



# National Transportation Safety Board Aviation Accident Final Report

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<b>Location:</b>	Chicago, IL	<b>Accident Number:</b>	CEN11LA051
<b>Date &amp; Time:</b>	11/02/2010, 1027 CDT	<b>Registration:</b>	N709BR
<b>Aircraft:</b>	BOMBARDIER INC CL-600-2B19	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Ground collision	<b>Injuries:</b>	37 None
<b>Flight Conducted Under:</b>	Part 121: Air Carrier - Scheduled		

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## Analysis

The airplane was stopped on the ramp when it was struck by an unoccupied ground service pickup truck. The truck was previously driven and parked nose first against the terminal building. The driver reported that he put the truck into Park, exited it with the engine running, and did not apply the parking brake. Surveillance video shows the airplane on the ramp as the pickup truck went towards the terminal and disappeared from view. Approximately 18 seconds later, the truck is seen moving in reverse from the terminal building and across the ramp, passing about 100 to 150 feet in front of the airplane. The video also revealed that, while still moving in reverse, the truck made a 180-degree turn and headed towards the airplane. The airplane, which was moving, stopped just prior to the truck impacting the forward left side of the airplane.

A postaccident inspection of the truck revealed that the transmission shift cable was out of adjustment, which allowed the transmission to slip into reverse; the parking brake cable had also been disconnected. Additionally, the truck's required maintenance inspection was 83.7 hours past due according to the truck's hour meter. Airline and airport procedure manuals state that vehicles are not to be left unattended with the engine running and that the parking brake must be set when a vehicle is parked. In addition, vehicles are required to be backed into designated parking spaces near buildings. Furthermore, the driver had not accomplished a complete user check of the truck at the beginning of his shift, as required by airline policy.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pickup truck driver's failure to follow airport and company policies regarding ground vehicle operations, which allowed for the unattended truck to collide with the airplane. Contributing to the accident were the truck's misadjusted shift lever and disconnected parking brake.

## Findings

<b>Personnel issues</b>	Decision making/judgment - Maintenance personnel (Cause) Scheduled/routine maintenance - Maintenance personnel
<b>Environmental issues</b>	Ground vehicle - Not specified (Factor)

## Factual Information

On November 2, 2010, at 1027 central daylight time, a Bombardier CL-600-2B19, N709BR, operated by SkyWest Airlines as flight 1020, was struck by an unoccupied United Airlines pickup truck at the O'Hare International Airport (ORD), Chicago, Illinois. There were no injuries to the 2 cockpit crew members, 1 cabin crew member, and 34 passengers. The airplane sustained substantial damage to four stringers and the forward bulkhead. The flight was operating under 14 Code of Federal Regulations Part 121. Visual meteorological conditions prevailed and an instrument flight rules flight plan had been filed. The planned destination for the flight was Quad City International Airport (MLI), Moline, Illinois.

The airplane had pushed back from gate F2 and stopped on the ramp when the crew was informed that they were blocking a gate. As the crew began to move the airplane they saw the pickup truck moving "rapidly" in reverse on the ramp, so they stopped. The pickup truck, which was unoccupied, then impacted the left side of the nose of the airplane.

The pickup truck was previously driven to the terminal building at gate F2D. The driver stated that he put the truck in park, and exited the truck with the engine running. He stated he was only going to be a short time, so he did not think it was necessary to turn the ignition off. He also stated that he did not apply the parking brake. When he returned to where he left the truck, it was gone. The driver stated he then saw the truck under the nose of the airplane.

Surveillance cameras at ORD captured the accident from two different vantage points. The videos both show the airplane stopped on the ramp between the F and G concourses. The blue pickup truck then crossed the ramp from right to left heading toward the F concourse prior to it going out of view. Approximately 18 seconds later, the truck can be seen backing away from the terminal building. The video revealed that the truck crossed about 100 to 150 feet in front of the airplane. While still traveling in reverse, the truck made a 180 degree turn and headed toward the airplane. The airplane stopped just prior to the impact with the pickup truck.

According to United Airlines personnel, other than turning off the ignition, nothing was changed inside the truck after the accident. Photographs taken at the accident site show the gear shift lever was positioned between P (park) and R (reverse).

The truck was towed from the accident site for a postaccident inspection. The truck was a 2001 Ford Ranger standard cab pickup which was owned and operated by United Airlines. The United Airlines identifier for the truck is PI1574. The truck odometer reading was 35,211 miles and the United Airlines hour meter installed in the truck indicated 3,816.7 hours.

The truck was hoisted off the ground for the initial inspection and testing. The gear shift lever remained as it was found; between park and reverse. When the ignition key was turned on the rear wheels could be turned by hand, the back-up lights were not illuminated, and the engine could not be started, indicating the truck was not in park. The gearshift lever was moved toward the parked position and after several attempts, the transmission went into park, locking up the drive train and allowing the engine to be started.

