



## OFFICE OF THE CHIEF COMMISSIONER

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### Safety Recommendation: AIC 21-R01/20-2001

**Addressed to:** Pratt and Whitney Canada

**Date Issued:** 30 June 2021

**Date Reissued:** 21 September 2021

**Investigation link:** AIC 20-2001

**Action Status:** Issued

### Introduction

On 16 March 2020 at 03:43 UTC (13:43 local time), the Civil Aviation Safety Authority of PNG (CASA PNG) notified the PNG AIC via email of a serious incident which occurred on the same date, involving a Bombardier DHC-8-402 aircraft, registered VH-QOE, owned by Qantas Airways Limited and operated by Sunstate Airlines (QLD) Pty Ltd. The AIC immediately commenced an investigation, and the appointment of an Investigator-In-Charge (IIC) in accordance with PNG Legislation, Civil Aviation Act 2000(As Amended) and ICAO Annex 13 standards and dispatched a team of investigators to perform on-site activities.

### Occurrence

On 16 March 2020, at about 11:29 local, the flight crew of a Bombardier DHC-8-402, registered VH-QOE, owned by Qantas Airways Ltd and operated by Sunstate Airlines (QLD) Pty Ltd enroute from Jacksons International Airport, Port Moresby, Papua New Guinea to Cairns International Airport, Queensland, Australia on a scheduled passenger flight, declared a PAN as a result of an in-flight smoke/fumes event.

The flight crew identified an unusual smell entering the cockpit which intensified as the aircraft continued climbing. After passing 10,000 ft, the cabin crew confirmed that the unusual smell extended to the cabin. At 11:28:23 the flight crew commenced the QRH procedure for "*Smoke (Warning Light) or Fuselage Fire, Smoke or Fumes*" by actioning its *RECALL ACTION* items, donning their oxygen masks, and broadcasting a PAN, to then request ATC for a priority return to Port Moresby.

Moresby Radar instructed the crew to track to Jacksons International Airport and plan for an approach to land on runway 32R.

As soon as the aircraft was established on the approach at about 4,000 ft, the smoke alarm in the toilet activated. The crew continued the approach and requested for ARFF to be available upon landing. The

control tower then notified the ARFF and a team was sent to a stand by position at taxiway Golf to assist the aircraft as necessary.

The aircraft landed at 11:47:08. After completing the landing roll, the flight crew called the cabin crew to check on the status of the smoke and condition of the passengers. The cabin crew confirmed that the smoke was still present in the cabin and passengers were having trouble breathing.

After exiting the runway, the flight crew stopped the aircraft and shut down the engines at taxiway Foxtrot. The cabin crew conducted a precautionary disembarkation with the assistance of ARFF who were accompanying the aircraft by then. Passengers were later transported to the airport terminal.

There were 12 persons on board the aircraft: 2 flight crew, 2 cabin crew and 8 passengers. No injuries were reported.

The fumes/smoke event occurred due to burning oil in the No.2 engine. The oil was found to have leaked from a fractured No.3 bearing carbon seal element.

### **Safety deficiency description**

The AIC recognises that 10% percent of the PW150A fleet are still in the pre-SB35341 configuration and remain exposed to the same risk of a smoke/fume event similar to that involving VH-QOE and other reported No.3 bearing carbon seal related smoke events.

P&WC stated that events similar to the VH-QOE smoke/fume event had been reported on carbon seals with time since new higher than 8,500 hours, with 85% of these events being on carbon seal with time since new above 10,000 hours.

The investigation noted that with No.3 bearing carbon seal wear-out time may vary from engine to engine based on amount of exposure to high temperatures and humidity. However, the known trend identified as the least amount of time for failure for the No.3 bearing carbon seal as 8,500 hours. It is a concern that operators are operating the engine even past No.3 bearing carbon seal times in excess of 10,000 hours. The investigation noted that, in the SB3534, the earliest failure time was not included as information or as a condition for replacement of the seal. The specification was for the operators of engines qualified in the service bulletin to replace the No.3 bearing carbon seal.

Considering the earliest failure time established by the manufacturer, the AIC believes that in any engine predominantly exposed to an operational environment similar to the one identified in this occurrence, No. 3 bearing seal may fail before meeting the requirements for replacement of the service bulletin and/or those contained in the *CIR Manual*, which may eventually lead to other safety related occurrences in the future.

At the time of the occurrence, the affected engine had clocked more than 9,200 hours without a disassembly or a need to do so. Due to the aircraft's operational environment, the engine was predominantly operating in areas where exposure to high temperature and humid conditions was a condition, which, in the context of the approximation of 8,500 hours as the earliest failure time of the No. 3 bearing seal, provided the conditions for that component to eventually fail, leading to this serious incident. Therefore, the earliest failure event occurred at about 8,500 hours as stated by PWC was deemed relevant for the replacement of the seal in the context of this occurrence.

