Attachment 7

To Operations Group Factual Report

DCA13FA094

Bombardier (deHavilland) DHC8-102 QRH and ODM Revisions and Supplements

- Cabin . . . . . Secure
- IF possible ensure no passengers are seated in the plane of the propellers.
- GPWS CB–B9 (EGPWS–B3) (Left Rear CB Panel) . . . . . pull
- Emergency Lights . . . . . On
- Auto/Man/Dump . . . . . Dump
- ELT . . . . . On
- Shoulder Harness . . . . . Lock

Review appropriate Landing Considerations:

Landing Gear Extended . . . . . Page 8.3
Landing Gear Retracted . . . . . Page 8.3
Ditching . . . . . Page 8.4

LANDING GEAR EXTENDED:

Landing Considerations

When airplane comes to a stop:

- Emerg Brake . . . . . On
- Condition Levers . . . . . Fuel Off
- Pull Fuel Off Handles . . . . . Pull
- Battery Master . . . . . Off
- Evacuate airplane

LANDING GEAR RETRACTED:

- Ldg Gear Horn CB (E5–Left Main DC) . . . . . pull

Landing Considerations

- Flap 35
- Maintain V_{REF} until immediately prior to flare.
- DO NOT exceed 5° nose up during flare.
- Touch down with minimum speed and minimum rate of descent without stalling.

After ground contact:

- Condition Levers . . . . . Fuel Off
- Pull Fuel Off Handles . . . . . Pull
- Battery Master . . . . . Off

When airplane comes to a stop:

- Evacuate airplane

CONTINUED ON NEXT PAGE

SAFETY OF FLIGHT SUPPLEMENT

NO. 9

JAN 10, 1997

Insert this Safety of Flight Supplement in Chapter 4 of the DHC—8 SERIES 100 OPERATING DATA and complete the appropriate columns of the Log of Safety of Flight Supplements.

SUBJECT: DHC—8 AIRCRAFT — ALTERNATE LANDING GEAR EXTENSION PROCEDURES.

Recently a DHC—8—100 aircraft was landed during revenue service with only the left main landing gear extended (and indicating down and locked). The right main landing gear and the nose landing gear did not extend using normal extension procedures due to a hydraulic leak in the landing gear selector valve.

The flight crew did not properly comply with Section 3—6—1 of the AFM which provides procedures for "Alternate Landing Gear Extension". Therefore, the right main landing gear and the nose landing gear were never released from uplock.

During aircraft recovery from the runway, the "Alternate Landing Gear Extension" procedures were used to extend the nose and right main landing gear to a down and locked position. Subsequent testing determined that the "Alternate Gear Extension" system and the landing gear indication system (main and alternate) performed normally.

There appears to be some confusion concerning proper compliance with "Alternate Landing Gear Extension" procedures as detailed in the AFM. There also appears to be a perception that when operating the "Main Gear Release Handle" a "detent" should be felt or that feeling a "detent" indicates that all gear are released from uplock. **This is incorrect.** The "Main Gear Release Handle" must be pulled fully down until the L DOOR and R DOOR amber door lights illuminate and the LEFT and RIGHT green, gear—locked—down advisory lights illuminate. It should be noted the pull force required on the gear release handle may exceed those experienced during practice extensions, particularly those experienced in flight simulators.

BRAD/de Havilland believes that there is justification to emphasize proper procedures for the use of the "Alternate Landing Gear Extension" system during flight and/or simulator training exercises.

It is suggested that pilots read and initial this Safety of Flight Supplement.

SAFETY OF FLIGHT SUPPLEMENT

NO. 14

JUL 24/09

SAFETY OF FLIGHT SUPPLEMENT, LANDING GEAR FAILURES

LANDING GEAR FAILURES

Structural failure of the landing gear is not covered under Type Certification, therefore, no specific Airplane Flight Manual procedure covering this malfunction is provided or required.
When it is known that a landing must be performed which could be identified as an emergency landing due to the presence of factors which introduce a hazard to the airplane and its occupants, paragraph 3.16, Emergency Landing, of the Airplane Flight Manual (AFM), outlines the main points to be addressed as applicable.

