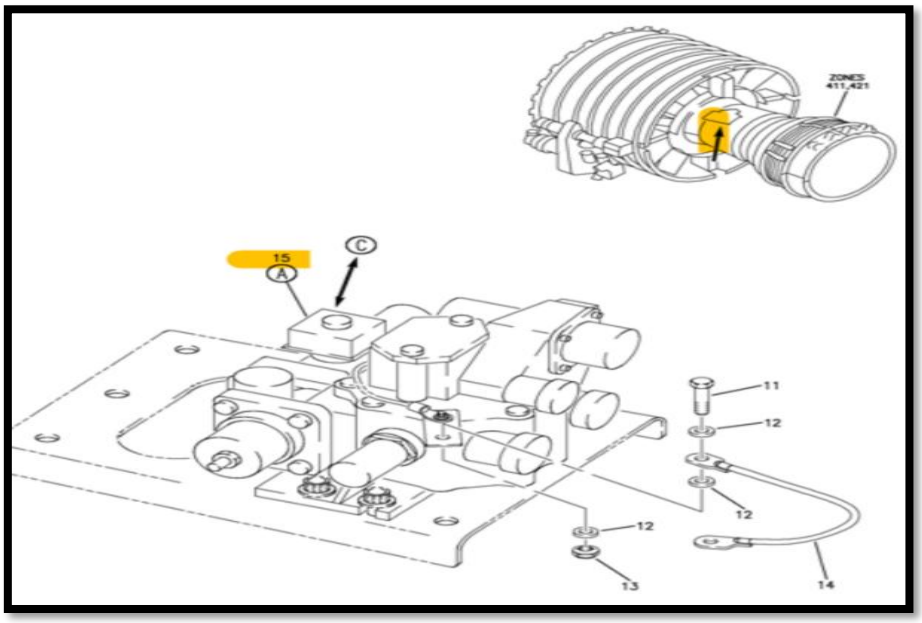



*Figure 10: No.1 Engine High-Stage Regulator*

### 1.16.11 Post Maintenance Functional Testing

Following completion of the component replacements, maintenance personnel carried out engine ground runs and crossover operational tests on both engine bleed air systems at various engine power settings.

Throughout the tests, the recorded duct pressure values remained within the applicable AMM limits, and the No. 2 BLEED TRIP OFF indication did not recur. The

results of the maintenance checks were satisfactory, and the aircraft was subsequently released to service.

## 1.17 Organisational and Management Information

As of 2026, Malaysia Airlines operates a mixed fleet comprising the Boeing 737-800, Boeing 737-8, Airbus A330-200, Airbus A330-300, Airbus A330neo and Airbus A350-900. The airline is undergoing a continuing fleet modernisation programme aimed at improving operational efficiency, fuel performance, passenger comfort and long-term fleet sustainability.

The modernisation programme includes the progressive introduction of newer generation narrowbody and widebody aircraft to replace or supplement ageing aircraft within the existing fleet. This transition supports Malaysia Airlines' strategy to strengthen its domestic and international network while maintaining operational reliability and capacity appropriate to market demand.

## 1.18 Additional Information

Following removal from the aircraft, selected ECS and bleed air components were disassembled, inspected and overhauled. The left Flow Control Valve (FCV) was found with excessive leakage, abnormal pressure regulation, an intermittent position indicator switch, restricted butterfly valve movement and deterioration of several internal components.

The No. 1 engine high stage regulator showed unstable regulation, improper reverse flow check operation, leakage and deterioration of internal diaphragms and components. The No. 2 engine bleed air regulator was found with an inoperative pressure switch associated with a loose connector pin, unstable regulation, connector damage and internal deterioration.

These findings identified deterioration and defects within the removed ECS and bleed air components and were considered as part of the technical assessment of the pressurisation event. The detailed component inspection and shop findings reports are provided in *Appendix D*.

## 1.19 Useful or Effective Investigation Techniques

The investigation applied standard Annex 13 investigation methods, including the review of flight data, maintenance records, technical documentation, operator submissions and engineering correspondence. No laboratory testing or specialised technical examination was required to establish the basic sequence of events.

A particularly useful technique was the review and correlation of the FDR readout with Boeing's comparative flight data analysis. Boeing compared the occurrence flight with two earlier flights, MAS390 on 14 October 2025 and MAS1438 on 15 October 2025, and identified the same abnormal left ECS pack indication.

The investigation subsequently reviewed the available FDR readout and relevant system parameters, including aircraft altitude, warning indications, engine parameters, ECS Pack ON status and pack flow indications, to reconstruct and correlate the system behaviour during the occurrence.

# 2.0 ANALYSIS

## 2.1 General

The analysis considered the operational, technical, human factors, environmental and organisational aspects of the serious incident. The occurrence involved a loss of cabin pressurisation during cruise, followed by a cabin altitude warning, manual deployment of passenger oxygen masks and an emergency descent to 10,000 ft.

The available evidence did not indicate any structural failure, fire, adverse weather, crew incapacitation or aerodrome related factor. The flight crew responded by selecting manual pressurisation control, closing the outflow valve, carrying out the applicable non normal procedures and initiating the emergency descent. The aircraft subsequently landed safely at Bintulu Airport with no injuries.

The investigation applied the 5M Model comprising Man, Machine, Medium, Mission and Management to assess the interaction between aircraft system behaviour, crew response, operating environment, mission profile and organisational support.

## 2.2 5M Model Analysis

### 2.2.1 Man

The “Man” element considered the actions and performance of the flight crew, cabin crew, maintenance personnel and technical support personnel involved in the occurrence.

The flight deck crew comprised the Pilot in Command, a Cadet Pilot acting as Second in Command, and a Safety Pilot. The additional pilot provided support and monitoring during the abnormal pressurisation event.

The crew recognised the increasing cabin altitude, selected manual pressurisation control, commanded the outflow valve closed and carried out the applicable non normal procedures. The Safety Pilot manually deployed the passenger oxygen masks, and the aircraft was descended to 10,000 ft.

The available evidence indicated that the crew response was timely and appropriate. Effective task sharing, communication and monitoring were maintained during the emergency, and there was no evidence that flight crew actions caused or contributed to the initiating technical malfunction.

