

SERIOUS INCIDENT

Aircraft Type and Registration:	DHC-8-402 Dash 8, G-PRPC	
No & Type of Engines:	2 Pratt & Whitney Canada PW150A turboprop engines	
Year of Manufacture:	2010 (Serial no: 4338)	
Date & Time (UTC):	21 September 2018 at 1735 hrs	
Location:	Edinburgh Airport	
Type of Flight:	Commercial Air Transport (Passenger)	
Persons on Board:	Crew - 4	Passengers - 70
Injuries:	Crew - None	Passengers - None
Nature of Damage:	None	
Commander's Licence:	Airline Transport Pilot's Licence	
Commander's Age:	38 years	
Commander's Flying Experience:	6,302 hours (of which 6,143 were on type) Last 90 days - 161 hours Last 28 days - 26 hours	
Information Source:	Aircraft Accident Report Form submitted by the pilot	

Synopsis

Shortly after levelling at cruise altitude an audio warning sounded and the CABIN PRESSURE warning illuminated. The crew followed the QRH checklist and initiated an emergency descent, and a MAYDAY was declared. On reviewing their actions, the crew saw that the air conditioning system was off. After levelling at FL100, and after consultation with the operator, the crew decided to continue the flight to Edinburgh.

History of the flight

During the previous sector the crew had difficulty in controlling the flight deck and cabin temperature, causing passenger and crew discomfort. During a busy turnaround, the commander therefore undertook a reset of the air conditioning packs using the Q400 'Supplemental Procedure Ground Reset Guide'. The crew completed their procedures and departed from Belfast City Airport at 1805 hrs.

The departure was routine and the aircraft climbed to its planned cruise level of FL170. Shortly after reaching cruise level, at 1825 hrs the flight deck triple chime audio warning sounded and the CABIN PRESSURE warning illuminated. The flight crew immediately checked the cabin altitude and, when they confirmed that it was above 10,000 ft, they actioned the 'Rapid Depressurisation and Emergency Descent' checklist from the QRH. A MAYDAY was declared.

During the descent the crew reviewed their actions and noticed that both air conditioning pack switches were selected to OFF. They selected both packs on and the aircraft began to pressurise. The aircraft levelled at FL100 just to the south of Glasgow. The cabin crew were informed of the situation but they told the flight crew that the passengers were unaware of the event (the Q400 has no passenger oxygen masks to drop down in front of passengers).

Via the handling agent in Edinburgh, the crew asked their operations department if they should continue to Edinburgh or return to Belfast. The company wanted them to continue to Edinburgh, and the flight arrived there at 1855 hrs.

Human factors

During the short turnaround the crew had to deal with a number of extraneous factors. The aircraft catering had run out of drinking water for the crew and there was difficulty in acquiring a resupply which caused the commander to leave the flight deck for a period. The destination for the sector had been changed and the new flight plans were not available, so the co-pilot left the aircraft to collect those from the terminal building. Due to the issues with temperature control the commander decided to reset the air conditioning system. During this he was interrupted by other flight deck activities and did not complete the procedure.

Organisational information

An earlier defect with the automatic control of cabin temperature had been deferred in accordance with the Q400 '*Minimum Equipment List*'. This information had been recorded in the company electronic maintenance system but was not reflected in the paper Technical Log carried aboard the aircraft. Therefore, the crew were not aware of the issue and had operated the air conditioning system in an inappropriate mode on the first sector, which had resulted in the inability to control temperature.

In reference to the fact that the deferred defect was not reflected in the aircraft Technical Log, the operator published the following text in a newsletter:

'...it's really important that all cabin defects are recorded as and when they are noticed. It's not enough to pass things on to the line engineers verbally – a formal record is the only reliable method of ensuring that the issue will be dealt with.'

Analysis

During the turnaround preceding the incident sector the crew workload was influenced by numerous factors including a change in planned destination and issues with catering. These factors led to both flight crew members being absent from the flight deck for periods of time during the turnaround. As a consequence, their ability to work effectively as a team and trap each other's errors was significantly diminished.

The temperature control problem which the crew encountered in the preceding sector caused issues with both crew and passenger comfort. Due to the discrepancy in the

maintenance system, however, the crew were unaware of the relevant technical issue. In an effort to resolve the problem during the turnaround, the commander undertook the reset procedure from the Q400 '*Supplemental Procedure Ground Reset Guide*', but the conduct of the procedure added to the already elevated workload of the crew, and the commander was interrupted and it was not completed correctly.

When both pilots returned to the flight deck they were keen to try and make an on-time departure despite the issues that had affected the turnaround. Their workload was now significantly above the norm and while they believed they had completed all the relevant checklist actions correctly, it became apparent later that both air conditioning systems had been left selected OFF. The aircraft did not, therefore, pressurise and the Cabin Altitude warning sounded shortly after reaching the cruise flight level.

Conclusion

The aircraft departed Belfast with both air conditioning systems off and therefore did not pressurise. The fact that the systems were off was not detected during routine checks before departure. The effectiveness of the crew's actions was reduced by the high workload resulting from operational factors and by their attempts to deal with the symptoms of a technical issue with the aircraft, which had not been communicated to them.