

**AVIATION OCCURRENCE REPORT**

**COLLISION WITH VEHICLE**

**AIR FRANCE  
BOEING 747-200 F-BPVV  
MONTREAL INTERNATIONAL (MIRABEL) AIRPORT, QUEBEC  
15 OCTOBER 1995**

**REPORT NUMBER A95Q0206**

The Transportation Safety Board of Canada (TSB) investigated this occurrence for the purpose of advancing transportation safety. It is not the function of the Board to assign fault or determine civil or criminal liability.

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**Summary**

The Air France cargo Boeing 747-200 was parked at gate 111 at Montreal International (Mirabel) Airport, Quebec, and was being prepared for a flight to Charles de Gaulle Airport, France. The ramp operations, conducted by Air Canada employees, were almost completed when the co-pilot requested taxi clearance from the apron controller. Taxi clearance was issued and the captain started to taxi the aircraft.

A ground handler and a ground power unit (GPU) vehicle were still situated under the aircraft. After the aircraft had taxied about 85 feet, its right wing main landing gear struck the GPU vehicle and pushed it approximately three feet before the captain stopped the aircraft. There were no injuries; however, the aircraft sustained minor damage to two main wheel tires and to a wheel-well door. The incident occurred in daylight conditions.

Ce rapport est également disponible en français.

### Other Factual Information

The aircraft was being prepared for flight by two ground handlers and one aircraft maintenance engineer, all Air Canada employees. One ground handler, the signalman, was located forward of the right wing at approximately the three o'clock position relative to the co-pilot. Both Air France and Air Canada ground operating procedures state that the signalman must take up a position forward of the aircraft, within view of the flight crew. However, the open ramp concept at Mirabel does not allow the signalman to operate safely forward of the aircraft because of other vehicle traffic and the possibility of jet blast from other aircraft. The aircraft maintenance engineer was situated just slightly forward of the signalman and was observing the engine start-up sequence. The other ground handler, who was in charge of communications, was situated under the nose of the aircraft and had his headset connected to the intercom system during the engine start-up sequence. He told the pilots that the aircraft was clear before the commencement of the engine start-up sequence.

The ground power unit (GPU) vehicle was situated on the right forward side of the aircraft. The ground handling procedures of both companies state that the GPU vehicle should be driven clear of the aircraft as soon as it is disconnected and no longer in use. However, according to local practice, the GPU vehicle is kept close to the aircraft so that the ground handler can use it to transport the wheel chocks and himself away from the aircraft.

The policies of the air carrier (Air France) and of the company handling ground operations (Air Canada) specify that the ground handler in charge of communications with the crew shall not disconnect the intercom communication cord before all staff and equipment are outside the security perimeter (designated as 25 feet around the aircraft). The ground handler disconnected his intercom and gave the "all clear" to the pilots; however, he had difficulty securing the intercom trap door. The flight crew was not aware of this difficulty. The aircraft maintenance engineer drove his vehicle to the nose of the aircraft in order to assist his colleague. The members of the flight crew did not see the aircraft engineer drive his vehicle toward the aircraft because they were busy with cockpit duties. They believed that the ground handler in charge of communications and the signalman were one and the same person. To the crew members, it was, therefore, impossible that someone could still be positioned under the aircraft. They also believed that all vehicles were clear from under the aircraft as required by the operational procedures of both the air carrier and the company handling ground operations.

When the co-pilot requested taxi clearance, the controller's response was: "Air France 6443, circulez autour de la bâtisse par la droite pour la sortie Québec." Translated, this means, "Air France 6443, taxi around the building to the right for the Québec exit." The flight crew mentioned that, from the way it was pronounced, they had understood the word "bâtisse" as "Bât. 6."

All three crew members looked at their airport area charts and searched for the building or area designated as "Bât. 6." After searching the charts, they realized that the apron controller meant "bâtisse," which means building in French. The accepted radio phraseology used to designate the building in question is the word "cluster" or "îlot"; both may be used in French.

From the apron control tower, the controller is unable to see the whole aircraft parked at gate 111. The cluster building blocks his view of the area surrounding the aircraft and makes it impossible for him to confirm that the aircraft is clear of all obstacles before he issues the taxi clearance. Even if the position of the aircraft had allowed the controller a better view of the area surrounding the aircraft, the controller is not responsible for confirming that that part of the apron is clear.

The responsibility for ensuring that the aircraft is clear of all obstacles before advancing lies with the flight crew.

The co-pilot recalls seeing that the signalman had only his closed right hand positioned against his right shoulder. According to the co-pilot, the signal was distorted because the signalman seemed to be talking on the walkie-talkie. The co-pilot interpreted this signal as a somewhat lax signal to proceed. The hand signal to proceed consists of holding the right arm straight out to the side, at shoulder height, and holding the left arm across the chest with the left hand pointing to the right, indicating the direction of travel. The signalman mentioned that he kept his hands in the "stop" signal position during the engine start-up sequence and that he did not make eye contact with the co-pilot. The hand signal used to indicate "stop" consists of holding both arms above the head to form an "X" pattern.

The signalman was wearing the same uniform as his colleagues. Only his orange fluorescent gloves differentiated him from the others. These gloves were somewhat dirty and faded, and were not as conspicuous as when they were new. The signalman mentioned that, after the aircraft started to advance, he continued to hold the "stop" hand signal, moving forward as the aircraft moved forward. He indicated that the co-pilot did not look in his direction.

When the aircraft maintenance engineer and the ground handler under the aircraft heard the engines spool up, they rapidly went to their respective vehicles. The aircraft maintenance engineer drove his vehicle away from the aircraft; however, the ground handler's GPU vehicle stalled. The ground handler rapidly exited his vehicle and ran to the left side of the aircraft. At that moment, the captain noticed someone on the left side, by the No. 1 engine, and immediately brought the aircraft to a complete stop.

