REPUBLIC OF RWANDA

Ministry of Infrastructure

Aviation Accident and Incident Investigation Directorate General

Report on the serious incident to Bombardier DHC-8-400 with registration 9XR-WM, operated by RwandAir, involving detaching of an engine access panel during take-off at Kigali International Airport, on 07th April 2023.

Ref AAID [2023-02]

The sole objective of investigations carried out by the AAID is the prevention of accidents and incidents. It shall not be the purpose of such an investigation to apportion blame or liability.

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List of abbreviations used in this report

Acronym	Meaning
AAID	Aviation Accident and Incident Investigation Directorate General (Rwanda)
ATC	Air Traffic Control
AMM	Aircraft Maintenance Manual
AMT	Aircraft Maintenance Technician
AOM	All Operator Message
CASA	Civil Aviation Safety Alert
DAR	Three letter code for Julius Nyerere International Airport (Dar es Salaam)
Dec.	December
DHC	De Havilland Canada
EBB	Three letter code for Entebbe International Airport
F/O	First Officer
FOD	Foreign Object Damage
KGL	Three letter code for Kigali International Airport
NBO	Three letter code for Jomo Kenyatta International Airport
Q300, Q400	Reworked and revamped version of the De Havilland Dash 8 aircraft whereby that Q means Quiet originated from the noise suppression characteristic of those types.
RCAA	Rwanda Civil Aviation Authority
RCAR	Rwanda Civil Aviation Regulation
SB	Service Bulletin
TCCA	Transport Canada Civil Aviation
UTC	Universal Time Coordinated
VOR	Very high frequency Omnidirectional Range (radio navigation system for aircraft)

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Synopsis

On 7th April, 2023 RwandAir aircraft Bombardier DHC-8-Q400 with registration number 9XR-WM, conducted flight WB 440 departing from Kigali international airport to Julius Nyerere International Airport, Dar es Salaam, Tanzania. During the take-off roll the inboard engine access panel from the right-hand engine detached. The airport inspection team at Kigali found the access panel on runway and informed Air Traffic Control who communicated to the Captain about the detached panel.

The aircraft returned to Kigali International Airport immediately and landed uneventfully. After parking an inspection was conducted which did not reveal any other damage to the aircraft apart from the right-hand engine access panel that was missing. The panel had been opened during oil servicing before departure at Kigali.

The Q400 engine access panel measures approximately 110x150cm and has four quick release latches. The missing panel was found alongside the runway at taxiway Charlie where the aircraft had lifted off from runway 10.

When the panel was retrieved by airport staff at Kigali, it was identified that the two middle latches were closed, while the two bottom latches were found in the open position.

Apart from the incident with flight WB 440, an identical incident had happened on the same aircraft on 26th December, 2020. Besides a total of 11 additional similar incidents from other operators were found whereby a Q400 engine access panel detached during the take-off. In all cases the panel had not been closed correctly; no mechanical failure of the latches occurred.

In view of these repeated occurrences, the aircraft manufacturer and Transport Canada Civil Aviation issued a total of three safety publications comprising proposed actions of a non-mandatory nature. Apart from the prescribed installation of an instruction placard on the engine cowlings, it was found that the proposed safety actions had not been implemented by the operator. After the

conduct of investigation for the previous incident the Aviation Accident and Incident Investigation Directorate (AAID) issued safety recommendations in July 2021. These recommendations were not implemented.

The AAID reached the conclusion that the ergonomic design of the DHC-8-400 engine access panel is prone to human error. Further the AAID listed lack of implementation of published safety instructions by the operator as a contributory factor of the incident.

This investigation has resulted in the formulation of seven safety recommendations that are addressed to RwandAir and the RCAA.

1. FACTUAL INFORMATION

1.1 History of the Flight

1.1.1 General

On 7th April, 2023 when RwandAir Aircraft DHC-8-400 with Flight number WB 440[1], registered 9XR-WM, was in take-off from Kigali International Airport to Julius Nyerere International Airport, Dar es Salaam, Tanzania for a scheduled passenger flight at 09:50[2] am, the right-hand inboard engine access panel detached off the aircraft. The inspection team at Kigali International airport found the panel in the halfway of the runway at the height of taxiway Charlie and communicated to the ATC about the incident. The ATC informed the pilots about the missing panel and thereafter the Captain assigned Engineer on board and Purser to verify through a passenger compartment window about the received information. He got confirmation that the panel was missing and all aircraft parameters were found normal. Thereafter the Captain prepared to return to Kigali immediately. The flight landed at Kigali international Airport uneventfully.

The cockpit crew consisted of the Captain and the First Officer (F/O). Apart from the cabin crew, also an Aircraft Maintenance Technician (AMT) travelled with the flight.
In view of the above the AMT had reported for duty at 3:30 UTC on that day and had operated the previous flight from KGL-EBB-NBO-KGL.

According to the AMM, Oil servicing of Q400 aircraft needs to be done within 15-30 minutes after every landing. On the day of the incident the AMT performed oil servicing after arrival of the 9XR-WM at Kigali prior to departure of flight WB440 to Julius Nyerere International Airport.

[1] WB 440: flight number of RwandAir Flight From Kigali International Airport to Julius Nyerere International Airport
[2] All times in this report are in UTC

1.1.2 Flight KGL to DAR

The Flight WB 440 was prepared with 10 minutes delay according to the scheduled time and departed 09:35 UTC. During preparation for flight, the Captain stated that he conducted a walk-around inspection as per company procedure but this walk-around inspection was done before the oil servicing took place. The AMT conducted the planned oil servicing on both engines. In order to have access to the Q400 engine oil servicing cap, it is necessary to open a large engine cowling panel. This panel is hinged at the top and is equipped with a total of four quick release latches, two in middle and two at the bottom. During interview with AMT, he stated that he was not sure of which latches he had closed first.

1.1.3 Runway Inspection Team

After WB 440 took off from Kigali, the runway inspection team conducted a runway inspection and found the engine access panel in the middle of runway at taxiway Charlie. The inspection team informed the ATC about the found panel whereupon ATC without delay communicated to the pilots. The inspection team together with Operator's Engineers on ground confirmed that, when the panel was retrieved, the two middle latches were closed while the two bottom latches were found in the open position.

1.1.4 After Return to Kigali International Airport

After landing at KGL, the aircraft inspection was conducted and no other damages were identified apart from the access panel being detached.

The detached panel was found partially damaged at the edge due to the ground impact. The middle latches were in closed positions, while the two bottom latches were in the open position.

Aviation Accident and Incident Investigation Directorate (AAID) was notified about the incident after one hour and responded immediately by instituting an investigation.

1.2 Injuries to persons[3]

The incident did not result in any injuries to persons.

1.3 Damage to aircraft

After landing the engine access panel from the right-hand inboard engine cowling was missing, see Figure 1.



Figure 1: picture of the right engine of 9XR-WM missing its engine access panel after landing of flight WB 440 at Kigali

Figure 2 below shows the panel after it had been recovered by the Kigali International Airport Runway Inspection team. At this stage the AAID investigation team found that the two bottom latches were in the open position.

[3] This report follows the paragraph numbering according to Appendix 1 of ICAO Annex 13. Paragraphs numbers that are not listed, are not applicable to this investigation.



Figure 2: Photo of the panel as found by the Kigali Airport Inspection team

From the picture in Figure 3 below it can be seen that the epoxy material on the inside of the panel shows a crack running from the forward latch via an air intake to the aft side of the panel.



Figure 3: Photo showing a crack in the epoxy material on the inside of the panel.

1.5 Personnel information

1.5.1 Captain

Age:	63years old
Licence type:	Airline Transport Pilot Licence
Date of issue:	22nd November 2022
Valid until:	30th November 2024
Medical certificate valid until:	4th October 2023
Total flying experience	22151[4]
Total flying experience on type	4413

Table 1: Captain's Personal Information

1.5.2 First Officer

Age:	37years old
Licence type:	Commercial Pilot Licence
Date of issue:	16th March 2023
Valid until:	30th June 2023
Medical certificate valid until:	30th June 2023
Total flying experience	2800:01
Total flying experience on type	2646:14

Table 2: First Officer's Personal Information

1.5.2 Aircraft Maintenance Technician

The AMT had acquired his type rating licenses originally issued by the South African Civil Aviation Authority for maintenance activities on DHC-8-400 aircraft. These licenses were validated by RCAA on April 20th 2022.

[4] Flying Experience in Hours: Minutes: Seconds

1.6 Aircraft information

Manufacturer	De Havilland-Canada
Type	DHC-8-400
Serial Number	4498
Registration	9XR-WM
Engines	Pratt & Whitney PW150A
Date of manufacture	16 June 2015
Certificate of airworthiness	Date of issue: 28 July 2022 Date of expiry: 31July 2023

Table 3: Aircraft Information

1.7 Meteorological information

Meteorological conditions were no significant factor in this incident. During the take-off from KGL no precipitation or other adverse weather conditions prevailed.

1.16 Tests and research

1.16.1 Q400 engine access panel

The access panel that detached from the Q400 on right-hand engine cowling during take-off from Kigali International Airport has a size of approximately 110x150 cm. The panel is hinged at the top and is made from a carbon/epoxy composite material. It is normally secured in the closed position by a total of four quick release latches: two in the middle and two at the bottom end, see Figure 4.

