SERIOUS INCIDENT

Aircraft Type and Registration:	Bombardier Dash 8 Q400, G-FLBE
No & Type of Engines:	2 Pratt & Whitney Canada PW150A turboprop engines
Year of Manufacture:	2009
Date & Time (UTC):	25 November 2010 at 0915 hrs
Location:	Paris Charles de Gaulle Airport, France
Type of Flight:	Commercial Air Transport (Passenger)
Persons on Board:	Crew - 4 Passengers - 60
Injuries:	Crew - None Passengers - None
Nature of Damage:	None
Commander's Licence:	Airline Transport Pilot's Licence
Commander's Age:	53 years
Commander's Flying Experience:	14,300 hours (of which 810 were on type) Last 90 days - 150 hours Last 28 days - 33 hours
Information Source:	Aircraft Accident Report Form submitted by the pilot and information provided by the maintenance organisation

Synopsis

During the approach, the flight crew observed an indication that the right main landing gear was not in the 'down and locked' position. After completion of the emergency checklist items, the indicator continued to show that the right main landing gear was unsafe. An emergency was declared and the aircraft made an uneventful landing. An investigation by the operator revealed that a grease nipple, released from the right main landing gear lock link assembly, had become lodged on the eye end of the landing gear downlock actuator, preventing the lock from operating correctly. As a result of this incident the operator has introduced several measures to minimise the possibility of a recurrence.

History of the flight

After selecting the landing gear to the DOWN position, on the approach to land, the flight crew observed an indication that the right main landing gear (MLG) was not in the 'down and locked' position. After confirming the warning, the flight crew initiated a go-around and entered a holding pattern. On completion of the emergency checklist items, including the use of the alternate landing gear actuation system, the indicator continued to show that the right MLG was unsafe, so the flight crew declared a MAYDAY. Observation of the main landing gear showed that both appeared to be fully deployed and there was no obvious defect with the right MLG. The flight crew briefed the senior

cabin crew member on the nature of the emergency and their intentions, after which the cabin crew prepared the cabin and passengers for an emergency landing. Prior to commencing the approach, the flight crew shut down the right engine in accordance with the advice contained in the emergency checklist. The aircraft completed an uneventful landing and came to a halt on the runway where, after shutting down the left engine, a rapid disembarkation was completed.

Approximately 30 minutes after the landing, whilst waiting for transport to the terminal building, the AFRS approached the flight crew to determine if they could make the landing gear 'safe' prior to moving the aircraft. A member of the flight crew re-entered the cockpit to retrieve the landing gear locking pins. The AFRS had some difficulty in locating the correct points in which to insert the locking pins and asked the flight crew for assistance. After consulting the aircraft manuals the locking pins were eventually inserted and the aircraft towed from the runway.

Investigation

A team of engineers from the operator was dispatched to recover the aircraft and carry out an investigation into the incident. On arrival they confirmed that the right landing gear locking mechanism had not fully engaged and that the landing gear had been 'unsafe' during the landing. It was also discovered that the landing gear locking pins had not been inserted in the correct location by the AFRS and that the landing gear remained unsafe. After securing the landing gear, the engineers found that a grease nipple, covered in grease, was stuck to the eye end of the landing gear downlock actuator. This had prevented the actuator from moving through its full range of travel which resulted in the landing gear remaining unlocked and the landing gear unsafe warning observed by the flight crew. It had also prevented the alternate landing gear extension system from operating correctly. When the grease nipple was removed, the landing gear locking mechanism operated normally.

Further examination of the landing gear revealed that a grease nipple was missing from the aft lock link assembly. Two further grease nipples were found missing from the landing gear stabiliser brace assembly. The examination also found excess grease around all the landing gear greasing points and on the aft lock link assembly. It was considered that, due to its location, the grease nipple which was recovered from the downlock actuator had been released from the landing gear lock link assembly.

Following the incident, the operator initiated a fleet wide inspection of the landing gear assemblies to confirm that all of the grease nipples were present and to identify the presence of excess grease around the grease nipple locations and other areas of the landing gear. The results of this inspection showed that 50% of the fleet had one or more grease nipples missing and that 84% of the fleet had excessive grease around the grease nipples or on the lock link assembly. A review of the usage of grease nipples issued to the Dash 8 Q400 fleet showed that 500 had been issued during 2010 and 450 in 2009.

The grease nipples fitted to the Dash 8 Q400 landing gear are of a 'push fit' type. The shank of the nipple is fitted with a small barb and is an interference fit with its locating hole. During manufacture and overhaul they are cooled in liquid nitrogen before being pressed into place. Replacement of a nipple 'on-wing' requires the shank of the nipple to be coated in adhesive prior to it being tapped into position.

Actions taken by the operator

The operator is in discussion with both the airframe and landing gear manufacturer to determine if improvements to the installation procedures can be made to minimise the loss of grease nipples from landing gear units. The manufacturers have been requested to consider the introduction of threaded grease nipples.

In addition, the operator has revised its maintenance practices to prevent the use of high pressure grease guns during landing gear lubrication and to ensure that any excess grease is removed from the grease nipples and landing gear. Also, a routine inspection for the security of the grease nipples is now carried out after a lubrication task; any loose nipples are removed and recorded in the aircraft technical log to ensure that it is replaced during the next schedule maintenance input.

New procedures have also been introduced to ensure that, in the event of having to make the landing gear safe, any personnel involved are provided with clear guidance on the locations to install the landing gear locking pins.