



Australian Government

Australian Transport Safety Bureau

In-flight deployment of ditching dam involving De Havilland Aircraft of Canada DHC-8, VH-SCE

80 km south-south-east of Whyalla Airport, South Australia on 8 August 2019

ATSB Transport Safety Report
Aviation Occurrence Investigation
AO-2019-044
Final – 14 May 2020

Released in accordance with section 25 of the *Transport Safety Investigation Act 2003*

Publishing information

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Addendum

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Safety summary

What happened

On the afternoon of 8 August 2019, a De Havilland Aircraft of Canada DHC-8-315 was being operated by QantasLink on a flight from Adelaide to Whyalla, South Australia.

The flight proceeded normally until just after top of descent when a loud repetitive banging noise started in the cabin. The cabin crew decided to break the protocols for the sterile cockpit environment to inform the flight crew, via the interphone, of the abnormal noise. The flight crew could not hear the noise in the cabin and were unaware of the situation.

Further investigation by the cabin crew identified that the noise was coming from the vicinity of the right rear emergency exit at seat row 10. They then identified a yellow object flapping on the outside of the aircraft, just below the exit. The flight crew concluded that the right ditching dam had likely deployed. The decision was made to continue to Whyalla, where an uneventful landing was conducted.

After landing, it was confirmed that the right rear emergency exit ditching dam had opened in flight, and had been destroyed by aerodynamic forces.

What the ATSB found

The operator subsequently determined that the ditching dam had not inflated but rather, for reasons that could not be determined, the ditching dam cover had opened in flight, allowing the uninflated dam to unfurl into the slipstream. The opening of the ditching dam did not affect the safety of other aircraft systems or the continued flight.

The cabin crew informing the flight crew of the issue while the aircraft was on descent had the potential to be a distraction. However, the cabin crew's decision to break the sterile cockpit environment and alert the flight crew to the situation was appropriate.

Safety message

Not every system in an aircraft is controllable or monitored by the flight crew. Cabin crew should not hesitate to inform flight crew of abnormal conditions within or external to the cabin, as flight crew may be unaware of the situation.

The occurrence

What happened

On the afternoon of 8 August 2019, a De Havilland Aircraft of Canada DHC-8-315 was being operated by QantasLink on a flight from Adelaide to Whyalla, South Australia. For both the flight crew and cabin crew, it was the first of four scheduled passenger flights for the day. The captain was the pilot flying and the first officer was the pilot monitoring.¹ The planned flight time to Whyalla was approximately 35 minutes.

Conditions for the flight were as forecast, with severe turbulence and icing conditions at lower levels. Once the aircraft reached the cruise altitude of 16,000 ft, it was clear of cloud and the crew described the conditions as calm.

At top of descent, the first officer made a public address to the cabin informing the cabin crew to 'Prepare the cabin for landing'. This was acknowledged by the first flight attendant over the aircraft interphone. At this point, a loud repetitive banging noise started in the cabin.

The cabin crew initially suspected the sound was ice coming off the propellers and hitting the fuselage, which they had been briefed on before the flight. However, both cabin crew were confused by the volume and intensity of the noise, which did not align with their previous experience of flying in icing conditions. The cabin crew decided to break the sterile cockpit environment (see the section titled *Sterile cockpit procedures*) to inform the flight crew, via the interphone, of the abnormal noise in the cabin.

Up until that time, the flight crew were unaware of the issue and their only indication of a problem was being able to hear the noise when talking to the cabin crew over the interphone. There were no cockpit warnings. The captain transferred flying duties to the first officer so he could coordinate the cabin crew investigation, radio communication and decision-making tasks. The descent was halted and the aircraft held at the Whyalla RNAV holding point.

Upon further investigation by the cabin crew, they identified the sound was coming from the vicinity of the right rear emergency exit at seat row 10. Shortly after, they identified through the window a yellow object flapping on the outside of the aircraft, just below the exit. Based on this information, the flight crew concluded that the right ditching dam had possibly deployed (see the section titled *Ditching dam*).

The flight crew contacted their maintenance organisation and a decision was made to continue to Whyalla. The captain resumed pilot flying duties and the aircraft landed without further incident.

After landing, it was confirmed that the ditching dam at the right-hand rear emergency exit had opened in flight and been destroyed by aerodynamic forces (Figure 1).

Post-flight maintenance

It was subsequently determined that the ditching dam had not inflated but rather, for unknown reasons, the ditching dam cover had opened in flight, allowing the uninflated dam to unfurl into the slipstream. When the replacement ditching dam assembly cover was installed, it did not initially meet the required engagement tolerance into the airframe channel that retains it. The flight crew member who conducted the pre-flight inspection reported that the ditching dam cover was securely engaged before the flight.

¹ Pilot Flying (PF) and Pilot Monitoring (PM): procedurally assigned roles with specifically assigned duties at specific stages of a flight. The PF does most of the flying, except in defined circumstances; such as planning for descent, approach and landing. The PM carries out support duties and monitors the PF's actions and the aircraft's flight path.

Figure 1: The ditching dam as found upon landing

Source: Qantaslink. Annotated by ATSB.

Context

Ditching dam

The ditching dam on the rear Type III emergency exits of a DHC-8-315 is an inflatable device that activates on operation of the exit hatch to minimise water ingress into the cabin after a ditching or landing on water. The device is only required for high-weight operations when the aircraft would sit lowest in the water. For the occurrence flight, the aircraft would not have required the ditching dam to be available. The inflation is automated and there are no controls or indications in the cockpit of its deployment.