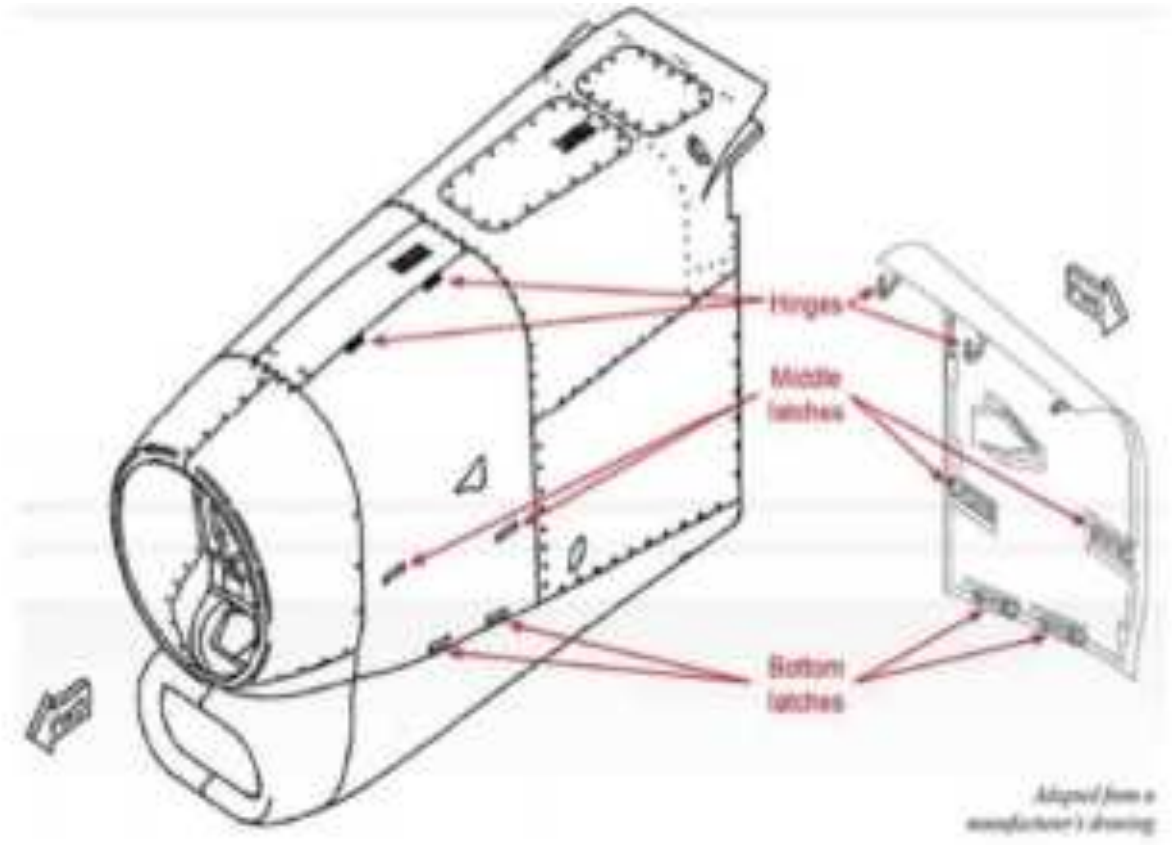


Figure 4: Access panel with hinges at the top, two middle latches & two bottom latches

1.16.2 Engine oil servicing on Q400 and Q300 aircraft

In principle the oil level of both engines is checked after each flight. On Bombardier/De Havilland Q400 aircraft engine oil checking and servicing requires opening of the entire engine access panel. To facilitate oil servicing, Q300 aircraft - the aircraft type that preceded the Q400 series - is equipped with a separate small oil servicing hatch that eliminates the need to open the entire engine access panel, see Figure 5 below:

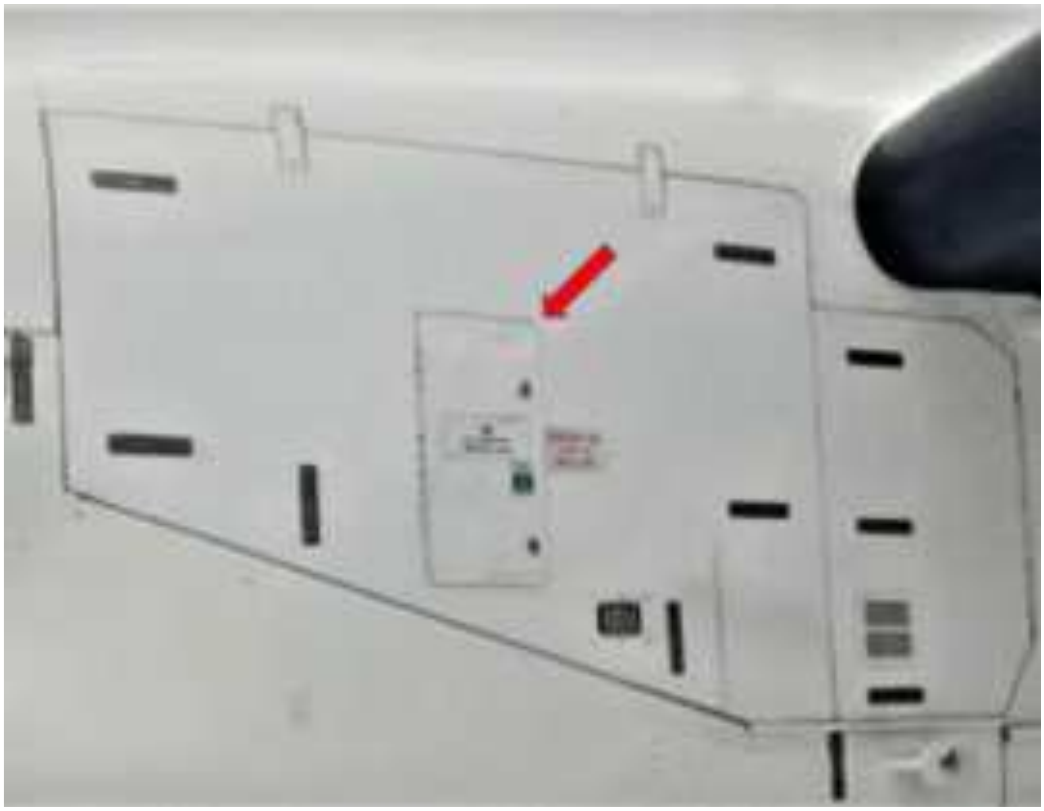


Figure 5: Separate oil servicing panel on Bombardier Q300 aircraft

1.16.3 Q400 engine fire protection system

Each engine nacelle of Q400 aircraft is equipped with three sensors that will trigger a warning in the cockpit in case an overheat condition is detected.

A missing engine access panel will affect the correct functioning of the overheat sensors.

Additionally two fire extinguishing bottles are located in the adjacent wing leading edge. These bottles can be discharged into the engine nacelle after an engine fire warning in the cockpit has been triggered.

The fire extinguishing agent only is effective in a closed compartment. Therefore, when the engine access panel is missing, the engine fire extinguishing system will not be functional anymore.

1.16.4 Similar occurrences

Apart from the two similar incidents involving engine access panel detached during take-off from flight WB 440 and WB465 that occurred on Dec. 26th 2020 and 7th April 2023 respectively, it was found that since Dec. 2005 at least 11 similar occurrences involving detached engine access panels of DHC-8-400 aircraft have been documented by other operators and investigating authorities. In the conduct of investigations from other operators, it has been confirmed that the engine access panels are detached during take-off mostly because the two lower latches of the panel were not or not correctly closed after oil servicing.

The aircraft manufacturer issued a Service Bulletin (SB)[5] in June 2017, see Appendix 5.2. This SB calls for or the application of placards on the engine cowlings.

Subsequently the aircraft manufacturer issued an 'All Operator Message' (AOM) in July 2020. This AOM addresses (1) instructions for maintenance personnel, (2) installing of an improved type of placards and (3) reworking of the latch fittings. Both the SB and AOM are discussed in paragraph 1.16.5.

In September 2020 the Transport Canada Civil Aviation (TCCA) published a Safety Alert (CASA 2020-08), to raise awareness of the proper maintenance practice and recommended modifications to prevent inadvertent opening of engine access panels during flight, see Appendix 5.4.

Following the conduct of previous incident with flight WB 465 that occurred on December 26th 2020, Aviation Accident and Incident Investigation Directorate (AAID) issued Safety recommendations to the operator RwandAir and Regulator

[5] A Service Bulletin (SB) is issued by manufacturers of aircraft, their engines or their components to communicate modifications which can be embodied in aircraft. If an available modification is judged by the manufacturer to be a matter of safety rather than simply product improvement, then these usually are issued as an Airworthiness Directive (AD) by the appropriate Civil Aviation Authority.

RCAA in relation to the findings identified during investigation and required measures to prevent occurrence of similar incidents, see Appendix 5.1.

1.16.5 Service Bulletin and All Operator Message from manufacturer

On June 12th 2017 the aircraft manufacturer Bombardier/De Havilland issued SB 84-11-46, see Appendix 5.2.
The reason for publishing this SB was formulated as follows:

> *"Several incidents have been reported where the nacelle forward cowl doors have departed aircraft during flight. In all cases, no physical evidence from recovered doors support latch failure.*
> *Departing door may cause damage to aircraft structure and/or flight controls and loss of nacelle fire detection and extinguishing."*

The SB calls for the installation of placards on the engine cowlings that illustrate how the engine access panels need to be closed and how an improperly closed panel can be identified by a small gap between the lower edge of the access panel and the surrounding cowling structure.
Furthermore the SB shows a picture of the panel in its open position whereby the inside of the quick release latches is painted in a contrasting colour, see Figure 6.



Figure 6: Latches painted with a different color of the panel to easily determine their status.

AAID Investigation for WB 440 incident found that the placards had been installed on the two Q400 aircraft that are operated by RwandAir.