Following the occurrence, maintenance and engineering personnel carried out troubleshooting and functional checks of the pressurisation, ECS and bleed air systems, which assisted in identifying the technical abnormalities.

Based on the available evidence, the “Man” element was not considered causal or contributory to the occurrence. The actions of the flight crew were appropriate and mitigated the consequences of the pressurisation event.

### 2.2.2 Machine

The “Machine” element was considered the most significant factor in the occurrence and included the aircraft pressurisation, Environmental Control System (ECS), air-conditioning packs, bleed-air system, cabin pressure control system and associated indications.

The investigation review of the FDR readout in *Figure 11* for the occurrence flight on 21 October 2025 identified an abnormal condition in the left ECS pack parameters. Throughout the relevant portion of the flight, the Left ECS Pack ON/OFF parameter shown in *Figure 12* remained at 0 (OFF), while the Left ECS Pack Flow parameter remained predominantly at 0 (LOW).

This combination indicated that the recorded left pack status was not consistent with normal expected pack operation. The investigation also identified that the right ECS pack remained indicated ON, with changes in the right pack flow parameter during the later part of the flight.

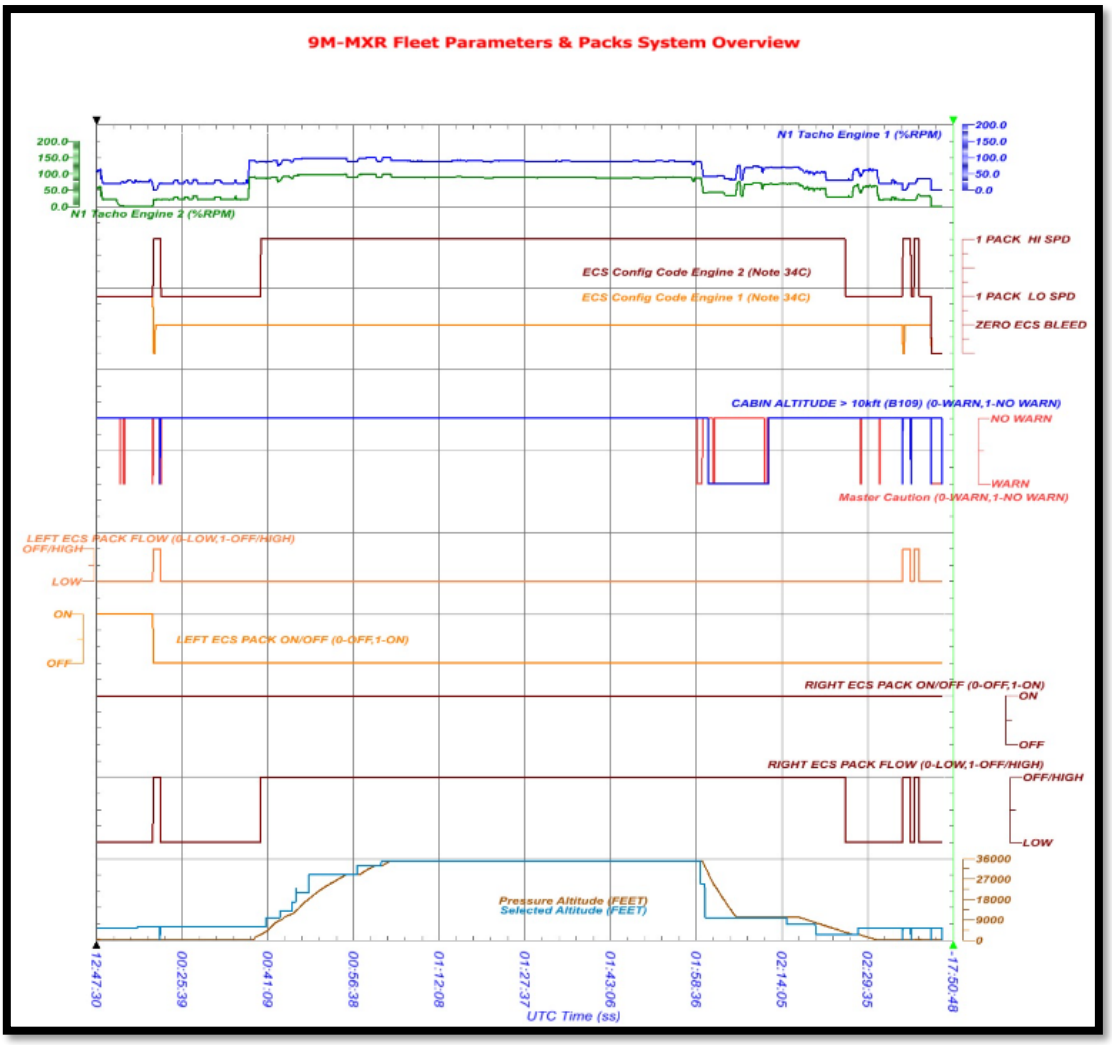



*Figure 11: FDR Readout*

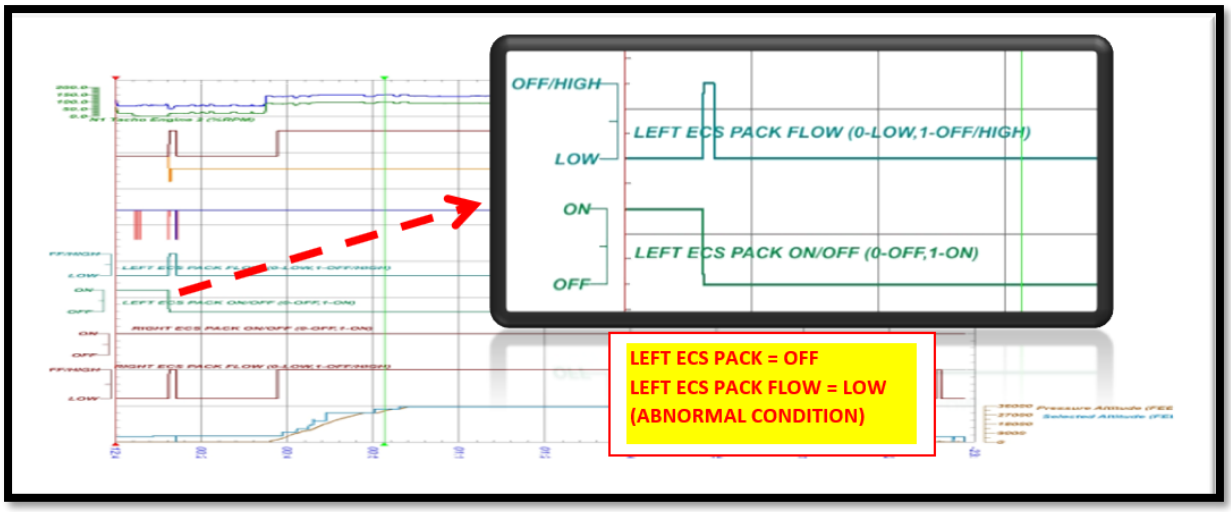



*Figure 12: FDR Readout Showing Left ECS Pack OFF with Low Pack Flow*