### **Recommendation number AIC 21-R01/20-2001 to Pratt & Whitney Canada**

The PNG Accident Investigation Commission recommends Pratt & Whitney Canada to revise the requirements for replacement of No.3 bearing carbon seal contained in Service Bulletin 35341 and adjust the service limit of the component in accordance with its known wear out time trend of about 8,500 hours.

#### **Action requested.**

The PNG Accident Investigation Commission requests that Pratt & Whitney Canada note recommendation AIC 21-R01/20-2001 and provide a response to the AIC within 90 days, but no later than 28 September 2021, and explain including evidence about how Pratt & Whitney Canada has addressed the safety deficiency identified in the safety recommendation.



**HUBERT H. NAMANI, LLB**

*Chief Commissioner*

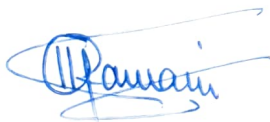
30 June 2021

### **Recommendation number AIC 21-R01/20-2001 to P&WC (Reissued)**

The PNG Accident Investigation Commission recommends that Pratt & Whitney Canada ensure that operators of aircraft fitted with the engine PW150A which have the No.3 bearing carbon seal, PN: 3053630-01, are fully aware of the sudden failure trend of the seal and that the earliest probable fracture time can be earlier (as early as about 8,500 hours) than its first overhaul shop visit.

#### **Action requested**

The PNG Accident Investigation Commission requests that Pratt & Whitney Canada note revised recommendation AIC 21-R01/20-2001 and provide a response to the AIC no later than 20 November 2021 and explain including evidence about how Pratt & Whitney Canada has addressed the safety deficiency identified in the safety recommendation.



**HUBERT H. NAMANI, LLB**

*Chief Commissioner*

21 September 2021



## **Pratt & Whitney Canada response to the Safety Recommendation AIC 21-R01/20-2001**

On 20 November 2021, Pratt & Whitney Canada informed the PNG AIC that they had already taken appropriate safety action in response to the identified safety deficiency by releasing Service Bulletin SB35341 in 2016.

The AIC notes Pratt & Whitney Canada current record shows that as of the date of release of the AIC's Final Report AIC20-2001, 90% of the PW150A engines subject to Service Bulletin, SB35341.

### **PNG AIC assessment of the Pratt & Whitney Canada response**

The AIC has assessed the response provided by Pratt & Whitney Canada and determined that the safety deficiency identified has not been fully addressed.

The AIC agrees that the No.3 Bearing Carbon Seal PN: 3053630-01 defect, through operators reports and subsequent investigation, the Manufacturer and as a result, the Service Bulletin SB35341 was released to operators of the engine. However, the AIC believes that to complete the safety action, the carbon seal on the engines must be replaced.

The record shows that over a 5-year span, following the release of the Service Bulletin SB35341, the implementation of SB35341 has been slow and as of the date of release of the AIC's Final Investigation Report AIC 20-2001, 90% of the applicable PW150A engines undergone implementation of the Service Bulletin.

The AIC understands that it is the decision of operators to schedule and implement Service Bulletins. It is, therefore, imperative that operators are fully aware of the information relating to the Service Bulletin. The information gathered by the AIC shows that the reason for the SB35341 is that it is not following its designed intent. This is characterised by the sudden fracture or disintegration of the seal at earlier times than expected, as early as around 8,500 hours.

The AIC believes that from a safety perspective, if the service bulletin is released in relation to a defect and provides solution, but the implementation can be costly, all information associated with the defect should be provided and accurately represented to ensure that operators can make well informed decisions to take appropriate action either immediately, at the time the risk of failure starts to increase, at the next overhaul shop visit (see NOTE below) or operate as normal until a smoke event occurs. The AIC believes that awareness to Operators is not adequate to understand when and where the failure of the carbon seal can occur and the outcome of the failure.

**NOTE:** There is an instance showing that the conditions listed in the Service Bulletin SB35341 have also allowed operators to justify not implementing the Service Bulletin during a shop visit.

The failure mode was determined to be a sudden fracture or disintegration. The earliest known failure on an operating engine was about 8,500 hours. While the Manufacturer has reported that 90% of engines have already been subjected to SB35341, the 10% of engines aircraft carrying passengers are subject to the same exact risk. The risk, with a solution available, remains prevalent for the 10%.

The AIC has that the statistic provide by P&WC does not indicate that the risk was reduced, but rather that the number of aircraft exposed to the risk has lessened. The AIC concludes that Pratt & Whitney Canada response did not fully addressed address the *Safety Recommendation AIC 21-R01/20-2001*.

Therefore, the PNG AIC has assigned the Pratt & Whitney Canada response an ***unsatisfactory intent*** rating, and records the Status of the AIC Recommendation: **CLOSED, RESPONSE NOT ACCEPTED.**



**HUBERT H. NAMANI, LLB**  
*Chief Commissioner*

10 December 2021