In view of the repeated occurrences whereby engine access panels were lost during departure, the aircraft manufacturer issued All Operator Message No. 870 on July 17th 2020, see Appendix 5.3. This AOM addresses:

1. Adding an instruction to the Aircraft Maintenance Manual on how to properly close the engine access panels.
2. Installing of an improved type of placards, that replaces the placards from SB 84-11-46.
3. Reworking of the latch mechanism by chamfering the edges of the cowling door fittings. The reworked fittings improve the ability of the cowl doors to engage with the lower cowl structure, thereby reducing the possibility of a closed latch not engaging the fitting.

   As an alternative the AOM mentions that new fittings with chamfered edges can be supplied by the aircraft manufacturer.

   Investigation after the incidents with flight WB 440 and WB 465 revealed that both Q400 aircraft of RwandAir were not equipped with reworked or replaced fittings according to AOM No.870.

1.17 Organisational and Management Information

1.17.1 Rwanda Civil Aviation Regulation

For this investigation the following information from the Rwanda Civil Aviation Regulation (RCAR) is of importance:

– RCAR Part 4 (Airworthiness of aircraft)[6] indicates that an aircraft registered in Rwanda shall not engage in commercial air transport operation unless the aircraft has been maintained in accordance with the maintenance procedures, recommended by the aircraft manufacturer.

1.17.2 Information from interviews with RwandAir

[6] See RCAR Part 4: 4.105 Compliance with the Manufacturer's Instructions

From interviews conducted between AAID Investigators and RwandAir technical staff (Pilots, Purser and Engineers), it became clear that prior to the incident with flight WB 440, Service Bulletin 84-11-46 and All Operator Message No. 870, issued by Manufacturer and AAID safety recommendations were not implemented. Only placards showing step by step procedures for opening the access panel have been installed.
It was also acknowledged by Directors of Safety, Quality and Flight Operations that Safety Alert CASA 2020-08[7], issued by TCCA, the Canadian Civil Aviation Authority, had been received but not implemented as supposed to be.

Prior to the incident flight the aircraft had arrived in Kigali from Entebbe.
During the conduct of the interview with the Captain, he stated to have conducted the walk-around inspection upon arriving of the aircraft while the passengers from Entebbe were disembarking. At that stage the access panel had not yet been opened for oil servicing. After his walk-around check, the Captain went to the cockpit.

The Aircraft Maintenance Engineer who performed transit check and oil servicing, didn't inform cockpit crew about the opened access panel.

Technical personnel who were interviewed revealed that they didn't get chance to know about the previous incident. Additionally it was found that the related AAID investigation report 2021-1 had not been shared with them.

[7] CASA: Civil Aviation Safety Alert

2. ANALYSIS

2.1 Introduction

The engine access panel detached incident on the 9XR-WM aircraft at KGL on December 07th April 2023 is not an isolated case. Next to the two similar incidents that occurred to the 9XR-WM aircraft a total of 11 other occurrences had been documented whereby an engine access panel of a Q400 aircraft detached during take-off roll.

These occurrences have resulted in damage to the aircraft, has rendered the fire protection system of the related engine unserviceable, and created a risk for Foreign Object Damage (FOD) to other aircraft, since the panel is typically lost during the take-off roll and thus left behind on or near the runway.

Further it must be noted that in all cases no mechanical failures of the panel latches were found, therefore human factors are an important element to be considered in this investigation.

Additionally, the significant number of similar incidents also raises questions with regard to the design of the engine access panel and ergonomic flaws that might play a role when closing it.

The human factors and ergonomic aspects that relate to the Q400 engine access panel design are addressed in paragraph **2.4**.

Subsequently the effectiveness of the measures aimed at preventing improper locking of the Q400 engine access panel, as taken by the aircraft manufacturer and the Canadian TCCA, are discussed in paragraph **2.5.**

The Aircraft Maintenance Manual Revision will be addressed in paragraph **2.6.**

Lastly, paragraph **2.7** covers the timing and effectiveness of the pre-flight walk-around check.

2.2 Risks to the aircraft operation

The occurrences whereby a Q400 engine access panel was lost, have resulted in punctured de-icing boots, damage to VOR/LOC antennas, damage to the wing leading edges, the skin of the wings and the vertical stabilizer. Besides, in case of a flight with a missing panel, the fire detection and extinguishing system of the related engine is not functional. Under adverse circumstances, for example when a nacelle overheat condition would occur, operation with a missing engine access panel could have serious additional consequences for the safety of the flight.

2.3 Risks of an engine access panel left on the runway

All documented cases indicate that an engine access panel from which the two lower latches are not, or not properly engaged, will detach from the aircraft during the take-off roll. It goes without saying that a panel with an overall size of approximately 110x150 cm left behind on the runway, imposes a significant FOD risk for subsequent flights that depart from the same runway. The previous incident on WB 465 resulted into damage to the de-icing boot when the detached panel hit the adjacent wing leading edge.

Considering the large size of the panel, there is a potential for causing more serious damages on the aircraft while a lost panel can become a dangerous FOD to other aircraft taking off or landing.

2.4 Human factor and ergonomic aspects

In all 13 documented cases whereby a DHC-8-Q400 engine access panels detached during take-off roll, mechanical failure of the latch mechanism was not a factor. Instead it was found that either:

a) All four latches were in the closed position, but without the locking pin(s) being engaged into the receiving fixture(s) on the nacelle side, or:
b) The two bottom latches remaining in the open position after closing the panel.

Although it is obviously an omission not to engage the two lower latches after closing of the panel, it must be noted that these latches are quite far removed from the scene of the oil servicing. After checking and adding oil as required, the subsequent closing of the large panel and engaging the two middle latches, a false sense of 'the job being done' may arise.

Both conditions (a) and (b) illustrate the inherent vulnerability of the Q400 engine access panel design. In this respect it must be noted that its Q300 predecessor was equipped with a separate small hatch, that facilitated oil servicing without the need to open the entire engine access panel, see Figure 5 in paragraph 1.16.2.

The Q300 configuration is to be considered as an intuitive, fail safe design: when the oil servicing is completed, the adjacent small hatch 'invites' the user to close it properly.

Therefore, when taking into account the series of occurrences whereby a Q400 engine access panel was lost in combination with the requirement to open and close the panel virtually after every flight, it seems advisable that the aircraft manufacturer considers a redesign of the current Q400 engine access panel.

2.5 Safety publications from aircraft manufacturer and TCCA

In view of the recurring incidents whereby a Q400 engine access panel was lost, the aircraft manufacturer issued a Service Bulletin (SB) in June 2017 and an All Operator Message (AOM) in July 2020, see paragraph 1.16.6.

Additionally, Transport Canada Civil Aviation (TCCA) published a Safety Alert in Sept. 2020, see paragraph 1.16.4.

These three publications are all of a non-mandatory nature and aim to prevent a situation whereby the panel latches seem to be closed properly, while in fact they are not actually engaged in the locked position.

In view of the serious consequences that detaching of an engine access panel may have, the AAID is of the opinion that a safety publication entailing an obligation to implement the measures, as suggested in the SB, AOM and Safety Alert, would have been appropriate.

Apart from that, it must be noted that the above mentioned safety publications cannot compensate for the lack of intuitive ergonomics of the Q400 access panel when conducting oil servicing as compared to the more user-friendly Q300 configuration.

Both the Rwanda Civil Aviation Authority (RCAA) and the RwandAir Quality Assurance department acknowledged that they had timely received the related SB, AOM and Safety Alert. However, apart from applying the prescribed placards, up to the day of the second incident with the 9XR-WM aircraft, the recommended measures from these publications had not been followed up. These measures included:

- Adding an instruction to the Aircraft Maintenance Manual on how to properly close the engine access panels;
- To paint the inside of the latches with a contrasting colour from that of the panel surface to improve indication that the latch is not closed, see Figure 6 in paragraph 1.16.5.
- Installing of placards that show how an incorrectly closed door can be recognised;
- Reworking of the latch mechanism by chamfering the edges of the cowling door fittings.

Even though the SB, AOM and Safety Alert are of a non-mandatory nature, their recommendations should have been implemented since RCAR Part 4 (Airworthiness of Aircraft) clearly states that that a Rwanda registered aircraft shall be maintained “in accordance with the maintenance procedures, recommended by the aircraft manufacturer”.

2.6 AMM Revision

After confirming the cause of engine access panel incidents during take-off as incorrectly closing of the door, the manufacturer initially issued AMM temporary revision 71-197 that contains instructions on how to correctly close the engine nacelle access door. The temporary revision was embedded in the AMM as per Sept 5th, 2021. The relevant AMM page contains the following caution:

> MAKE SURE THAT ALL THE FORWARD SIDE DOOR LATCH PINS FULLY ENGAGE WITH THE NACELLE STRUCTUREWHEN YOU CLOSE THE FORWARD SIDE DOOR. IF YOU DO NOT DO THIS, THE FORWARD SIDE DOOR CAN COME OFF THE NACELLE DURING FLIGHT.

During the conduct of investigation, AAID found out that the AMT who closed the door before departure of flight WB440 had been given access to the AMM but he was not aware about the introduced instructions contained in new revision of Aircraft Maintenance Manual (AMM) issued by the manufacturer in relation to the correct closing of engine access panel.

Besides it was not demonstrated to the AAID that the above mentioned revised AMM task instruction on closing the access panel had been incorporated in the (digital) copies in use by the operator.

2.7 Effectiveness of the Pre-flight walk-around inspection

Operator's procedures require a walk-around check of the aircraft by one of the pilots prior to each flight. The current procedures do not indicate a specific timing for the walk-around in relation to the ground handling process. Based on the previous 9XR-WM incident, AAID recommended the operator to implement a procedure, specifying that the required pre-flight walk-around check by the pilot should take place after all significant ground handling activities are completed.