FDR data in *Figure 13* showed that the right ECS pack remained ON and subsequently transitioned to HIGH flow. With the left pack unavailable, the right pack provided increased airflow to support cabin pressurisation. This increased airflow demand placed additional load on the right engine bleed system, which subsequently approached an overheat condition. The flight crew were not provided with a specific warning or fault indication on the flight deck for the degraded left pack condition, as the left FCV closed condition did not generate a corresponding cockpit alert.

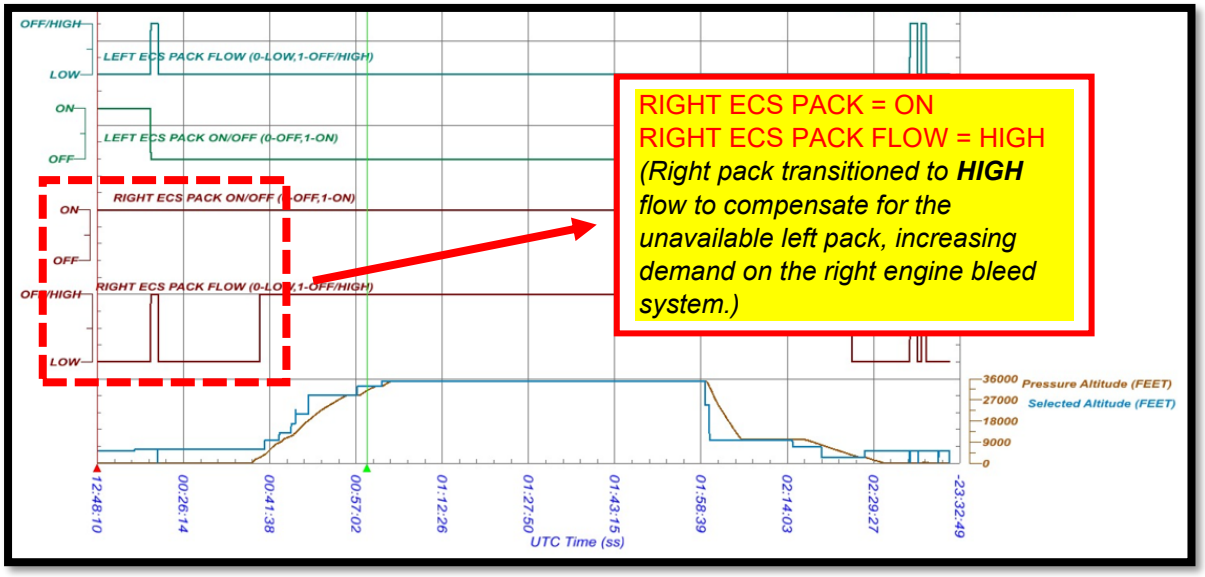



*Figure 13: Right ECS Pack High-Flow Operation Following Loss of Left Pack Airflow*

At approximately FL350, the FDR readout in *Figure 14* showed that the aircraft was established in cruise while the left ECS pack remained indicated OFF with the left pack

flow at LOW. The right ECS pack remained ON and was operating at HIGH flow, effectively carrying the cabin airflow and pressurisation demand. This increased demand placed additional load on the right engine bleed air system.

As the condition progressed, the left pack remained unavailable, and the right pack operated at increased flow to support cabin pressurisation. The increased demand caused the right bleed system to approach an overheat condition, with the right PRSOV likely modulating closed and reducing right side duct pressure and pack airflow. The reduced total airflow became insufficient to maintain cabin differential pressure, and the No. 2 bleed system subsequently tripped, further reducing the available pressurisation air supply.