The truck was then lowered to the ground and the engine was started. The vehicle was driven a short distance and stopped. The gearshift lever was moved to park, and the brakes were released. The vehicle remained stationary for 2 to 3 seconds then it began to move in reverse. This occurrence was repeated several times.

The shift cable adjustment procedure as outlined in the 2001 Ford Ranger Service Manual was performed. Following the procedure resulted in a 3/16 of an inch adjustment to the shift cable length. Following the adjustment the transmission functioned reliably in park, reverse, neutral, and drive, but could not be placed in either 1st or 2nd.

The inspection also revealed the parking brake cable was disconnected where the cable splits from one actuating cable to two, one for each rear wheel. The inspection also found that the right front tire was excessively worn along its inside edge.

The pickup truck driver, a United Airlines employee, stated that he performed a user check on the truck which consisted of starting the engine, and checking the brakes and lights. He added that the vehicle was operational and that he had driven it earlier in his shift. The driver said that to his knowledge there was nothing wrong with the gear shift lever. He stated that employees were not required to perform user checks on the vehicles at the beginning of their shift. He also stated that it was standard operating procedure to leave the vehicles running in the winter and that the proper way to park a vehicle outside the terminal was to back the vehicle in toward the building.

United Airlines Ground Equipment PM Program Detail and Task List states that ground vehicles must undergo a B Check every 12 months or 500 hours. It also states, "Safety items found during preventative maintenance will not be deferred. Work and repair items must be accomplished before equipment is returned to service and must be recorded on a separate work order." Among the items listed on the B check are:

- Shifter must lock into detent
- Unit must not move when shifter is in park or neutral
- Parking brake must hold in drive while idling

According to work order 7431, the last B check on the truck was completed on April 26, 2010. The meter reading at that time was 3,233.0 hours, 583.7 hours prior to the accident. Comments listed on the work order were "B/CK/COMPLETE." Work order 6095 listed the items that were addressed during the B check. Items listed on work order 6095 were:

- Bad brakes/Replace rear brakes-replace wheel cylinders-bleed and adjust
- No start-weak battery/Replace battery-drill out old broken hold down bolt
- Upper and lower ball joints bad-both sides/remove spindles/Replace upper control arms
- Stabilizer link broke/Replace both links
- Tires worn/Replace tires
- Spark plugs worn/Replace plugs
- Front brakes worn/Replace pads-rotors-pack bearings
- Rear brake cables froze/replace rear cables
- Right front corner light inop/Remove headlight assy/Replace bulb

- Upper brake light inop/Replace bulbs
- Cut Drums and inspect....Complete

#### UNITED AIRLINES RAMP OPERATIONS MANUAL

United Airlines Ramp Operations Manual addresses the operation of their ground vehicles. Page 8.1.2 of the manual states, in part:

Park motorized equipment, not in use, in designated areas.

- Place the unit in neutral;
- Set the parking brake;
- Turn lights off;
- Lower or stow platforms and booms; and
- Turn off the engine or electric power.

Under the Anti-Idling Policy it states:

- No motorized vehicle shall be left running while unattended.

Pages 8.1.3 and 8.1.4 of the manual address User Checks. This section states, in part:

#### Motorized Equipment

Check motorized equipment units at least once a shift. Keep local records of these checks for at least one month. Note: When equipment is not used on a daily basis or when equipment was not in use during the previous shift, it must be checked before returning it to service.

#### Brakes

Check primary brakes for pedal travel and to ensure the pedal has a non-slip foot pad.

Check parking brake for holding action. Check with the engine running at idle speed by placing the unit in both forward and reverse gears.

#### Tires

Check visually for proper inflation and sufficient tread.

#### Controls/Shift Quadrants

Check for excessive wear on the plate, looseness of control handle and placards.

#### O'HARE INTERNATIONAL AIRPORT PROEDURES

The Chicago Airport System, Ground Motor Vehicle Operation Regulations Manual, is the operations manual for those who operate ground vehicles in the airport operations area. The manual states, in part:

#### 11. OPERATIONS NEAR AIRCRAFT

C. When on the airfield, all vehicles must back into designated parking area, including spaces adjacent to and perpendicular to buildings.

#### 12. VEHICLE OPERATION ON THE AIRFIELD

H. No vehicle will be left unattended with its motor running, unless weather or operational

conditions dictate otherwise.

## 19. SAFETY EQUIPMENT

### B. Ground Vehicle Brakes

2. All vehicles must be equipped with a properly functioning parking brake. In the event a vehicle operator must leave their vehicle unattended, they must engage the parking brake.

Persons approved to operate drive vehicles within the airport operation area are required to be tested on the information in the Chicago Airport System, Ground Motor Vehicle Operation Regulations Manual. The truck driver passed the test on November 21, 2008.