Considering both incidents involving a detached engine access panel that occurred on 9XR-WM, the two bottom latches from the access panel that gives access to the oil servicing cap remained in the open position after oil servicing. The protruding latch handles could not be identified by the Captain performing the walk-around check since in both cases the walk-around checks were conducted before the oil servicing took place.

Therefore, it is advisable that RwandAir implements a procedure calling for a walk-around check after all significant ground handling activities are completed. In this way the walk-around check will be more effective in detecting any damage inflicted during the ground handling activities, any debris or materials that are left behind and any panel or (service) door that is not properly closed.

In view of above, AAID concludes that proper implementation of the proposed actions from the Service Bulletin, All Operator Message, Safety Alert and AAID safety recommendations most probably would have prevented the second incident with the 9XR-WM aircraft from happening.

3. CONCLUSIONS

3.1 Findings

3.1.1 The inboard cowling access panel of the right-hand engine of the 9XR-WM aircraft detached during the take-off roll at KGL because the two bottom latches of the panel had not been closed after oil servicing.

3.1.2 There was no other damage inflicted to the aircraft other than the detached panel of the right-hand engine.

3.1.3 After departure of flight WB 440 from Kigali International airport, the airport inspection team found the detached access panel in half way of the runway.

3.1.4 Detaching of an engine access panel on Bombardier Q400 aircraft imposes a risk for aircraft damage, renders the engine fire protection system of the related engine dysfunctional and will create a hazard for Foreign Object Damage (FOD) to other aircraft.

3.1.5 Apart from the incident with the 9XR-WM aircraft that occurred on 7th April, 2023, a similar incident had happened on the same aircraft in 2020.

3.1.6 In addition to the two incidents with the 9XR-WM aircraft, another 11 similar incidents from other operators, whereby Q400 engine access panels were lost during take-off, have been documented.

3.1.6 In view of the repeated occurrences whereby an engine access panel of Bombardier Q400 aircraft are lost, the aircraft manufacturer issued a Service Bulletin in July 2017 and an All Operator Message in July 2020; additionally Transport Canada Civil Aviation (TCCA) published a Safety Alert on this issue in September 2020 while the AAID issued its safety recommendations in July, 2021.

3.1.7 The issued Service Bulletin and All Operator Message from the aircraft manufacturer, as well as the Safety Alert from Transport Canada Civil Aviation, contain proposed actions and recommendations of a non-obligatory nature.

3.1.8 During the conduct of this investigation it was found out that - apart from the installation of instruction placards - the issued Service Bulletin, All Operator Message and Safety Alert were not implemented.

3.1.10 The total of 13 documented cases whereby a Q400 engine access panel was lost during the take-off roll demonstrate that the ergonomic design of the panel is prone to human error.

3.1.11 The Aircraft Maintenance Technician who closed the panel before flight was not trained on the issued task instructions, the issued Service Bulletin and All Operator Message from the aircraft manufacturer, as well as the Safety Alert from Transport Canada Civil Aviation.

3.1.12 The pilots who conducted the flight WB 440 were not aware of the issued Service Bulletin, All Operator Message from the aircraft manufacturer, Safety Alert from Transport Canada Civil Aviation and the related AAID Safety recommendations.

3.1.13 The circumstances and investigation findings for both incidents that occurred on WB 440 and WB 465 are the same.

3.1.14. The Captain conducted the walk-around inspection upon arriving to the aircraft before engine oil serving was done.

3.1.15. The Aircraft Maintenance Engineer opened right engine access panel to check the quantity of oil in the engine and serviced the engine.

3.1.16. The Engineer didn’t report to the cockpit crew that maintenance activity was done after their walk around.

3.1.17. The engineer didn't remember the latches he closed first when he was closing the engine access panel after oil servicing.

3.1.19. The engineer had a valid maintenance licence issued by Rwanda Civil Aviation Authority.

3.1.20. There was no third party damage due to this incident.

3.1.21. The runway inspection team found the detached engine access panel and informed the ATC accordingly without delay.

3.1.22. ATC communicated to the Captain about the detached engine access panel.

3.1.23. Aircraft returned at Kigali International Airport uneventfully

3.2 Causal factor

3.2.1 The aircraft departing while the non-closure of the two bottom latches from the access panel of the right-hand engine remained undetected.

3.3 Contributory factors

3.3.1 Lack of implementation of Service Bulletin, All Operator Message from the aircraft manufacturer and Safety Alert from Transport Canada Civil Aviation as well as AAID Recommendations.

3.3.2 The pre-flight walk-around inspection by the pilot being conducted before the access panel was closed after completion of the engine oil servicing.

3.3.3 The ergonomic design of the Q400 engine access panel being prone to human error.

4. SAFETY RECOMMENDATIONS

4.1 Operator is recommended to ensure that Aircraft Maintenance Technicians who perform duties are trained how to close the panel as per Service Bulletin, All Operator Message and Aircraft Maintenance Manual instructions.

4.2 Operator is recommended to ensure that the new Aircraft Maintenance Technicians and pilots hired are informed about Service Bulletin, All Operator Message from the aircraft manufacturer, and Safety Alert from Transport Canada Civil Aviation as well as AAID Recommendations in relation to engine access panel separation during take-off

4.3 Operator should establish periodic safety review meetings in order to ensure the effective implementation of safety deficiencies reported.

4.4 Operator is recommended to implement a procedure for pilots to conduct pre-flight walk-around inspection after all ground maintenance services have been completed.

4.5 The Operator is recommended to establish procedures for consistently delivering trainings for pre-flight inspection on aircraft DHC-8-400 (Q400) with practical element demonstrating correctly secured engine access panel.

4.6 The operator to establish the procedures demonstrating how the pertinent safety information is disseminated to the ground technical personnel.

4.7 Rwanda Civil Aviation Authority to establish the system for monitoring the implementation of service bulletins and safety recommendations issued

APPENDICES

5.1 Causal Factor, Contributory Factors and Safety Recommendations of the Previous AAID Investigation

Causal Factor, Contributory Factors and Safety Recommendations from the Previous AAID Investigation concerning detaching of an engine access panel during take-off that occurred to the 9XR-XM aircraft on Dec. 26th 2020.

3.2 Causal factor

3.2.1 The aircraft departing while the non-closure of the two bottom latches from the access panel of the left-engine remained undetected.

3.3 Contributory factors

3.3.1 No follow-up being given by the RCAA and RwandAir after receipt of the related Service Bulletin and All Operator Message from the aircraft manufacturer as well as the Safety Alert from Transport Canada Civil Aviation.

3.3.2 The walk-around pre-flight check by the pilot being conducted before the access panel was closed after completion of the engine oil servicing.

3.3.3 The ergonomic design of the Q400 engine access panel being prone to human error.

4. SAFETY RECOMMENDATIONS

To Rwanda:

4.1 The Rwanda Civil Aviation Authority and RwandAir are recommended to ensure that Aircraft Maintenance Technicians who perform duties for RwandAir flights are licensed in accordance with the requirements as laid down in RCAR Part 7.

4.2 The Rwanda Civil Aviation Authority and RwandAir are recommended to ensure that Aircraft Maintenance Technicians are scheduled in accordance with the rest & duty limitations as laid down in RCAR Part 4.

4.3 The Rwanda Civil Aviation Authority and RwandAir are recommended to ensure that Service Bulletins and other relevant documentation from aircraft manufacturers and foreign CAA's are adequately assessed and timely implemented as laid down in RCAR Part 4.

4.4 RwandAir is recommended to implement a procedure, specifying that the required pre-flight walk-around check by the pilot should take place after all significant ground handling activities are completed.

To Canada:

4.5 Bombardier/De Havilland is recommended to modify the design of the current Q400 engine access panel, thereby:

- improving the ergonomics for latching of the panel, or
- eliminating the need to open the entire access panel for oil servicing.

4.6 Transport Canada Civil Aviation and Bombardier/De Havilland are recommended to refrain from using publications of a non-obligatory nature for issues that constitute a direct safety threat.

Appendix 5.2: Service Bulletin 84-11-46 Bombardier/De Havilland

BOMBARDIER

de HAVILLAND DASH 8

SERVICE BULLETIN

Customer Support

ATA SYSTEM: 1124 NUMBER: 84-11-46

SUBJECT: Placards and Markings – Retrofit – Exterior Label Installation – Nacelle Cowl Door Closing Procedures – ModSum 4-459982

1. PLANNING INFORMATION

A. **Effectivity**

Aircraft Affected:

In-Service: DHC-8 Aircraft Models 401 and 402 Serial Numbers 4001, 4003 thru 4554.

NOTE: The instructions in this service bulletin are only applicable to the systems and parts installed at the time of delivery on the aircraft or as changed by Bombardier Aerospace Service Bulletin(s). Before you do this bulletin, examine all STC or equivalent action changes to make sure this bulletin can be completed.

Spares Affected:

None

B. **Reason**

Problem: Several incidents have been reported where the nacelle forward cowl doors have departed aircraft during flight. In all cases, no physical evidence from recovered doors support latch failure.

Departing door may cause damage to aircraft structure and/or flight controls and loss of nacelle fire detection and extinguishing.

Cause: Cause of problem is attributed to human errors of failure to ensure all the door latches are engaged and that the door fully touches the door seals after the doors are closed when the maintenance is completed.

Solution: This service bulletin introduces ModSum 4-459662. The ModSum adds two new exterior labels for cowl door closing procedures to prevent the incorrect closure of the cowl doors. New labels are placed on both LHS and RHS nacelles, on the inboard and outboard cowl doors.