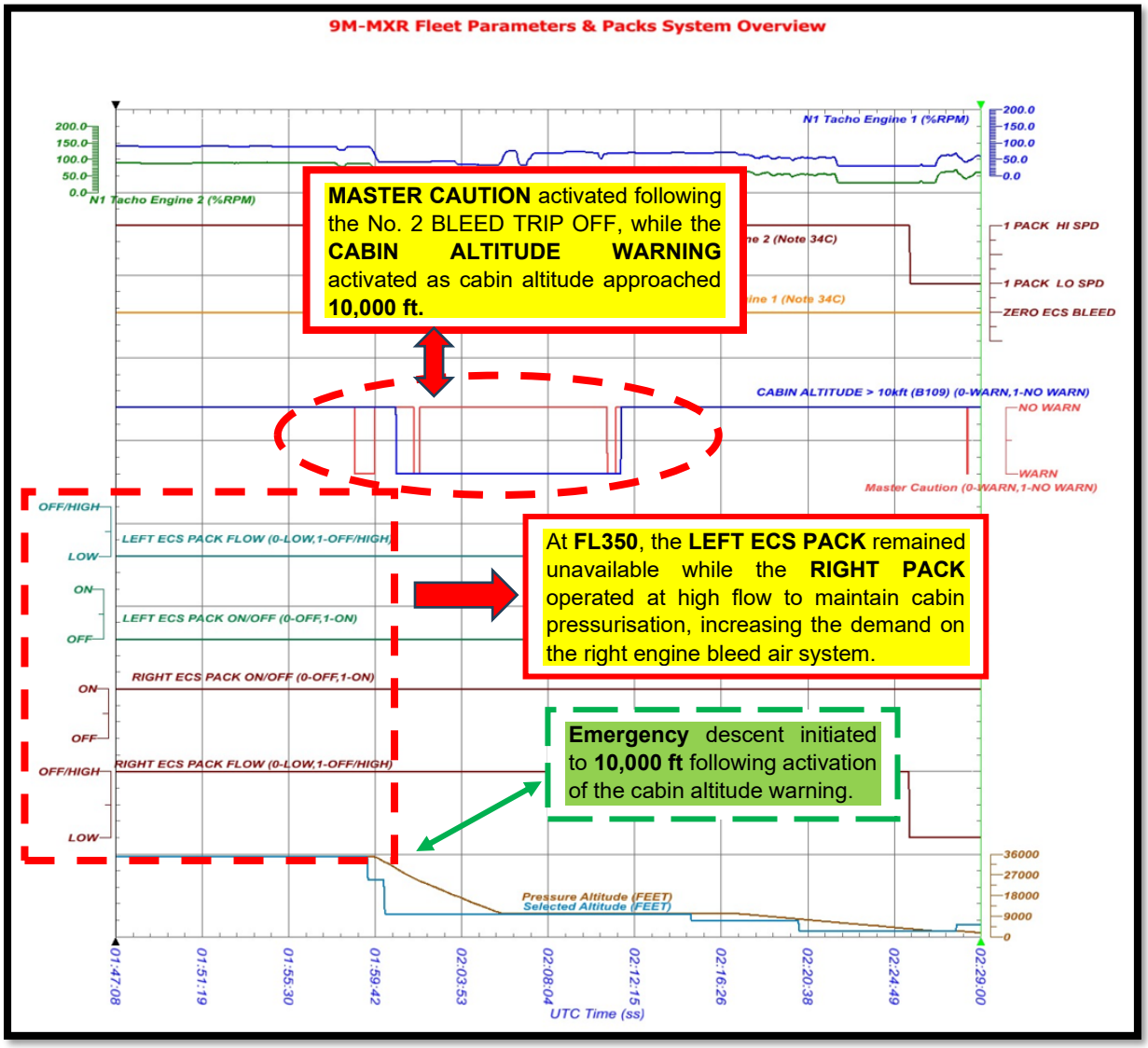



*Figure 14: FDR Sequence of Cabin Altitude Warning and Emergency Descent to 10,000 ft*

The Master Caution activation was consistent with the No. 2 BLEED TRIP OFF system fault indication, while the CABIN ALTITUDE WARNING activated separately as the cabin altitude approached 10,000 ft. The crew selected MANUAL pressurisation, commanded the outflow valve fully closed and, when cabin altitude continued to rise, carried out the applicable non-normal procedures and initiated an emergency descent to 10,000 ft.

The investigation's FDR readout supported the technical sequence in which the left FCV remained closed, resulting in increased reliance on the right ECS pack and greater demand on the right engine bleed-air system. The right bleed system subsequently tripped, reducing the available pressurisation airflow and leading to the cabin altitude warning and emergency descent.

Based on the available evidence, the "Machine" element was considered the primary contributing factor to the serious incident. The principal technical condition was the latent left FCV closed condition, which reduced the available ECS capacity and increased reliance on the remaining right pack and bleed-air system.

### 2.2.3 Medium

The "Medium" element considered the operating environment in which the occurrence developed, including altitude, weather, airspace, communications and aerodrome conditions.

The pressurisation abnormality occurred during cruise at approximately FL350. At this altitude, adequate airflow from the ECS packs and bleed air system is required to maintain the necessary cabin differential pressure. Consequently, the reduction in available pack and bleed airflow increased the significance of the technical malfunction and resulted in a progressive rise in cabin altitude.

The available evidence indicated that the weather and surrounding operating environment were not factors in the occurrence. No significant turbulence, icing, lightning, volcanic ash or other adverse environmental conditions were reported.

Air traffic communications remained available during the event, enabling the crew to coordinate the descent and continuation of the flight. Following the emergency descent

to 10,000 ft, the aircraft continued to Bintulu and landed safely without further incident. Airport emergency services were available but were not required to intervene.

Based on the available evidence, the “Medium” element was not considered causal or contributory to the serious incident. However, the high-altitude cruise environment increased the operational consequences of the loss of pressurisation and required timely crew action to descend the aircraft to a safe altitude.

### 2.2.4 Mission

The “Mission” element considered the operational purpose and context of the flight, including the route, phase of flight, passenger carrying operation, crew composition and operational decisions made during the occurrence.

MH2742 was a scheduled domestic passenger flight from Kuala Lumpur International Airport to Bintulu Airport, carrying 109 passengers and 8 crew members. The pressurisation abnormality developed during cruise at approximately FL350, about 40 NM before the planned top of descent.

The flight deck crew comprised the Pilot in Command, a Cadet Pilot undergoing supervised line training, and a Safety Officer. The training element did not contribute to the technical malfunction. During the abnormal situation, the presence of three pilots provided additional support for aircraft control, system monitoring, checklist accomplishment and passenger oxygen deployment.

When the pressurisation condition deteriorated, the operational objective changed from normal passenger transport to emergency management. The crew prioritised aircraft control, oxygen availability and descent to a safe altitude. Following activation of the cabin altitude warning, the applicable emergency procedures were carried out and an emergency descent to 10,000 ft was initiated.

After reaching 10,000 ft, the cabin pressurisation condition stabilised. The aircraft then continued to Bintulu and landed safely without injuries, aircraft damage or the need for an emergency evacuation.

Based on the available evidence, the “Mission” element was not considered causal or contributory to the serious incident. The change from normal flight operations to

emergency management was handled appropriately and supported the safe outcome of the flight.

### 2.2.5 Management

The “Management” element considered the organisational and procedural arrangements relevant to the occurrence, including maintenance control, engineering monitoring, technical support, safety communication and the operator’s response to identified system abnormalities.

The aircraft held valid certification and was maintained in accordance with the applicable regulatory and approved maintenance requirements. Following the occurrence, maintenance personnel carried out troubleshooting and functional testing of the aircraft pressurisation, ECS and pneumatic systems in accordance with the applicable maintenance procedures. The actions included checks of the engine bleed systems, FCV wiring and associated pressurisation components.