As a result of this accident, United Airlines conducted an inspection off all their ground vehicles at ORD. The inspection resulted in 8 out of 111 vehicles being taken out of service for repairs. In addition, United Airlines instituted the following changes:

- 1) Developed a service vehicle user check audit program at ORD.
- 2) Developed a user check audit program at ORD to ensure compliance with company policy of performing user checks on ground service vehicles.
- 3) Instituted a Maintenance Management Program (MMP) to analyze what service vehicle parts are failing and at what frequency. The objective is to replace parts prior to them failing.
- 4) Created a Maintenance Planner position to track and monitor the maintenance program for ground service vehicles, and to assure maintenance is being done in a timely manner.
- 5) All ground vehicle user checks at ORD were reviewed and revised as needed.
- 6) Continual evaluation of area to park and store ground service vehicles.
- 7) Directed all United Airline ORD departments to enforce the policy of setting the parking brake whenever a vehicle is left unattended.

## History of Flight

Standing

Ground collision (Defining event)

## Pilot Information

<b>Certificate:</b>	Airline Transport	<b>Age:</b>	39, Male
<b>Airplane Rating(s):</b>	Multi-engine Land; Single-engine Land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	Seatbelt, Shoulder harness
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 1 Without Waivers/Limitations	<b>Last Medical Exam:</b>	07/12/2010
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	07/29/2010
<b>Flight Time:</b>	6997 hours (Total, all aircraft), 3156 hours (Total, this make and model), 4099 hours (Pilot In Command, all aircraft)		

## Co-Pilot Information

<b>Certificate:</b>	Airline Transport	<b>Age:</b>	32, Male
<b>Airplane Rating(s):</b>	Multi-engine Land; Single-engine Land	<b>Seat Occupied:</b>	Right
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	Seatbelt, Shoulder harness
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	Yes
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 1 With Waivers/Limitations	<b>Last Medical Exam:</b>	01/25/2010
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	04/11/2010
<b>Flight Time:</b>	4814 hours (Total, all aircraft), 2208 hours (Total, this make and model)		

## Aircraft and Owner/Operator Information

Aircraft Manufacturer:	BOMBARDIER INC	Registration:	N709BR
Model/Series:	CL-600-2B19	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Transport	Serial Number:	7850
Landing Gear Type:	Retractable - Tricycle	Seats:	50
Date/Type of Last Inspection:	11/01/2010, Continuous Airworthiness	Certified Max Gross Wt.:	53000 lbs
Time Since Last Inspection:		Engines:	2 Turbo Fan
Airframe Total Time:	17567 Hours	Engine Manufacturer:	GE
ELT:	Installed, not activated	Engine Model/Series:	CF34 SERIES
Registered Owner:	SKYWEST AIRLINES INC	Rated Power:	9140 lbs
Operator:	SKYWEST AIRLINES INC	Air Carrier Operating Certificate:	Flag carrier (121)
Operator Does Business As:		Operator Designator Code:	S2YA

## Meteorological Information and Flight Plan

Observation Facility, Elevation:	ORD, 672 ft msl	Observation Time:	1051 CDT
Distance from Accident Site:	0 Nautical Miles	Condition of Light:	Day
Direction from Accident Site:	0°	Conditions at Accident Site:	Visual Conditions
Lowest Cloud Condition:	Few / 25000 ft agl	Temperature/Dew Point:	9°C / 0°C
Lowest Ceiling:	None	Visibility	10 Miles
Wind Speed/Gusts, Direction:	10 knots, 150°	Visibility (RVR):	
Altimeter Setting:	30.46 inches Hg	Visibility (RVV):	
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Chicago, IL (ORD)	Type of Flight Plan Filed:	IFR
Destination:	Moline, IL (MLI)	Type of Clearance:	None
Departure Time:	CDT	Type of Airspace:	

## Airport Information

Airport:	O'Hare International (ORD)	Runway Surface Type:	
Airport Elevation:	672 ft	Runway Surface Condition:	
Runway Used:	N/A	IFR Approach:	None
Runway Length/Width:		VFR Approach/Landing:	None

## Wreckage and Impact Information

<b>Crew Injuries:</b>	37 None	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>	N/A	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	37 None		

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Pamela S Sullivan	<b>Adopted Date:</b>	10/03/2011
<b>Additional Participating Persons:</b>	Cy Rosit; FAA-ORD-FSDO; Des Plaines, IL Michael Eisenstat; SkyWest Airlines; St. George, UT Jeff Plantz; United Airlines; Elk Grove Village, IL Christine Clarida; United Airlines; Elk Grove Village, IL		
<b>Publish Date:</b>	10/03/2011		
<b>Investigation Docket:</b>	<a href="http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=77726">http://dms.nts.gov/pubdms/search/dockList.cfm?mKey=77726</a>		

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