C. Description

The procedures in this service bulletin give the instructions to do the tasks that follow:

- aircraft electrical power is removed
- the nose landing gear lock is engaged
- the main landing gear lock pins are installed through each main gear and main gear door mechanism
- access is gained to the left and right hand side of each nacelle
- new labels are installed
- close out.

D. Compliance

Bombardier Inc. highly recommend that ModSum 4-459662 be incorporated at the earliest opportunity unless otherwise directed by the operator's airworthiness authority.

E. Approval

The technical content of this service bulletin has been approved under the authority of the Transport Canada Civil Aviation (TCCA) Design Approval Organization No: DAO #93-G-02.

This service bulletin does not affect Airworthiness Limitations (AWLs) or Damage Tolerance Inspections (DTIs).

F. Manpower

It will take an estimated 2.00 man-hours to complete this service bulletin. The breakdown of the man-hours is shown in the table that follows:

TASK	MAN-HOURS
Job Set-Up	0.25
Procedure	1.50
Test / RTS	0.00
Close-Out	0.25

This estimate is for direct labour done by an experienced crew and it does not include; planning, familiarization, cure time, part fabrication, tool acquisition or lost time.

G. Material - Price and Availability

The ModKit(s) required to do this service bulletin is/are listed in the table below:

Kit Number	Description
8MK4811-001	Retrofit Kit - Q400 Exterior Label Inst - Nacelle Cowl Door Closing Procedures

Operators should submit a purchase order through the Customer Response Center (CRC) to the Customer Accounts Service Team (CAST) at Bombardier Aerospace Commercial Aircraft division specifying aircraft serial number(s) to:

Bombardier Aerospace
Customer Accounts Services Team (Mail Stop N11-32)
123 Garratt Blvd.
Toronto
Ontario
Canada M3K-1Y5
E-mail addresses:
International: cast.international@aero.bombardier.com
European: pa_emea@aero.bombardier.com

Americas East: cast.americaseast@aero.bombardier.com
Americas West: cast.americaswest@aero.bombardier.com
Telephone:
North America:Toll Free +1-844-CRC-CRC0 (+1-844-272-2720) or direct +1-514-855-8500
Facsimile:
International: (416) 373-5966
Americas East: (416) 373-5964
Americas West: (416) 375-5965

H. Tooling – Price and Availability

None

I. Weight and Balance

Not affected

J. Electrical Load Data

Not affected

K. Publications Affected

Aircraft Illustrated Parts Catalog ..... PSM 1-84-4
ModSums Manual ..... PSM 1-84-12

L. References

The initial issue of this service bulletin was prepared to the engineering drawings and related data that follows:

DRAWING	SHEET	REV
8MK4811	1	--
8Z9984	1	--

ModSum 4Q459662 Rev. 'A'

ModSum 4-459662 Rev. 'B'

ModSum 4Q9003468 Rev 'A'

PCA 46357 Revision 0 (for internal reference only)

2. MATERIAL INFORMATION

A. Parts Required Per Aircraft

(1) Modification Kit 8MK4811-001

(2) Detailed Kit Content:

Quantity Per Kit -001	Part Number	Description	Remarks
2	811534A0-103	Sym - Cowl Door Closing Procedures (LHS Inboard, RH Outboard)	
2	811534A0-101	Sym - Cowl Door Closing Procedures (LHS Outboard, RH Inboard)	
1	829084	Retrofit - Exterior Label Instl Q400 (Nacelle Cowl Door Closing Procedures)	Drawing Only
1	8MK4811	Kit	Drawing Only

NOTE: No drawings will be provided with this kit. Drawings will be distributed concurrently with the service bulletin.

Listed drawings that are required to complete the kits above can be requested by writing to the following e-mail address:

qseriesdwgrequest@aero.bombardier.com

(3) In addition to the above part(s), the following material(s) are required for the completion of this service bulletin and may be procured as single items from Bombardier Aerospace Commercial Aircraft or purchased directly from industry sources.

Each consumable product listed in the table below is given its own unique Product ID Number. The number is used to identify a particular recommended product, the specifications and the trade names any of which can be used unless specified otherwise (refer to PSM 1-84-18 Consumable Products Manual).

Consumable Product ID Number	Qty. Per Aircraft	Description	Remarks
09-01A	A/R	Sealant, Temperature Resistant, Integral Fuel Tanks, High Adhesion	DHMS S3.01

B. Parts Required to Modify Spares

None

C. Special Tools and Equipment Required

Reference	Designation
3M Co. PA-1, Blue or Gold	Plastic Squeegee
3M Co. SA-1	Low Friction Sleeve
3M Co. RBA-1	Rivet Brush
3M Co. Air Release Tool 3M1X	Pin or Sharp Round Pointed Tool
Razor Blade with a Safety Holder	Cutting Tools
2 in. (50.80 mm) (3M P/N 75-5410-0401-6)	Rubber Hand Roller (RHR)

D. Existing Parts Accountability

None

3. ACCOMPLISHMENT INSTRUCTIONS

A. Job Set-Up

WARNING: MAKE SURE YOU INSTALL THE LOCKPINS ON THE MAIN LANDING GEAR. MAKE SURE YOU ENGAGE THE NOSE GEAR LOCK. IF YOU DO NOT DO THIS, THE LANDING GEAR CAN ACCIDENTALLY RETRACT. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO THE EQUIPMENT.

WARNING: MAKE SURE YOU INSTALL THE LOCKPINS IN THE DOOR MECHANISMS OF THE MLG AND NLG. THE DOOR MECHANISMS CAN ACCIDENTALLY CLOSE THE LANDING GEAR DOORS. THIS CAN CAUSE INJURIES TO PERSONS AND DAMAGE TO THE EQUIPMENT.

(1) Placard and select all aircraft electrical power to OFF. Obey all relevant WARNINGS and CAUTIONS (refer to AMM TASK'S 24-00-00-861-802 and 24-00-00-810-801).

(2) Make sure that lock pins are installed through each main gear and main gear door mechanism.

(3) Make sure the nose gear ground lock is engaged.

(4) Set wheel chocks in front and behind the landing gear tires.

(5) Set up the work platforms or ladders as required to gain access to the left and right side of each nacelle. Make sure the work platforms or ladders are electrically grounded.

B. Procedure

(1) Install label 81153440-101 and label 81153440-103 on the LH nacelle as shown (refer to Figure 1, Figure 2, Figure 3 and AMM TASK 20-00-16-400-801).

NOTE: Make sure highest standard of fit, form and function is maintained. Only if required, it is permissible to notch, slit and trim edges of labels on installation, however, text and the graphics must remain undisturbed.

(2) Seal the edges of all labels with sealant 06-01A (refer to AMM TASK 51-23-00-390-801).

(3) Install label 811S3440-101 and label 811S3440-103 on the RH nacelle as shown (refer to Figure 1, Figure 4, Figure 5 and AMM TASK 20-00-16-400-801).

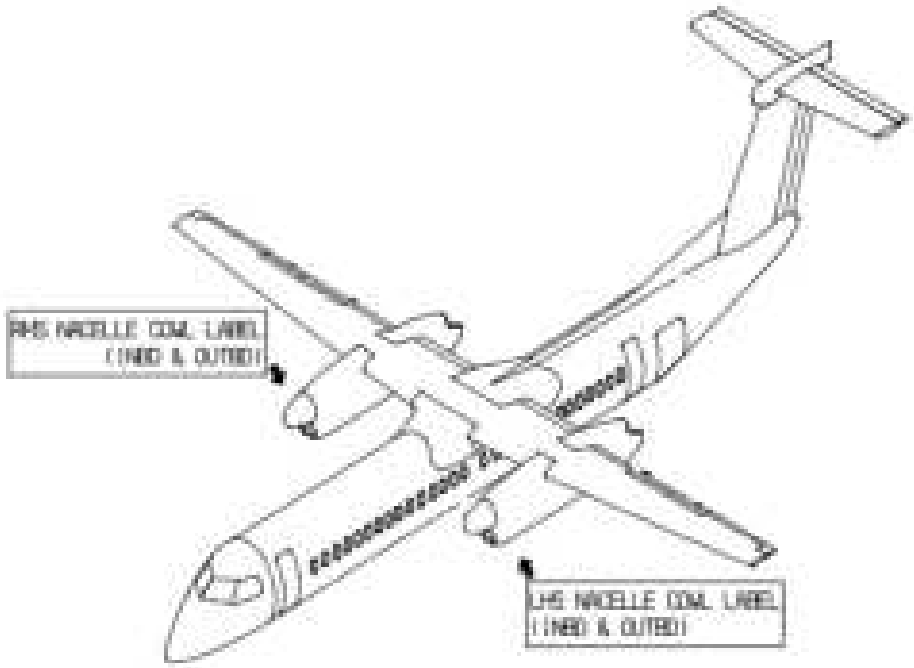
NOTE: Make sure highest standard of fit, form and function is maintained. Only if required, it is permissible to notch, slit and trim edges of labels on installation, however, text and the graphics must remain undisturbed.

(4) Seal the edges of all labels with sealant D6-21A (refer to AMM TASK 51-23-00-390-801).