A significant management consideration was the detection of latent ECS abnormalities. Review of previous flight data identified similar left pack/FCV indications before the occurrence flight. As the left FCV closed condition did not provide a clear flight deck indication or PZTC fault, the condition could remain undetected during normal operation while the right pack compensated for the reduced left-pack airflow.

The previous flight data evidence demonstrated the importance of effective engineering trend monitoring, particularly for ECS pack ON status, pack flow, bleed-system behaviour and other parameters that may indicate intermittent or non-alerting system degradation. Earlier identification of such abnormal trends provides an opportunity for engineering assessment and maintenance intervention before the condition develops into a more significant in-flight event.

Following the occurrence, the operator’s Engineering department implemented interim safety measures, including additional monitoring and inspection of the B737NG pressurisation and pack systems to support earlier detection of abnormalities. Flight Operations also issued an internal safety communication to flight crew, including emphasis on clear and deliberate communication while oxygen masks are in use.

Based on the available evidence, the “Management” element was not considered the direct initiating cause of the serious incident. However, it remained an important latent safety consideration because the absence of an obvious cockpit indication for the left FCV closed condition placed greater reliance on flight data trend monitoring, engineering review and effective maintenance follow up for early detection of the degraded ECS condition.

### 2.3 5M Analysis Summary

The 5M analysis identified the “Machine” element as the primary contributing factor to the serious incident. The latent left FCV closed condition reduced the available ECS capacity, resulting in increased reliance on the right pack and bleed air system. The right bleed system subsequently tripped, reducing the airflow available for cabin pressurisation and leading to the cabin altitude warning and emergency descent.

The “Man” element was not causal. The flight crew recognised the developing pressurisation abnormality, carried out the applicable emergency procedures, ensured oxygen availability and descended the aircraft to 10,000 ft, thereby reducing the consequences of the event.

The “Medium” and “Mission” elements were not considered causal or contributory. The high-altitude cruise environment increased the consequences of the pressurisation malfunction, but no adverse weather, communication, navigation or aerodrome factors contributed to the occurrence. The transition from normal passenger operation to emergency management was handled appropriately.

The “Management” element was not identified as the direct initiating cause but remained an important latent safety consideration. The absence of an early cockpit indication for the left FCV closed condition highlighted the need for effective flight data trend monitoring, engineering review and timely maintenance follow up to identify intermittent or non-alerting ECS abnormalities.

### 2.4 Conclusion of 5M Analysis

The 5M analysis concluded that the serious incident was primarily associated with the “Machine” element, involving the latent left ECS pack FCV closed condition, increased

reliance on the right pack and the subsequent right bleed system trip, which reduced the available airflow for cabin pressurisation.

The “Man” element was effective in mitigating the consequences, as the flight crew carried out the required emergency actions, ensured oxygen availability and descended the aircraft to 10,000 ft. No flight crew error was identified as a causal factor.

The “Medium” and “Mission” elements were not causal, although the high-altitude cruise environment increased the operational consequences of the pressurisation failure. The “Management” element remained relevant to the early detection and monitoring of latent ECS abnormalities.

Overall, the occurrence highlighted the importance of effective flight data trend monitoring, timely engineering follow-up and early detection of intermittent or non-alerting ECS pack abnormalities. A summary of the 5M analysis findings is provided in Appendix E.

## 3.0 CONCLUSION

### 3.1 Findings

#### 3.1.1 Personnel

i. The Pilot in Command held a valid Airline Transport Pilot Licence (ATPL) and Class 1 medical certificate.

ii. The Safety Pilot and Cadet Pilot held valid Commercial Pilot Licences (CPL) and Class 1 medical certificates.

iii. Each pilot had a recorded rest period of 12 hours since the previous flight.

iv. There was no evidence that fatigue, medical incapacitation, drugs or alcohol contributed to the occurrence.

v. The flight crew’s actions during the pressurisation emergency were appropriate, and no flight crew action was identified as causal to the serious incident.

### 3.1.2 Aircraft

i. The aircraft held valid Certificate of Registration and Certificate of Airworthiness and was maintained in accordance with the applicable approved requirements.

ii. No structural damage attributable to the occurrence was identified following the flight.

iii. The aircraft was equipped with a Flight Data Recorder (FDR) and Cockpit Voice Recorder (CVR).

iv. Relevant FDR data were successfully recovered and used to support the investigation and technical analysis.

v. The investigation identified the principal aircraft-system abnormality within the ECS, bleed-air and pressurisation systems, involving the left pack FCV closed condition and subsequent degradation of the right bleed-air supply.

### 3.1.3 Flight Operation

i. MH2742 was a scheduled domestic passenger flight from Kuala Lumpur International Airport to Bintulu Airport, carrying 117 persons, comprising 109 passengers and 8 crew members.

ii. The occurrence developed during cruise at approximately FL350, before the planned top of descent.

iii. The flight crew identified an abnormal cabin rate of climb and increasing cabin altitude, selected MANUAL pressurisation and commanded the outflow valve closed.

iv. The No. 2 engine bleed system tripped, reducing the available bleed-air supply for cabin pressurisation.

v. The cabin altitude warning activated as cabin altitude exceeded 10,000 ft, and the crew initiated an emergency descent to 10,000 ft.

vi. The aircraft subsequently continued to Bintulu and landed safely without further incident.

### 3.1.4 Survival Aspects

i. The passenger oxygen masks were manually deployed by the Safety Pilot when the cabin altitude warning activated.

ii. The flight crew used the applicable emergency procedures and initiated an emergency descent to 10,000 ft.

iii. The oxygen deployment and emergency descent were effective in protecting the occupants from the effects of elevated cabin altitude.

iv. There were no injuries to passengers or crew, and no emergency evacuation was required after landing.

