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**ACCIDENT**

<b>Aircraft Type and Registration:</b>	Bombardier DHC-8-402 Dash 8, G-JEDW
<b>No &amp; Type of Engines:</b>	2 Pratt & Whitney Canada PW150A turboprop engines
<b>Year of Manufacture:</b>	2004
<b>Date &amp; Time (UTC):</b>	2 December 2005 at 2000 hrs
<b>Location:</b>	Birmingham International Airport
<b>Type of Flight:</b>	Public Transport (Passenger)
<b>Persons on Board:</b>	Crew - 4                      Passengers - 47
<b>Injuries:</b>	Crew - None                      Passengers - None
<b>Nature of Damage:</b>	Damage to tow bar and nose wheels
<b>Commander's Licence:</b>	Airline Transport Pilot's Licence
<b>Commander's Age:</b>	57 years
<b>Commander's Flying Experience:</b>	13,200 hours (of which 165 were on type) Last 90 days - 164 hours Last 28 days - 47 hours
<b>Information Source:</b>	Aircraft Accident Report Form submitted by the pilot and further enquires by the AAIB

**Synopsis**

After an uneventful push back and engine start, when the tug and tow bar had been disconnected from the aircraft, the aircraft started moving forwards before the pilots were ready to taxi. The aircraft ran into the tow bar, damaging it and the aircraft's nose wheels. The parking brake had not been applied at the appropriate time during the push back sequence.

**History of flight**

The aircraft pushed back for the fourth sector of the day. The ground crew consisted of an aircraft tug driver and a coordinator who was in contact with the pilots via a headset plugged into the flight deck intercom system.

The aircraft's auxiliary power unit was unserviceable so an engine had to be started on-stand prior to push back. Starting the second engine was delayed until after the push back.

The push back and engine starts were uneventful and the 'After Start' check list was completed; this list does not include a check as to whether the parking brake is applied. On completion of the push back the co-pilot noticed the ICE DETECTED warning light and another unidentified caption on the Master Warning Panel. He attracted the commander's attention to these warnings, but the commander motioned to the co-pilot to be quiet, by placing his index finger over his lips, and acknowledged

the warnings. The commander could not remember what the coordinator said to him, whether he applied the parking brake or what he said to the coordinator. He does, however, remember informing the coordinator that he was “clear to disconnect”.

Having looked left and right for adjacent hazards, the commander placed the propeller condition levers to MAX. This is part of the company’s ‘Pre-Taxi’ check. At this point the commander heard a banging noise on the nose of the aircraft and saw a member of the ground crew waving his arms. At the same time the co-pilot heard a loud, metallic noise. Both pilots immediately applied their foot brakes and the moving aircraft was brought to a halt. The parking brake was then applied.

The aircraft’s nose wheels had made contact with the disconnected tow bar causing damage to one wheel, both tyres and the tow bar.

### **Ground crew comments**

In his report to his company, the coordinator stated that initially the push back proceeded normally. At the end of the push-back, the tug driver gave the coordinator the ‘brakes on’ hand signal. Having instructed the commander to apply the parking brake, the coordinator received a “clear to disconnect” verbal instruction. The aircraft was then chocked and the tow bar was disconnected, first from the tug and then from the aircraft.

The tug driver added that he always left a “few inches” between the chock and the nose wheel in order to make it easier to remove the chock after start. The tow bar was then reattached to the tug before the chock was removed and placed on the tug.

Having been advised by the commander that both engines were running, the coordinator was instructed

to disconnect his headset from the aircraft. As he was sealing the headset socket on the aircraft, he heard the aircraft’s engines go to what he described as “full power” and the aircraft started to move. He immediately banged on the aircraft in a bid to get the commander to stop the aircraft but it continued moving forwards for a few feet until it hit the tow bar. The coordinator then reconnected his headset and informed the pilots what had happened.

### **Aircraft damage**

As a result of the collision with the tow bar, one nose wheel tyre was damaged and one was unseated from its wheel rim. Also, a section of rim was dislodged from one wheel. Consequently both nose wheels were replaced.

Upon initial inspection the nose leg was found undamaged. However, subsequently and as a precaution, it was replaced to allow a more detailed inspection for hidden damage.

### **Discussion**

#### *Residual thrust*

The manufacturer reported that after engine start and prior to placing the condition levers to MAX, there is likely to be a small amount of residual forward thrust from the propellers. On level ground this would not be enough to accelerate the aircraft from rest. This means that if the parking brake was not applied, the aircraft was unlikely to have moved forwards and made contact with the nose wheel chock until the engines were accelerated. When the condition levers were moved to MAX, the chock had been removed and the additional thrust was sufficient to move the aircraft forwards.

#### *Push back procedures*

It appears that whilst the commander was distracted, he cleared the ground crew to disconnect the tug without having first applied the parking brake. Also, the ground

crew, on hearing the “clear to disconnect” instruction, might have misheard the commander and interpreted his message to mean that the parking brake was “set”.

### **CVR Procedures**

As part of the operating company’s internal investigation in to this accident, the CVR was removed from the aircraft and sent to an approved avionics servicing facility for download and replay. Subsequently, when the AAIB was notified of the accident, the CVR was sent to the Branch for analysis.

Because the CVR was not electrically isolated soon after the accident, the only recordings were of conversations long after the accident. Consequently, it was not possible to determine what was said by the pilots and the coordinator during the push back.

After this accident the operating company reviewed its procedures for post-incident handling of CVRs and FDRs. They discovered that they had engineering procedures regarding the isolation of the FDR but not the CVR. As a result, the company’s procedures have been amended to ensure that both the CVR and FDR are isolated after an incident.

### **Conclusion**

During the push back, there was a break down in CRM (Crew Resource Management) between the pilots which led to the parking brake not being applied at the appropriate time. The conversation between the pilots and the ground crew was not available to confirm what was said and by whom. Consequently, it is possible that the instruction “clear to disconnect” to the ground crew might have been misinterpreted to mean that the parking brake had been applied. Subsequently, while the ‘Pre-Taxi’ checks were being completed, the aircraft moved forward before the pilots were ready to start taxiing and it collided with the tow bar.

### **Comments**

The parking brake should have been applied before clearance was issued to disconnect either the tug or the headset. Also, if ground crew are uncertain regarding a pilot’s message to them, they should ask for it to be repeated.