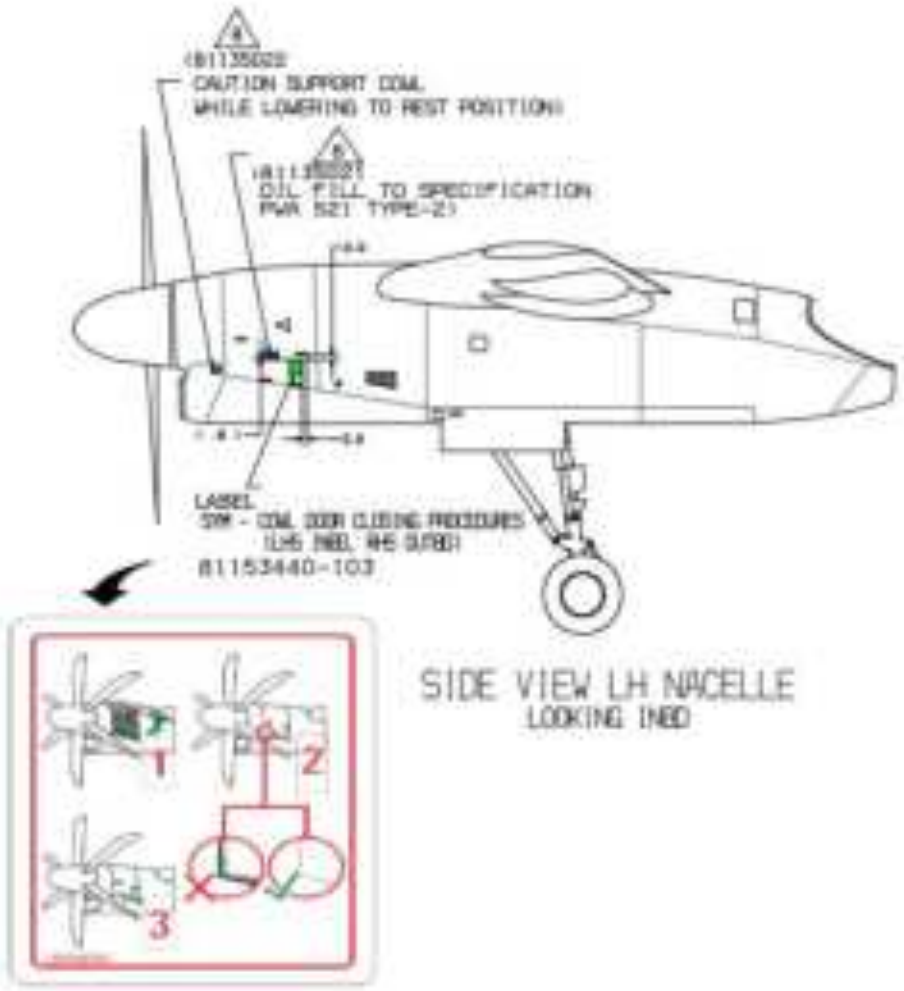
C. Close Out

(1) Remove all tools and equipment from the work area.

(2) On incorporation of this ModSum, make an entry that conforms to local regulatory requirements in the applicable logbook(s). Enter component serial numbers if applicable. Enter this ModSum number only after complete and functional incorporation of all work defined in this service bulletin.



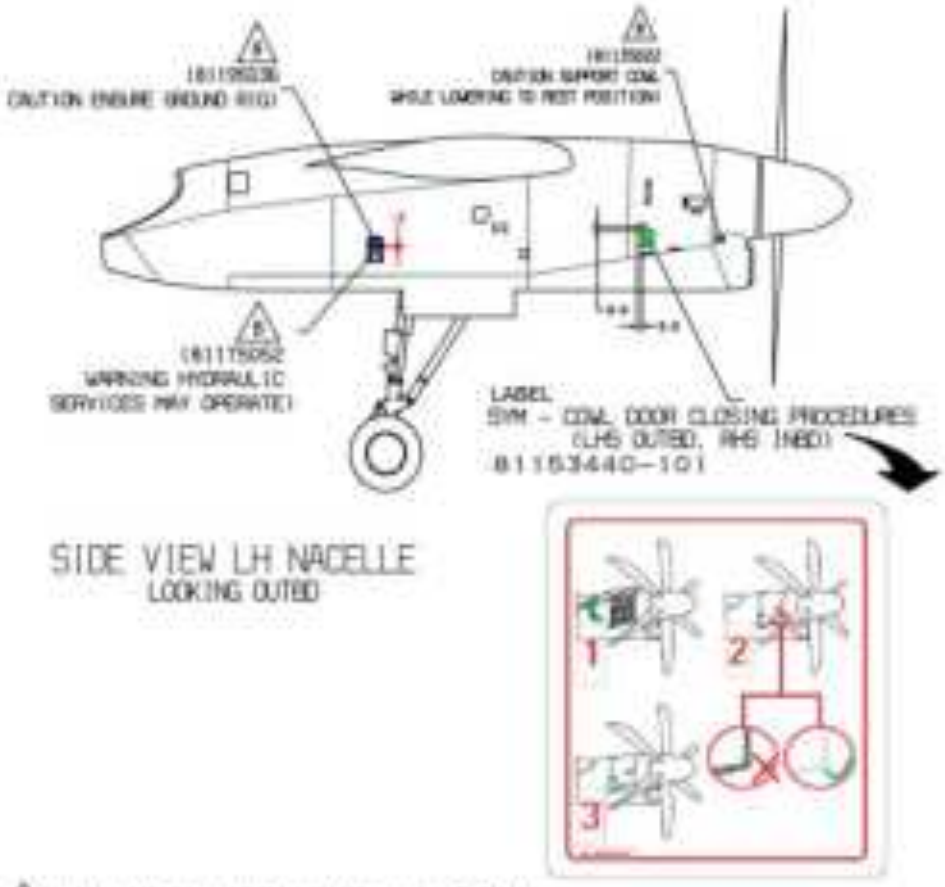
Location of Nacelle Cowl Label Installation
Figure 1



A. EXISTING LABELS SHOWN FOR REFERENCE ONLY.
NO REWORK REQUIRED. PART NUMBERS REFERENCED IN BRACKET ARE NOT INCLUDED

NOTE: ALL DIMENSIONS ARE IN INCHES

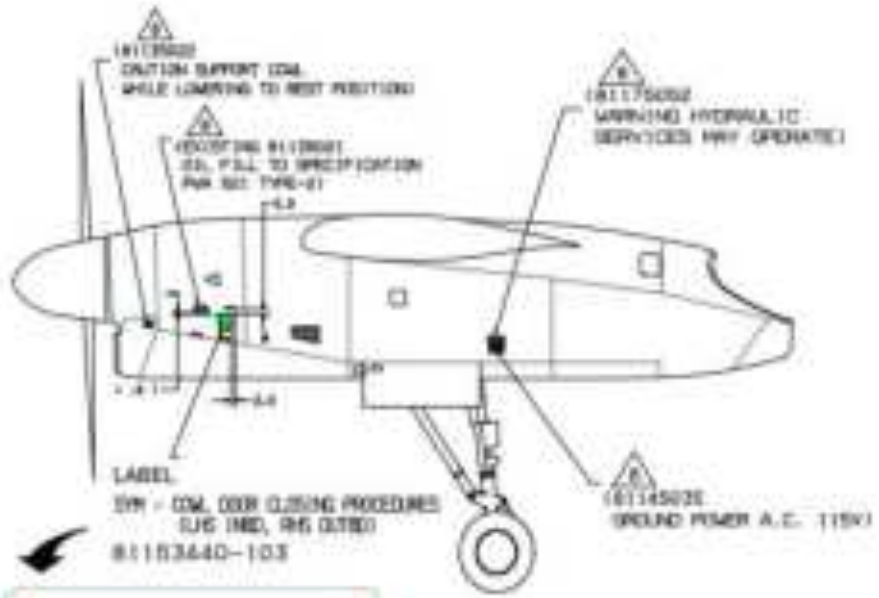
Label Installation – LH Nacelle – Looking Inboard
Figure 2



(6) EXISTING LABELS SHOWN FOR REFERENCE ONLY.
NO REWORK REQUIRED. PART NUMBERS REFERENCED IN BRACKET ARE NOT INCLUDED

NOTE: ALL DIMENSIONS ARE IN INCHES

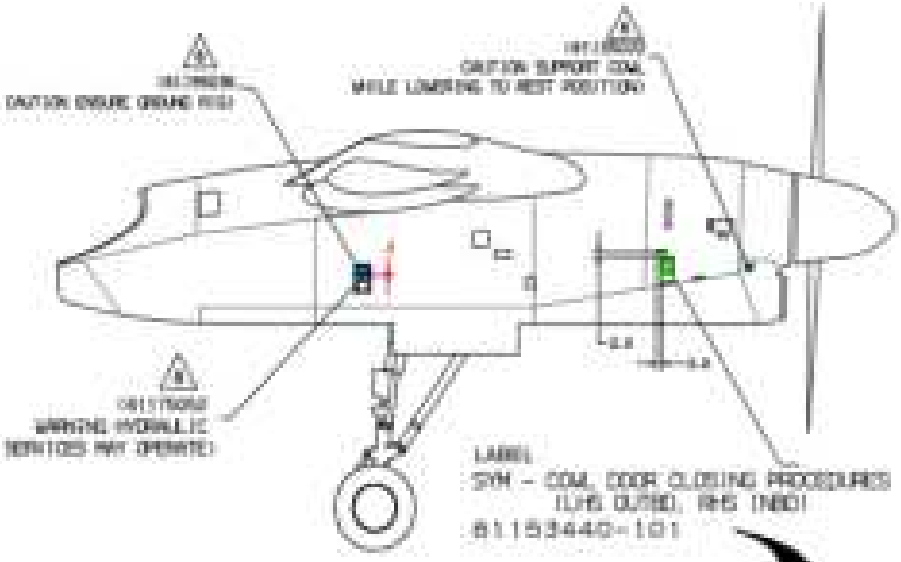
Label Installation – LH Nacelle – Looking Outboard
Figure 3



EXISTING LABELS SHOWN FOR REFERENCE ONLY.
NO REWORK REQUIRED. PART NUMBERS REFERENCED IN BRACKET ARE NOT INCLUDED

NOTE: ALL DIMENSIONS ARE IN INCHES

Label Installation – RH Nacelle – Looking Outboard
Figure 4



EXISTING LABELS SHOWN FOR REFERENCE ONLY.
NO REWORK REQUIRED. PART NUMBERS REFERENCED IN BRACKET ARE NOT INCLUDED

NOTE: ALL DIMENSIONS ARE IN INCHES

Label Installation – RH Nacelle – Looking Inboard
Figure 5

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BOMBARDIER

SERVICE BULLETIN (SB) – RECORD OF INCORPORATION – Q SERIES DASH 8 AIRCRAFT

To: CMDB Focal
Facsimile: (1) 416 375 4538
E-mail: cmdb.requests@aero.bombardier.com

From: _____
Company: _____
Phone: _____ Date: _____
Facsimile: _____ Date: _____
E-mail: _____

The data that you provide below will help us record the incorporation of this ModSum and the aircraft effectivity in the maintenance manual.