### 3.1.5 Technical Findings

i. FDR data showed an abnormal left ECS pack/FCV condition, with the Left ECS Pack ON parameter indicating 0 (OFF) while the pack flow indication remained at LOW.

ii. The left pack FCV remained closed, reducing the available ECS airflow and causing the right ECS pack to operate at increased flow demand.

iii. The increased demand caused the right engine bleed system to approach an overheat condition and subsequently trip, resulting in insufficient airflow to maintain cabin pressurisation at cruise altitude.

iv. The left FCV closed condition did not provide an early flight deck indication or PZTC fault, limiting the crew’s ability to detect the degraded ECS condition before the cabin altitude warning.

v. Previous flight data showed similar left pack/FCV abnormalities before the occurrence flight, indicating that the condition was latent and pre-existing.

vi. The recorded DCPC fault codes were consistent with cabin altitude threshold exceedance and manual mode selection and did not establish a failure of the cabin pressure control system.

vii. Previous FDR data contained similar left pack/FCV abnormalities however, the condition was not identified before the occurrence.

viii. Existing aircraft monitoring logic and maintenance test coverage could not detect the intermittent or uncommand FCV closed condition in flight.

ix. The occurrence highlighted the need for enhanced FDR trend monitoring and timely engineering review of recurrent or non-alerting ECS pack abnormalities.

### 3.1.6 Operational Response

i. During cruise, the flight crew observed an abnormal cabin rate of climb and increasing cabin altitude and selected the pressurisation system to MANUAL, commanding the outflow valve closed.

ii. The No. 2 BLEED TRIP OFF indication subsequently illuminated as the pressurisation condition continued to deteriorate.

iii. When the cabin altitude warning activated as cabin altitude approached 10,000 ft, the flight crew donned oxygen masks and carried out the applicable non normal procedures.

iv. The Safety Pilot manually deployed the passenger oxygen masks, and the flight crew initiated an emergency descent to 10,000 ft.

v. The aircraft remained under control throughout the occurrence and subsequently continued to Bintulu, where it landed safely with no injuries or aircraft damage.

vi. The crew’s actions mitigated the consequences of the pressurisation event, and no flight crew action was identified as a causal factor in the technical malfunction

### 3.2 Cause/Contributing Factor

The serious incident was caused by the left ECS pack Flow Control Valve (FCV) remaining closed during flight, which reduced the available airflow and increased reliance on the right ECS pack. The right bleed system subsequently tripped, resulting in insufficient airflow to maintain normal cabin pressurisation.

The investigation classified the occurrence as a Serious Incident under the **System/Component Failure or Malfunction (Non-Powerplant) (SCF-NP)**[1] category because the event involved a malfunction of the aircraft's environmental control, pneumatic and pressurisation systems, which reduced the aircraft's ability to maintain normal cabin pressurisation and required an emergency descent.

A contributing factor was the latent left FCV closed condition, which had no clear flight deck indication and was initially masked by the right ECS pack compensating for the reduced airflow. Similar abnormalities in previous flight data were also not detected before the occurrence.

## 4.0 SAFETY RECOMMENDATIONS

### 4.1 Immediate Safety Actions of Preliminary Report

**4.1.1** The Preliminary Report for this serious incident, issued on 08 December 2025, included the following immediate safety recommendation for action by the operator's Engineering department:

*The operator's Engineering department shall implement interim safety measures in coordination with Boeing, including additional monitoring and inspection of the B737NG pressurisation and pack systems to support early detection of abnormalities.*

***(AAIB Recommendation: SR SI09/25-1)***

Based on the immediate safety recommendation issued in the Preliminary Report, the operator implemented a 15-day repetitive inspection and monitoring programme for the B737NG fleet, including DCPC interrogation, ECS pack evaluation, FCV signal

[1] **System/component failure or malfunction [non-powerplant] (SCF-NP) -** "Failure or malfunction of an aircraft system or component — other than the powerplant."

verification and ACMS monitoring to support earlier detection of uncommand FCV closure and other pressurisation abnormalities

**4.1.2** The Preliminary Report for this serious incident, issued on 08 December 2025, contained the following recommendation for immediate safety action to the operator's Flight Operations department:

*The operator's Flight Operations should issue internal safety communication to all flight crew to raise awareness of this event, including emphasise on clear, deliberate communication when using oxygen masks.*

Based on the immediate safety recommendation issued in the Preliminary Report, the operator issued Flight Safety Memos FSM 0093 and FSM 0094 to flight crew to increase awareness of the occurrence and reinforce clear and deliberate communication while oxygen masks are in use

### 4.2 Safety Recommendations of this Report

The Safety Recommendations to the respective organisations to address the safety concerns identified in this investigation are as follows:

#### 4.2.1 Aircraft Operator

i) *It is recommended that the Aircraft Operator establish a permanent engineering trend monitoring programme for the B737NG pressurisation, pneumatic and ECS systems, including routine review of FDR data for ECS Pack ON status, pack flow, bleed-system abnormalities and cabin altitude related parameters, to enable early identification of intermittent or non-alerting system degradation.*
***(AAIB Recommendation: SR SI09/25-1)***

In response to Safety Recommendation SI09/25-1, the Aircraft Operator reported that MAB Airline Engineering had implemented an ACARS event trigger to facilitate early detection of aircraft system abnormalities and support timely engineering monitoring and corrective action.

*ii) It is recommended that the Aircraft Operator continue recurrent flight crew training and awareness relating to cabin pressurisation abnormalities, cabin altitude warning, oxygen mask communication, emergency descent procedures and crew resource management during high-workload emergency situations.*
***(AAIB Recommendation: SR SI09/25-2)***

In response to Safety Recommendation SR SI09/25-2, the Aircraft Operator reported that TSI-B73NG-25-0258 is active and has been implemented as a recurring task across its B737NG fleet.

### 4.2.2 Aircraft Manufacturer

i) It is recommended that the Aircraft Manufacturer review and, where necessary, enhance its maintenance and troubleshooting guidance concerning FCV closed indications, abnormal pack flow combinations and associated bleed system degradation.
**(AAIB Recommendation: SR SI09/25-3)**

## 5.0 COMMENTS TO THE REPORT AS REQUIRED BY ICAO ANNEX 13 PARAGRAPH 6.3

As required by ICAO Annex 13, paragraph 6.3, the draft Final Report was sent to the State of Occurrence/Registry/Operator (CAAM), the State of Design and Manufacture (NTSB), and the Aircraft Operator, inviting their significant and substantiated comments on the report.