The co-pilot's request for taxi clearance was made 41 seconds after the captain told the intercom ground handler to disconnect and to revert to hand signals. The aircraft started to move approximately 20 seconds after taxi clearance was given, and the aircraft advanced for approximately 33 seconds before coming to a stop.

An internal audit of the company handling ground operations for Air France at the Mirabel airport was scheduled for the following month. There was no record of any audits taking place before the occurrence. It is the responsibility of the group supervisors to monitor the ground operations and ensure that they conform to handling company procedures and safe operations.

### **Analysis**

Contrary to company procedures of the air carrier and of the company handling ground operations, the GPU vehicle was not removed from beneath the aircraft prior to engine start-up; it was left near the aircraft so that the ground handler in charge of communications could use it to transport the wheel chocks and himself away from the aircraft after engine start-up and the completion of the aircraft ground checks. Prior to the engine start-up sequence, the ground handler in charge of communications with the crew told the pilots that the aircraft was clear; the crew was, therefore, unaware that the GPU vehicle remained beneath the aircraft. The flight crew members were also unaware that a problem existed with the intercom trap door; they believed that the aircraft was ready to taxi.

The non-standard phraseology used in the taxi clearance interrupted the flight crew's normal ground operation sequence and check-list, and distracted them. The total elapsed time from the crew's acceptance of the taxi clearance to the actual taxiing of the aircraft was longer than normal; therefore, the co-pilot anticipated a "proceed" signal because he assumed that the aircraft was clear and that everything would be in place for the aircraft to advance.

Because of the open ramp concept, the signalman was situated approximately at the three o'clock position relative to the co-pilot, rather than in front of the aircraft. This position is at the limit of the co-pilot's peripheral vision when he is looking forward; it therefore becomes more difficult to notice the signalman and any signal changes he might make.

The co-pilot stated that he saw the signalman's closed right hand positioned against his shoulder; the signalman seemed to be talking on the walkie-talkie. The co-pilot interpreted this signal as the signal to proceed.

The signalman stated that he did not make eye contact with the co-pilot and that he held his hands in the signal to stop during the entire ground operation. Due to the conflicting statements of the signalman and the co-pilot, the position of the signalman's hands could not be determined. Given that the signalman's fluorescent gloves were dirty and faded, they may not have been as conspicuous as necessary.

After hearing the engine spool up, the ground handler under the aircraft attempted to drive the GPU vehicle clear of the aircraft, but the vehicle stalled.

No recent internal company audit had been performed to ensure that ground personnel were conforming to procedures, or to verify the state of wear of safety equipment used during ground operations.

## **Findings**

1. The GPU vehicle was not removed from within the aircraft's safety perimeter after it was disconnected. The procedures used at Mirabel by the company handling ground operations are different from the procedures at other airports.
2. The ground handler in charge of communications with the crew told the pilot that the aircraft was clear and was ready for engine start.
3. The communications ground handler disconnected his intercom before all staff and equipment were clear of the aircraft.
4. The flight crew members did not see the aircraft maintenance engineer approach the aircraft with his vehicle, and they were unaware of the intercom panel problem.
5. The total elapsed time from the crew's acceptance of the taxi clearance to the actual taxiing of the aircraft was longer than normal; this led the co-pilot to anticipate that he would receive the "clear to proceed" signal from the signalman.
6. The co-pilot interpreted the signalman's hand signal as a signal to proceed.
7. The signalman's fluorescent gloves were dirty and faded, and may not have been as conspicuous as necessary.
8. The GPU vehicle stalled when the ground handler attempted to drive it away from under the aircraft.
9. The aircraft struck the GPU vehicle with its right main wing landing gear and pushed it approximately three feet.
10. No internal audit of the company handling ground operations had been performed recently.

## **Causes and Contributing Factors**

After interpreting the signalman's hand signal as a signal to proceed, the flight crew advanced the aircraft, which struck the GPU vehicle. Contributing to this occurrence was the fact that the ground handler incorrectly stated to the flight crew that the aircraft was clear when the GPU vehicle remained under the aircraft; this local practice was not in accordance with published procedures of the air carrier or the company handling ground operations.

## **Safety Action Taken**

After this incident, the Direction générale des affaires techniques et de la qualité (Technical Affairs and Quality Department) of Air France implemented the following corrective action:

1. The departure procedures prescribed in the Manuel Généralités Lignes (General Line Manual) (MGL) were amended to ensure more comprehensive and accurate ground/aircraft communications.

2. Ground handling contracts will make reference to the procedures in Air France manuals to describe the services provided by the ground handling company.
3. The persons in charge of logistical operations will ensure that all en route ground operations are executed in accordance with the procedure described in the MGL.
4. Verification of crew compliance with the departure procedures described in the MGL will be added to the skills review program for all flight crew.
5. The areas for preventive action proposed following a company survey on taxiing will be analyzed and appropriate corrective measures will be taken if necessary.
6. The instructions regarding departure procedures provided in the various company manuals will be brought in line with those prescribed in the MGL.
7. All manual revisions will be accompanied by a note drawing the attention of personnel to the changes.
8. Information regarding this incident will be distributed to the persons concerned.

In addition, Air Canada has amended its procedures at Mirabel Airport so that all vehicles will be clear of the aircraft before the signalman disconnects his intercom and gives the "all clear" signal to the crew.

*This report concludes the Transportation Safety Board's investigation into this occurrence. Consequently, the Board, consisting of Chairperson Benoît Bouchard, and members Maurice Harquail and W.A. Tadros, authorized the release of this report on 09 October 1996.*