Operator: _____ **Service Bulletin:** _____ **Revision:** _____

Aircraft Serial Number: _____ Model Number: _____ Date Bulletin Completed: _____

Aircraft Serial Number: _____ Model Number: _____ Date Bulletin Completed: _____

Aircraft Serial Number: _____ Model Number: _____ Date Bulletin Completed: _____

Aircraft Serial Number: _____ Model Number: _____ Date Bulletin Completed: _____

Aircraft Serial Number: _____ Model Number: _____ Date Bulletin Completed: _____

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Aircraft Serial Number: _____ Model Number: _____ Date Bulletin Completed: _____

Aircraft Serial Number: _____ Model Number: _____ Date Bulletin Completed: _____

Aircraft Serial Number: _____ Model Number: _____ Date Bulletin Completed: _____

Fax this sheet to (1) 416 375 4538 or Email PDF to:

cmdb.requests@aero.bombardier.com

BOMBARDIER

SERVICE BULLETIN (SB) – COMMENT SHEET – Q SERIES DASH 8 AIRCRAFT

To: SB Focal (Toronto), Bombardier Aerospace Commercial Aircraft
Phone: (1) 416 375-4078 Facsimile: (1) 416 375 4538
E-mail: syed.rizvi@aero.bombardier.com

From: _____
Company: _____
Phone: _____ Extn: _____
Facsimile: _____ Date: _____
E-mail: _____

Select appropriate box(es) and add comments or suggestions you would like us to know that may enhance the quality of our service bulletins.

Service Bulletin: _____ **Revision:** _____ **ModSum:** _____

1. **PLANNING INFORMATION**

☐ Effectivity ☐ Reason ☐ Description ☐ Compliance
☐ Approval ☐ Manpower ☐ Material ☐ Weight and Balance
☐ Electrical Load ☐ Tooling ☐ References ☐ Publications Affected

2. **MATERIAL INFORMATION**

☐ Kit Content ☐ Special Tools/Equipment ☐ Parts to Modify Spares
☐ Consumables ☐ Disposition of Existing Parts ☐ Other _____

3. **ACCOMPLISHMENT INSTRUCTIONS**

☐ Job Set-Up ☐ Procedure ☐ Close-Out ☐ Test
☐ Illustration(s) ☐ Other _____

4. **COMMENTS, REMARKS, SUGGESTIONS**

_____
_____
_____
_____
_____

Fax this sheet to (1) 416 375 4538 or Email PDF to:

syed.rizvi@aero.bombardier.com

Appendix 5.3: All Operator Message No. 870 Bombardier/De Havilland

DE HAVILLAND AIRCRAFT OF CANADA LIMITED

[redacted]

DE HAVILLAND Dash 8-400

All Operator Message No. 870

ATTN:	Director/Manager of:	Maintenance Engineering Quality Control Flight Operations Procurement/Spares	
		DATE:	17 July 2020
ATA:	7100	MODEL:	DASH 8-400

SUBJECT: Nacelle Fwd Cowl Door, Improper Closing and Latching

REFERENCE:
(A)/ AMM Task 71-10-06-410-801
(B)/ SB 84-11-46
(C)/ IS-ModSums IS4Q7100024 and IS4Q7103025
(D)/ MODSUM 4Y124550 and 4V184175

The following message is being sent to all DE HAVILLAND AIRCRAFT OF CANADA LIMITED Operators and DE HAVILLAND AIRCRAFT OF CANADA LIMITED Field Service Representatives.

This message contains information requiring attention and/or action. Please ensure timely and appropriate distribution within maintenance and flight operations departments.

DISCUSSION

DE HAVILLAND AIRCRAFT OF CANADA LIMITED has received reports of Nacelle Fwd Cowl Doors P/N 87144003 and 87144004 (412AL, 422AL) departing the aircraft during takeoff. To date, all investigations have been attributed to the release of aircraft for flight with improperly latched doors. On some aircraft the latches were closed before the door was fully shut. The latches did not engage the fittings on the nacelle lower cowl. On other aircraft, the latches were never closed after performing maintenance.

To reduce the likelihood of improper latching, the following actions have been taken:
- AMM Task 71-10-06-410-80, originally released on October 5, 2017 provides instructions for proper closing the cowl doors.

- SB 84-11-46 has been issued to install a placard (P/N 81153440) on the doors showing correct and incorrect closing of the cowl doors. If the doors are closed correctly, then the surface of the

door will sit tight to the surrounding structure. If the doors are closed incorrectly, then the surface of the door will have a gap along the lower edge.



Figure 1 Cowl Door Closed but not engaged, latches not shut

Figure 1 shows door closed, and latches not closed, with a gap at the bottom of the door. The gap at the bottom of the door is indicative that the door has not engaged the latch fittings. Note the red paint on the underside of the latch is used to improve indication that the latch is not closed.

Gap at door bottom must be eliminated prior to shutting cowl latches to ensure proper engagement.



Figure 2 Gap at bottom of door if latch fittings are not properly engaged, view looking aft

Figure 2 looking aft at the bottom of the door shows the gap if the door is closed, but not flush. For proper engagement of the door with the latch fittings, the door must be manipulated to ensure flushness prior to closing the latches.

A production (only) MODSUM (4Q803582) will be issued for a revised simplified placard shown in Figure 4 with a wide hatched red border. The MODSUM is intended to include a one-way interchangeability statement, which will drive AIPC changes. Whenever a placard is changed on in-service aircraft, the old-style placard shown in Figure 3 may be installed until depletion of stock, after which the new style placard shown in Figure 4 can be purchased. Only the new style placard will be available from Material Services.