The status of the comments received is summarised below:

| States/Organisations | Status of Significant and Substantiated Comments |
|---|---|
| Civil Aviation Authority of Malaysia (CAAM) | Report received. No comments provided. |
| National Transportation Safety Board (NTSB) | Report received. No comments provided. |
| Aircraft Operator | Comments received and relevant amendments incorporated into the Final Report. |

## CONCLUDING STATEMENT

This investigation identified a latent malfunction of the aircraft's Environmental Control System (ECS), which resulted in reduced cabin pressurisation capability and necessitated an emergency descent. The findings highlighted the importance of early detection of intermittent system abnormalities, effective engineering trend monitoring and appropriate maintenance troubleshooting. The timely and coordinated response of the flight crew contributed to the safe continuation and landing of the aircraft without injuries.

In accordance with the principles of ICAO Annex 13, the findings and safety recommendations of this investigation are not intended to apportion blame or liability, but rather to identify safety concerns and prevent similar occurrences. The implementation of the recommended safety measures will help strengthen aircraft system reliability, enhance engineering monitoring and flight crew preparedness, and mitigate the risks associated with undetected technical abnormalities. Continued cooperation among the Aircraft Operator, Aircraft Manufacturer and relevant stakeholders is encouraged to support the implementation of these measures and the continuous improvement of aviation safety.

**Investigator In Charge**
**AAIB**
**Ministry of Transport, Malaysia**

**APPENDIX A**

## Certificate of Airworthiness.

**PIHAK BERKUASA PENERBANGAN AWAM MALAYSIA**
*CIVIL AVIATION AUTHORITY OF MALAYSIA*

**PERAKUAN KESELAMATAN TERBANG**
*CERTIFICATE OF AIRWORTHINESS*

| Tanda-Tanda Kenegaraan dan Pendaftaran<br>*Nationality and Registration Marks* | Pembuat dan Nama Sebutan Kapal Udara<br>*Manufacturer and Manufacturer's Designation of Aircraft* | Nombor Siri Kapal Udara<br>*Aircraft Serial Number* |
|---|---|---|
| **9M-MXR** | THE BOEING COMPANY<br>737-8H6 | 40155 |

**Kategori** *Category*: **14 CFR PART 25 TRANSPORT CATEGORY AIRPLANES**

Perakuan Keselamatan Terbang ini dikeluarkan menurut Konvensyen Penerbangan Awam Antarabangsa bertarikh 7 Disember 1944 dan Akta Penerbangan Awam 1969 dan peraturan-peraturan yang dikeluarkan di bawahnya, untuk kapal udara yang tersebut di atas yang didapati layak untuk terbang jika disenggarai dan dikendalikan menurut peraturan peraturan yang tersebut, dan had-had penerbangan yang bersabit.

*This Certificate of Airworthiness is issued pursuant to the Convention on International Civil Aviation dated 7 December 1944 and with the Civil Aviation Act 1969 and regulations issued thereunder, in respect of the above-mentioned aircraft, which is considered to be airworthy if maintained and operated in accordance with foregoing regulations and pertinent operating limitations.*

**Tarikh dikeluarkan** *Date of issue*: **28-Jan-2026**

**Tarikh tamat tempoh** *Date of expiry*: **30-Jan-2027**

AIR 36
DATO' CAPT. NORAZMAN BIN MAHMUD
**Pihak Berkuasa Penerbangan Awam Malaysia**
*Civil Aviation Authority of Malaysia*

Tiada apa-apa jua tulisan atau catatan boleh dibuat dalam Perakuan ini kecuali oleh Pihak Berkuasa Penerbangan Awam Malaysia.
*No entries or endorsement may be made in this Certificate except by Civil Aviation Authority of Malaysia.*

## APPENDIX B

## Certificate of Registration

CAAM/AW/7101-00 250423

**PIHAK BERKUASA PENERBANGAN AWAM MALAYSIA**
*CIVIL AVIATION AUTHORITY OF MALAYSIA*

**No. Perakuan** *Certificate No.*
**AR/16/202**

**PERAKUAN PENDAFTARAN**
*CERTIFICATE OF REGISTRATION*

| 1. **Tanda-Tanda Kenegaraan dan Pendaftaran** *Nationality and Registration Marks* | 2. **Pembuat dan Nama Sebutan Kapal Udara** *Manufacturer and Manufacturer's Designation of Aircraft* | 3. **Nombor Siri Kapal Udara** *Aircraft Serial Number* |
|---|---|---|
| **9M-MXR** | **THE BOEING COMPANY 737-800** | **40155** |

4a. **Dikeluarkan Kepada:** *Issued To:* **MALAYSIA AIRLINES BERHAD**

**Asas Pendaftaran:** *Basis of Registration:*

- ☒ **Pemilikan Kapal Udara** *Ownership of Aircraft*
- ☐ **Pengendali Kapal Udara** *Operator of Aircraft*
- ☐ **Lain-lain (Nyatakan):** *Other (Explain):*

4b. **Alamat Pemegang Perakuan:** *Address of Certificate Holder:*
1ST FLOOR, ADMINISTRATION BUILDING
SOUTHERN SUPPORT ZONE
KUALA LUMPUR INTERNATIONAL AIRPORT
64000 SEPANG
SELANGOR
MALAYSIA

5. **Nama dan Alamat Pemunya, Jika Berbeza dengan Pemegang Perakuan:** *Name and Address of Owner, If Different from Certificate Holder:*
**EINN VOLANT AIRCRAFT LEASING IRELAND 1 LIMITED**
AVIATION HOUSE
V14 AN29 SHANNON
COUNTY CLARE
IRELAND

6. **Adalah dengan ini diperakui bahawa kapal udara yang diperihalkan di atas telah dimasukkan ke dalam Daftar Kapal Udara menurut Konvensyen Penerbangan Awam Antarabangsa bertarikh 7 Disember 1944 dan Akta Penerbangan Awam 1969, dan peraturan-peraturan yang dikeluarkan di bawahnya.**

*It is hereby certified that the above described aircraft has been duly entered on the Aircraft Register in accordance with the Convention on International Civil Aviation dated 7 December 1944 and with the Civil Aviation Act 1969 and regulations issued thereunder.*

AIR 14

**DATO' CAPTAIN NORAZMAN BIN MAHMUD**
**b/p Pihak Berkuasa Penerbangan Awam Malaysia**
*for Civil Aviation Authority of Malaysia*

**Tarikh Dikeluarkan:** 17-JAN-2024 *Date of Issue:*
**Tempoh Sah Laku:** 25-JAN-2024 — 24-JAN-2027 *Validity Period:*

7. **Catatan:** *Remarks:* AIRCRAFT REGISTERED PURSUANT TO REGULATION 6(4) OF CIVIL AVIATION REGULATIONS 2016.
AIRCRAFT LEASE EXPIRES ON 30-JAN-2030.