The intent of the following is to provide a list of considerations that may assist the flight crew in their decision making process. The information presented will not always be appropriate for the conditions being experienced by the flight crew. Ultimately, the flight crew will have to make the final decisions given the information presented to them in the particular emergency situation.

Nose Landing Gear Up or Unsafe, Main Landing Gear Down And Locked:

If, after the Alternate Landing Gear Extension procedure has been completed, it cannot be verified that the nose landing gear is down and locked by the normal means, the flight crew must make a decision to perform a landing with the nose landing gear unsafe or an all landing gear up landing (refer to the All Landing Gear Up Landing procedure on the page that follows).

It is possible to safely land the Dash 8 Q100 airplane with the nose landing gear retracted. The geometry of the Q100 airplane is such that the propellers will not come in contact with the ground with the main landing gear extended and the nose landing gear retracted. In this situation, in addition to the direction of AFM paragraph 3.16, Emergency Landing, the following additional items are offered for consideration:

- Reduce landing weight through fuel burn.
- Attempt to achieve an aft C of G by re–seating passengers.
- Select a runway with minimal crosswind.
- Land with flap 35^{o}
- Fly the appropriate VREF for the landing weight
- Touchdown offset from the runway centreline if the runway is equipped with a centreline lighting system
- On touchdown, hold the nose up off the runway as long as possible. Prior to losing elevator effectivity, gently lower the nose onto the runway
- If the nose landing gear is not extended or it collapses, maintain directional control with rudder until it is no longer effective, at which point asymmetric braking may be used as required
- Apply brake or reverse thrust only after the nose wheel is on the ground and appears to be locked. If the nose landing gear is not extended or it collapses, apply brakes only.

All Landing Gear Up Landing:

If the Alternate Landing Gear Extension procedure has been completed and it cannot be verified that both main landing gear are down and locked by the normal means, the flight crew must make a decision to perform a landing with one main landing gear unsafe or, if the landing gear can be retracted, an all landing gear up landing. It is possible to safely land the Dash 8 Q100 airplane with all landing gear retracted. The geometry of the Q100 airplane is such that the propellers should not come in contact with the ground with all landing gear retracted, if it is possible to maintain the wings level throughout the landing. In this situation, in addition to the direction of AFM paragraph 3.16, Emergency Landing, and paragraph 3.15.1, Item 6., NOTE 1., the following additional items are offered for consideration:

- Reduce landing weight through fuel burn
- Passengers must be moved from the seats in the plane of the propellers and re–seated elsewhere in the cabin
- Select a runway with minimal crosswind
- Land with flap 35º
- Fly the appropriate VREF for the landing weight
- Touchdown offset from the runway centreline if the runway is equipped with a centreline lighting system
- Maintain a nose–up pitch attitude not exceeding 5º prior to runway contact
- On touchdown, maintain wings level using lateral control and directional control with rudder
- Feather and secure engines.

One Main Landing Gear Unsafe, Nose Landing Gear And Opposite Main Landing Gear Down And Locked:

If the Alternate Landing Gear Extension procedure has been completed and, it cannot be verified that both main landing gear are down and locked by the normal means and the landing gear cannot be retracted, the flight crew must perform a landing with one main landing gear unsafe. The flight crew must assume and prepare for the gear to collapse on landing.
In this situation, in addition to the direction of AFM paragraph 3.16, Emergency Landing, the following additional items are offered for consideration:

- Reduce landing weight through fuel burn
- Passengers must be moved from the seats in the plane of the propellers and re–seated elsewhere in the cabin. Priority is to be given to the passengers seated on the side with the indicated unsafe main landing gear
- Crosswind (if any) would be advantageous from the side with the un–affected main landing gear
- Land with flap 35º
- Fly the appropriate VREF for the landing weight
- Giving due regard to the specific approach to be follow, flight conditions and possible missed approach; prior to commencing the final approach, feather and secure the engine on the side with the affected main landing gear
- On touchdown, maintain maximum wing down lateral control on the side with the un–affected main landing gear, If the unsafe main landing gear collapses, in an effort to reduce the airplane turning moment in the direction of the failed main landing gear, apply maximum braking and reverse thrust on the side with the un–affected main landing gear.
- Feather and secure the operative engine
- Be prepared to action an Engine Fire On Ground procedure.

[END]