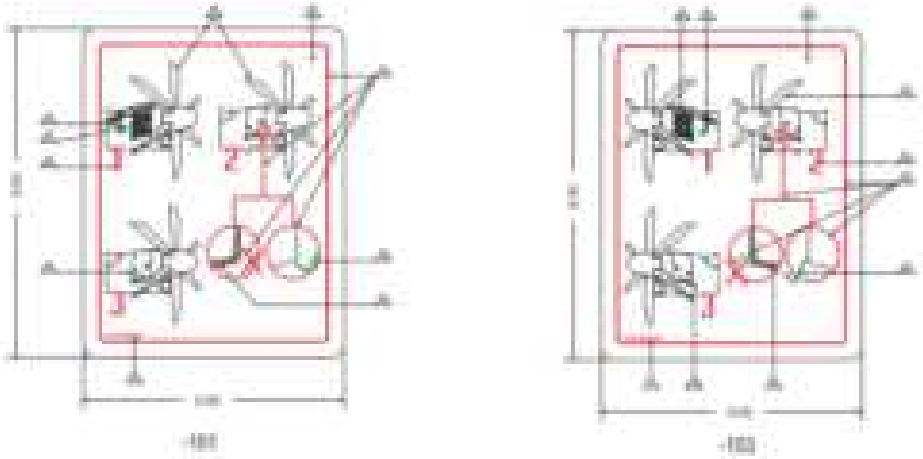


Figure 3 Old Cowl Door Labels – Drawing 81153440

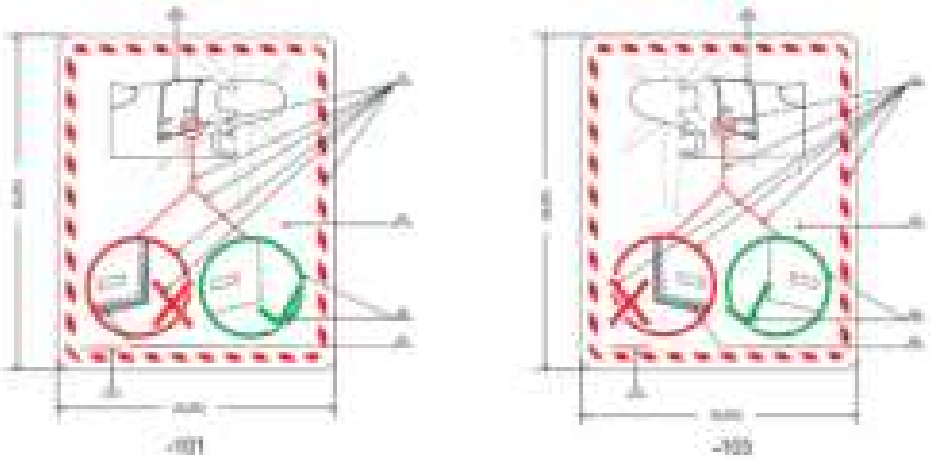
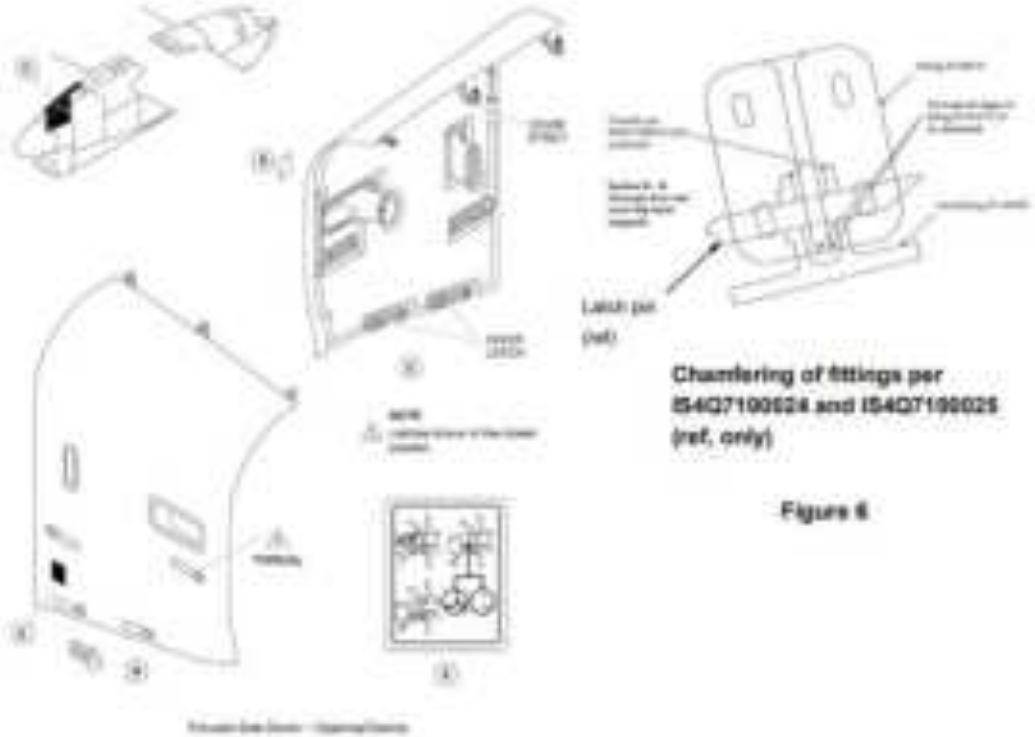


Figure 4 New Cowl Door Labels – Drawing 81153441

- Generic IS-Mods IS4Q7100024, IS4Q7100025 and Production Rework Mod 4Y124550 (Cut in at A/C S/N 4590) and production Mod 4Y184175 were developed to chamfer the edges of the nacelle door fittings P/Ns 87144058 and 87144059 as well as the nacelle firewall door latch fittings P/N 87144131. The reworked fittings improve the ability of the cowl doors to engage with the lower cowl structure, thereby reducing the possibility of a closed latch not engaging the fitting.

The above reworks are highly recommended on all aircraft. All doors lost in flight have been attributed to human factors. Cowl doors lost in flight can cause damage to aircraft including, but not limited to, puncture of the leading edges, damage to the systems within the leading edges, scuffing of the upper wing skins, and puncture of the vertical tail skins.



Chamfering of fittings per IS4Q7100024 and IS4Q7100025 (ref. only)

Figure 6

Ref SB 84-11-46

Figure 5

If desired, the new labels drawing 81153441-101/103, and the latch fittings with chamfered edges, part numbers 87144058-103/104 and 87144059-103/104 as well as the nacelle firefloor door latch fittings with chamfered edges P/N 87144131-103/104 can be ordered directly from DH Material Services.

Please direct responses and inquiries regarding the content of this ADM to your DE HAVILLAND AIRCRAFT OF CANADA LIMITED Field Service Representative or the Technical Help Desk in Toronto at telephone 1-514-855-8500 or Toll Free North America 1-844-272-2720 or e-mail [illegible]

Douglas Caldwell, Manager, In Service Engineering and Technical Support and Jason Rahaman, Director of Dash-8 Technical Services, DE HAVILLAND AIRCRAFT OF CANADA LIMITED.

Appendix 5.4: Transport Canada Civil Aviation Safety Alert 2020-08

Transport Canada / Transports Canada

Document No. / Document n° CASA 2020-08
Issue No. / Numéro d'édition 01
Date: 2020-06-15
Page: 1 of/de 3

CIVIL AVIATION SAFETY ALERT

ALERTE À LA SÉCURITÉ DE L'AVIATION CIVILE

ATTENTION:

OWNERS,OPERATORS AND MAINTAINERS OF DE HAVILLAND AIRCRAFT OF CANADA LIMITED DASH 8-400 SERIES (Q400) AEROPLANES

À L'ATTENTION DE :

PROPRIÉTAIRES, EXPLOITANTS ET SPÉCIALISTES DE LA MAINTENANCE D'AVIONS DASH-8 SÉRIE 400 (Q400) DE DE HAVILLAND AIRCRAFT OF CANADA LIMITED

DASH 8-400 (Q400) FORWARD COWL DOOR DEPARTURE FROM THE AIRCRAFT ON TAKE-OFF

PERTE DU CAPOT AVANT DU DASH-8-400 (Q400) AU DÉCOLLAGE

PURPOSE:

The purpose of this Civil Aviation Safety Alert (CASA) is to raise awareness of the proper maintenance practice and recommended modifications to prevent the forward cowl door on the engine nacelle from departing the aeroplane during take-off.

OBJET :

La présente alerte à la sécurité de l'Aviation civile (ASAC) vise à faire connaître les pratiques d'entretien adéquates et les modifications recommandées afin de prévenir la perte du capot avant de la nacelle moteur au décollage de l'avion.

BACKGROUND:

There have been a number of reported occurrences of the forward cowl door departing from the aeroplane on take-off following maintenance access to the powerplant area. Loss of the cowl door has resulted in damage to the aeroplane's wing leading edge, wing skin and vertical tail structure.

Inspections of the cowl doors recovered at the departure airports revealed that all occurrences were attributed to unsecured cowl doors. In some events, the latches on the door panel were not in the closed and latched position, indicating that the cowl doors were not latched after performing maintenance. In other events, the latches on the door panel were in the closed position, indicating

CONTEXTE :

Un certain nombre d'incidents ont été rapportés concernant la perte du capot avant au décollage de l'avion après l'accès par les techniciens d'entretien à la zone du groupe motopropulseur. La perte du capot a entraîné des dommages au bord d'attaque de l'aile, au revêtement de la voilure et à la structure de l'empennage vertical de l'avion.

L'inspection des capots récupérés aux aéroports de départ a révélé que tous les incidents étaient liés à des capots non sécurisés. Dans certains cas, les loquets sur le panneau du capot n'étaient pas en position fermée et verrouillée, ce qui indique que le capot n'avait pas été verrouillé après les travaux d'entretien. Dans d'autres cas, les loquets sur le panneau du capot étaient en position fermée, ce qui

that the latches were closed before the cowl doors were shut, preventing the locking pin of latches from engaging in the receiving fitting on the nacelle lower cowl.

In order to prevent reoccurrence, De Havilland Aircraft of Canada Limited has issued an All Operator Message (AOM), No. 870 on 17 July 2020, to bring attention to a new Aircraft Maintenance Manual (AMM) task instruction for proper cowl door closing, the Service Bulletin 84-11-46, a new modsum which introduces placards for illustrating the proper closing of the cowl door, and new rework modifications to improve the ability of latch engagement.

RECOMMENDED ACTION:

Transport Canada Civil Aviation recommends that owners, operators and maintainers of Dash 8-400 aeroplanes familiarize themselves with De Havilland's AOM No. 870 and follow the improvement actions outlined in the AOM for maintenance instructions, placard addition and rework to the latch mechanism.

CONTACT OFFICE:

For more information concerning this issue, contact a Transport Canada Centre, or Zhiwei Wang, Continuing Airworthiness in Ottawa, by telephone at 1-888-663-3639, facsimile at 613-998-9178 or by e-mail at [redacted]

indique que les loquets avaient été fermés avant que le capot soit refermé, empêchant la goupille de verrouillage des loquets de s'engager dans le trou prévu pour la recevoir sur le capot inférieur de la nacelle.

Pour éviter que la situation ne se reproduise, De Havilland Aircraft of Canada Limited a émis le message à tous les exploitants n° 870 en date du 17 juillet 2020 pour les informer d'une nouvelle instruction relative à une tâche du manuel d'entretien de l'aéronef (AMM) concernant la fermeture correcte des capots, du bulletin de service 84-11-46, d'une nouvelle Modsum qui introduit des affichettes illustrant comment bien fermer le capot, et de nouvelles modifications de réusinage visant à faciliter l'engagement des loquets.

MESURE RECOMMANDÉE :

Transports Canada, Aviation civile, recommande que les propriétaires, les exploitants et les spécialistes de la maintenance d'avions Dash-8-400 prennent connaissance du message à tous les exploitants n° 870 de De Havilland et qu'ils mettent en œuvre les améliorations qui y sont mentionnées relativement aux instructions d'entretien, à l'ajout d'une affichette et au réusinage du mécanisme des loquets.

BUREAU RESPONSABLE :

Pour davantage de renseignements à ce sujet, veuillez communiquer avec un Centre de Transports Canada ou avec Zhiwei Wang, Maintien de la navigabilité aérienne à Ottawa, par téléphone au 1-888-663-3639, par télécopieur au 613-998-9178 ou par courriel à [redacted]

ORIGINAL SIGNED BY/ORIGINAL SIGNÉ PAR

Ramy Kouen
Chief, Continuing Airworthiness | Chef, Maintien de la navigabilité aérienne
National Aircraft Certification | Certification nationale des aéronefs

[redacted]

