

CI025 Occurrence Investigation

Executive Summary

On April 17, 2016, China Airlines scheduled passenger transport flight CI025, a Boeing 737-800 aircraft, registration number B-18609, took off from Guam Airport to Taoyuan Airport at 1409. There were 3 flight crew members, 10 cabin crew members and 109 passengers, totally 122 people on board.

At 1421:37, the aircraft climbed through 27,434 feet, the cockpit master warning sounded with cabin pressure control module panel 「AUTO FAIL」 and 「ALTN」 lights on. The flight crew switched the Pressurization Mode Selector from 「AUTO」 to 「ALTN」 position per Quick Reference Handbook. Since the Automatic Pressurization Control remained failed, the flight crew next switched the Pressurization Mode Selector to 「MAN」 (manual mode) accordingly. The flight crew judged the cabin pressurization was still controllable and continued to climb.

At 14:33, after the aircraft was leveled at flight level 370, the flight crew found that the cabin pressure altitude still climbed at a rate of 500 feet per minute, the cabin pressurization went out of control. They decided to make an emergency descent to 10,000 feet and returned to Guam.

According to the Republic of China (ROC) Aviation Occurrence Investigation Act, and the content of Annex 13 to the Convention on International Civil Aviation, the ASC, an independent aviation occurrence investigation agency, is responsible for conducting the investigation. The investigation parties invited to participate in this investigation including:

CAA (Civil Aeronautical administration, ROC), NTSB (National Transportation Safety Board, USA) and China Airlines.

The “Draft Final Report” was completed in November 2016. The report was submitted to the relevant parties for comments after being reviewed by the 52nd council meeting on 27th December, 2016. Upon compilation and integration of comments from parties, the Final Report was approved by 57th ASC council meeting on 16th May, 2017. The Final Report was published on 3rd June 2017.

There are a total of 9 findings from the “Draft Final Report”, and 4 safety recommendations issued to the related organizations.

Findings as the result of this investigation

Findings related to probable causes

1. A gear pin of cabin pressure system outflow valve was broken so that the outflow valve could not be controlled which resulted in abnormal cabin pressure and air turned back to Guam.

Findings related to risk

1. During the Operator's so-called “the contents of the Fault Isolation Manual is incomplete” event happened, the Aircraft On Ground team did not contact the Boeing for professional and effective recommendations. After the end of rescue, the team did not actively inquire about the cause of failure message during troubleshooting. This indicates that the China Airlines should implement the execution of maintenance management rules.

Other findings

1. The flight crews were properly certificated and qualified in

accordance with the Civil Aeronautics Administration and company requirements. The flight crews acted in compliance with manufacture and company's procedures during the occurrence flight.

2. The daily, preflight, transit checks and deferred defect records of the occurrence aircraft in the past three months were not logged with item related to the event, this indicates it was the first malfunction of the system before the occurrence. The subjected airplane landed at Guam Airport after completed the flight from Taoyuan Airport, the mechanic took a built-in test of the cabin pressure system. The troubleshooting operation was compliant with the Fault Isolation Manual procedures. There was no abnormal finding and the release of aircraft was compliant with current regulations.
3. The replaced outflow valve of the occurrence aircraft already completed Service Bulletin No. 20209-21-001 revision. Two gear pins were all solid pins. The outflow valve gear pins of current China Airlines 737 fleet, totally 18 aircrafts, were all solid.
4. After the occurrence, No.1 cabin pressure controller was removed to test for investigation, although the result failed to meet the specifications but has no relation to the occurrence. And the inspection results showed No. 2 cabin pressure controller and cabin control module were normal.
5. The Aircraft On Ground team did not execute the reset procedure per the Fault Isolation Manual, resulting in subsequent unnecessary component replacement.
6. The log entries of many troubleshooting operations in the Technical Log Book were according to the Aircraft Maintenance Manual rather than the recommended procedures consistence with the Fault Isolation

Manual.

7. All the malfunctions of this case should be resolved if the Fault Isolation Manual were followed. This shows the Fault Isolation Manual possesses the complete contents to do troubleshooting in this case. Because the Aircraft On Ground team was not familiar with the Fault Isolation Manual, such that the Aircraft On Ground team thought the Fault Isolation Manual was incomplete. The Civil Aeronautics Administration airworthiness inspector stationed in China Airlines found the necessity to enhance the troubleshooting capability in routine audit, and asked China Airlines to strengthen the troubleshooting and the Fault Isolation Manual training last year. But the situation of China Airlines personnel did not familiar with the Fault Isolation Manual still existed in this case, showing the training need to be enhanced continuously.

Safety recommendation

To China Airlines

1. Enhance the training and evaluation program for maintenance personnel to be familiar with using Fault Isolation Manual. Require maintenance personnel following the procedures of Fault Isolation Manual when performing troubleshooting. If any doubt arises about Fault Isolation Manual incomplete, consult manufacturer for advises. When encountering maintenance difficulty during troubleshooting, maintenance personnel shall be proactive to figure out and clarify the fault messages generated during troubleshooting to assure implementation of the maintenance management rules.

2. Enhance the training and assessment to the maintenance personnel on Technical Log Book entry to ensure the aircraft Technical Log Book must be logged with the referred section per Fault Isolation Manual accordingly during troubleshooting

To Civil Aeronautics Administration, Ministry of Transportation and Communications

1. Require transport category operators to enhance the training and evaluation program for maintenance personnel to be familiar with using Fault Isolation Manual. Require maintenance personnel following the procedures of Fault Isolation Manual when performing troubleshooting. If any doubt arises about Fault Isolation Manual was incomplete, consult manufacturer for advises.
2. Enhance inspection of the entry of the Technical Log Book of national aircraft to ensure that the troubleshooting procedure is performed in accordance with the Fault Isolation Manual.