Tiada apa-apa jua tulisan atau catatan boleh dibuat dalam Perakuan ini kecuali oleh Pihak Berkuasa Penerbangan Awam Malaysia
*No entries or endorsement may be made in this Certificate except by Civil Aviation Authority of Malaysia*

**APPENDIX C**

## Summary of Rectification Action

| No. | Date | Rectification Action | Result |
|---|---|---|---|
| 1 | 21 October 2025 | Flight MH2742 experienced an increase in cabin altitude followed by a No. 2 BLEED TRIP OFF indication. The aircraft landed safely at Bintulu Airport and was placed under an AOG rectification work package. | Rectification and troubleshooting were initiated. |
| 2 | 21 October 2025 | DCPC 1 and 2 BITE tests and fault-history reviews were carried out. Cargo-door seals, pack bellows, clamps and duct joints were inspected. Pack confidence and aircraft leak-down checks were also completed. | No significant leakage or abnormality was found, and the tests were satisfactory. |
| 3 | 22 October 2025 | The No. 2 engine Precooler Control Valve was replaced due to excessive free play. | Reverse-flow, leak and engine ground-run checks were satisfactory. |
| 4 | 22 October 2025 | The No. 2 engine Pressure Regulator and Shutoff Valve was replaced after it was found intermittently stuck in the half-open position. | The bleed-air system operated normally, and duct pressure was within limits. |
| 5 | 22–23 October 2025 | The No. 2 Bleed Air Regulator, No. 1 High Stage Shutoff Valve and No. 1 High Stage Regulator were replaced. | Reverse-flow, leakage and operational tests were satisfactory. |
| 6 | 22 October 2025 | Engine ground runs and bleed-air crossover operational tests were carried out on both engines. | All recorded values were within limits, and the No. 2 BLEED TRIP OFF indication did not recur. |
| 7 | 23 October 2025 | The aft outflow valve was replaced, followed by post-installation and bonding-resistance tests. | The post-installation and bonding-resistance test results were satisfactory. |
| 8 | 23 October 2025 | A stable voltage was confirmed at the left FCV connector, and the left Pack Flow Control Valve was replaced in accordance with Boeing's recommendation. | Leakage, PZTC BITE and valve operational tests were satisfactory, with no faults recorded. |
| 9 | 23 October 2025 | A post-installation voltage check and right Bleed Air Regulator bonding test were carried out. | The voltage and bonding-resistance readings were satisfactory. |
| 10 | 24 October 2025 | The maintenance work orders were closed after completion of the required rectification and testing. | The aircraft was certified ready for release to service. |
| 11 | 27 October 2025 | Boeing reviewed the post-rectification flight data. | Both left and right ECS packs were confirmed ON, with normal pack-flow parameters. |

## APPENDIX D

## Component Strip Inspection and Shop Findings

| Component | Part No. / Serial No. | Component Usage | Principal Inspection Findings |
|---|---|---|---|
| **Left Flow Control Valve (FCV)** | P/N 396608-1 S/N 7263 | 33,372 hours / 16,136 cycles | Initial testing identified excessive port and case leakage, excessive pressure regulation, improper switch operation and restricted movement of the butterfly plate. Further inspection identified an intermittent position indicator switch, dried packings, clogged servo-body bleed orifices, worn and dried diaphragms, a ruptured actuator diaphragm, and wear affecting pins, seals, bearings and butterfly valve components. |
| **No. 1 Engine High-Stage Regulator** | P/N 107484-7 S/N 11914 | 38,717 hours / 19,443 cycles | Testing identified unstable regulation, improper operation of the reverse flow check mechanism and shutoff valve leakage. Inspection also identified dried packings and diaphragms, worn valve components and contamination. The shop report associated the failure with a dried out reverse flow check mechanism diaphragm. |
| **No. 2 Engine Bleed-Air Regulator** | P/N 107492-6 S/N 5980 | 35,756 hours / 16,373 cycles | Testing identified an in-operative pressure switch associated with a loose connector pin, unstable regulation with fluctuating control pressure, a loose connector back shell and a cracked connector cover. Further inspection identified dried packings, contamination and wear of the connector and back shell. |

## APPENDIX E

## Summary of 5M Analysis Finding

| 5M Element | Findings | Assessment |
|---|---|---|
| **Man** | The flight crew identified the abnormal pressurisation condition, carried out the applicable non-normal procedures, used supplemental oxygen and initiated an emergency descent to 10,000 ft. Crew coordination and task sharing were effective. | **Not causal. Mitigating Factor.** |
| **Machine** | The left ECS pack FCV remained closed, reducing available left-pack airflow. The right ECS pack operated at increased demand, followed by degradation and trip of the right engine bleed system, resulting in insufficient airflow to maintain normal cabin pressurisation. | **Primary Technical Factor.** |
| **Medium** | The occurrence developed during high-altitude cruise at approximately FL350, where reduced pressurisation capability had greater operational consequences. No significant adverse weather or environmental conditions contributed to the occurrence. | **Not causal or contributory.** |
| **Mission** | The aircraft was conducting a scheduled passenger flight from Kuala Lumpur to Bintulu. Following the pressurisation abnormality, the operation changed from normal flight to emergency management, including descent to 10,000 ft and safe continuation to Bintulu. | **Not causal or contributory.** |
| **Management** | Similar left pack/FCV abnormalities were present in previous flight data but were not identified before the occurrence. The latent nature of the failure highlighted the importance of effective engineering trend monitoring, maintenance follow-up and detection of non-alerting ECS abnormalities. | **Latent safety factor / Area for improvement.** |