Previous occurrences

A review of reports on inflatable ditching dams for De Havilland Aircraft of Canada DHC-8-300 series aircraft was conducted using the following sources:

- Australian Transport Safety Bureau's Aviation Occurrence Database
- Civil Aviation Safety Authority's Defect Report Service (DRS)
- Federal Aviation Administration's Service Difficulty Reporting (SDR)
- Transport Canada's Continuing Airworthiness Web Information System (CAWIS).

Since 1982, there were a total of 22 reports, of which 13 were in-flight deployments. Most in-flight deployments were due to leaking fuselage adaptor burst discs or discs that had burst for unidentified reasons. When this occurs, leaky inflation bottle valves or fuselage pressurisation can lead to the ditching dam bag inflating.

However, five in-flight deployments were not the result of inadvertent inflation of the bag, with no reason for the deployment identified. Three of the reports stated that the deployment occurred during either cruise or descent.

None of the reports indicated any subsequent damage or interference with other aircraft systems.

Sterile cockpit procedures

A sterile cockpit environment incorporates procedures throughout safety critical phases of flight, such as take-off and landing, during which non-essential activities and communications are not permitted. For approach and landing, many operators start the sterile cockpit environment following acknowledgement of the 'Prepare the cabin for landing' call. While it is primarily focused on communication between flight crew members, it also applies to cabin crew contact with the cockpit.

With the introduction of reinforced cockpit doors, it has been recognised that this has had the effect of introducing an additional psychological barrier between flight crew and cabin crew. There has been a history of misunderstanding and hesitancy by cabin crew of informing flight crew of critical and sometimes life-threatening situations occurring in or external to the cabin of the aircraft².

Safety analysis

The specific reason for the ditching dam cover opening could not be determined.

While the aircraft had operated in both severe icing and turbulence during the initial part of the flight, conditions were benign when the device opened. However, it is possible that earlier exposure to these severe weather conditions may have affected the security of the cover.

It was reported that the cover was secure prior to the flight, but post-occurrence replacement of the ditching dam identified that it did not initially meet the required engagement tolerance into the airframe retaining channel. That raised the possibility that the occurrence cover may have appeared to be visually secure during the pre-flight inspection while also not being properly engaged.

Once the cover partially opened, aerodynamic forces drove the cover fully open and permitted the dam bag to unfurl into the airstream. The bag, cover and inflation hose then hit the fuselage repeatedly, which was the loud noise heard by the occupants of the aircraft. As a result of the deployment and given its location on the aircraft, if the device or part thereof had come loose, it was unlikely to have resulted in further damage to the aircraft.

The ditching dam opened when flight crew had initiated the sterile cockpit procedures for approach to Whyalla Airport. The cabin crew chose to break the sterile cockpit environment to inform flight crew of the issue. This had the potential to distract the flight crew from other flying-related tasks. However, this was appropriately balanced by the need to inform the flight crew of an abnormal situation of unknown severity. The ATSB considered that the cabin crew acted appropriately in informing the flight crew of the abnormal noise in the cabin. Management of the unexpected deployment was controlled through the use of non-normal checklists and effective resource management.

Findings

These findings should not be read as apportioning blame or liability to any particular organisation or individual.

- The ditching dam cover opened in-flight, possibly due to exposure to severe icing and turbulence and/or improper engagement of the cover with the airframe.
- The deployment of the ditching dam did not increase the risk of damage to other aircraft systems or to continued safe flight.

² FAA AC 120-48A 'Communication and Coordination Between Flight Crewmembers and Flight Attendants', dated 27 January 2020

- The ditching dam deployment occurred when flight crew had started sterile cockpit procedures but before cabin crew were required to be seated. It was appropriate that the cabin crew chose to break the sterile cockpit environment to inform flight crew of the issue.

General details

Occurrence details

Date and time:	8 August 2019 – 1445 CST	
Occurrence category:	Incident	
Primary occurrence type:	Technical - Airframe	
Location:	80 km SSE of Whyalla Airport, South Australia	
	Latitude: 33° 58.2' S	Longitude: 137° 39.6' E

Aircraft details

Manufacturer and model:	De Havilland Aircraft of Canada DHC-8-315	
Registration:	VH-SCE	
Operator:	Eastern Australia Airlines	
Serial number:	602	
Type of operation:	High capacity Regular Public Transport	
Departure:	Adelaide, South Australia	
Destination:	Whyalla, South Australia	
Persons on board:	Crew – 4	Passengers – 16
Injuries:	Crew – 0	Passengers – 0
Aircraft damage:	Minor	

About the ATSB

The ATSB is an independent Commonwealth Government statutory agency. The ATSB is governed by a Commission and is entirely separate from transport regulators, policy makers and service providers. The ATSB's function is to improve safety and public confidence in the aviation, marine and rail modes of transport through excellence in: independent investigation of transport accidents and other safety occurrences; safety data recording, analysis and research; fostering safety awareness, knowledge and action.

The ATSB is responsible for investigating accidents and other transport safety matters involving civil aviation, marine and rail operations in Australia that fall within the ATSB's jurisdiction, as well as participating in overseas investigations involving Australian registered aircraft and ships. A primary concern is the safety of commercial transport, with particular regard to operations involving the travelling public.

The ATSB performs its functions in accordance with the provisions of the *Transport Safety Investigation Act 2003* and Regulations and, where applicable, relevant international agreements.

Purpose of safety investigations

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

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

About this report

Decisions regarding whether to conduct an investigation, and the scope of an investigation, are based on many factors, including the level of safety benefit likely to be obtained from an investigation. For this occurrence, a limited-scope, fact-gathering investigation was conducted in order to produce a short summary report, and allow for greater industry awareness of potential safety issues and possible safety actions.