
		NTSB ID: DCA06MA064		Aircraft Registration Number: N431CA	
		Occurrence Date: 08/27/2006		Most Critical Injury: Fatal	
		Occurrence Type: Accident		Investigated By: NTSB	
Location/Time					
Nearest City/Place Lexington		State KY	Zip Code	Local Time 0607	Time Zone EDT
Airport Proximity:		Distance From Landing Facility:			
Aircraft Information Summary					
Aircraft Manufacturer Bombardier, Inc.		Model/Series CRJ-100		Type of Aircraft Airplane	
Revenue Sightseeing Flight: No			Air Medical Transport Flight: No		
Narrative					
<p>Brief narrative statement of facts, conditions and circumstances pertinent to the accident/incident:</p> <p>The Safety Board's full report is available at http://www.nts.gov/publictn/A_Accl.htm. The Aircraft Accident Report number is NTSB/AAR-07/05.</p> <p>On August 27, 2006, about 0606:35 eastern daylight time, Comair flight 5191, a Bombardier CL-600-2B19, N431CA, crashed during takeoff from Blue Grass Airport, Lexington, Kentucky. The flight crew was instructed to take off from runway 22 but instead lined up the airplane on runway 26 and began the takeoff roll. The airplane ran off the end of the runway and impacted the airport perimeter fence, trees, and terrain. The captain, flight attendant, and 47 passengers were killed, and the first officer received serious injuries. The airplane was destroyed by impact forces and postcrash fire. The flight was operating under the provisions of 14 Code of Federal Regulations Part 121 and was en route to Hartsfield-Jackson Atlanta International Airport, Atlanta, Georgia. Night visual meteorological conditions prevailed at the time of the accident.</p> <p>According to a customer service agent working in the Comair operations area, the flight crew checked in for the flight at 0515. The agent indicated that the crewmembers were casually conversing and were not yawning or rubbing their eyes.</p> <p>The flight crew collected the flight release paperwork, which included weather information, safety-of-flight notices to airmen (NOTAM), the tail number of the airplane to be used for the flight, and the flight plan. The flight crew then proceeded to an area on the air carrier ramp where two Comair Canadair regional jet (CRJ) airplanes were parked. A Comair ramp agent, who was performing the security check of the accident airplane, noticed that the accident flight crew had boarded the wrong airplane and started its auxiliary power unit (APU). Another company ramp agent notified the flight crewmembers that they had boarded the wrong airplane. The flight crew then shut down the APU and proceeded to the correct airplane.</p> <p>The LEX air traffic control tower (ATCT) was staffed with one controller at the time of the accident airplane's preflight activities, taxi, and attempted takeoff. The controller was responsible for all tower and radar positions.</p> <p>The cockpit voice recorder (CVR) recording began about 0536:08. At that time, the flight crew was conducting standard preflight preparations. About 0548:24, the CVR recorded automatic terminal information service (ATIS) information "alpha," which indicated that runway 22 was in use. About 1 minute afterward, the first officer told the controller that he had received the ATIS information.</p> <p>About 0549:49, the controller stated, "cleared to Atlanta Airport via Bowling Green, ERLIN TWO arrival. Maintain six thousand [feet mean sea level (msl)] ... Departure's [departure control radio frequency] one two zero point seven five. Squawk [transponder code] six six four one." The first officer replied, "okay, got uh, Bowling Green uh, missed the other part. Six thousand, twenty point seven five. Six six four one." The controller then repeated, "it's ERLIN TWO. Echo Romeo Lima</p>					
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India November Two arrival," and the first officer acknowledged the arrival information.

About 0552:04, the captain began a discussion with the first officer about which of them should be the flying pilot to ATL. The captain offered the flight to the first officer, and the first officer accepted. About 0556:14, the captain stated, "Comair standard," which is part of the taxi briefing, and "run the checklist at your leisure."

About 0556:34, the first officer began the takeoff briefing, which is part of the before starting engines checklist. During the briefing, he stated, "he said what runway ... two four," to which the captain replied, "it's two two." The first officer continued the takeoff briefing, which included three additional references to runway 22. After briefing that the runway end identifier lights were out, the first officer commented, "came in the other night it was like ... lights are out all over the place." The first officer also stated, "let's take it out and ... take ... [taxiway] Alpha. Two two's a short taxi." The captain called the takeoff briefing complete about 0557:40.

Starting about 0558:15, the first officer called for the first two items on the before starting engines checklist. When the captain pointed out that the before starting engines checklist had already been completed, the first officer questioned, "we did"? Afterward, the first officer briefed the takeoff decision speed (V1) as 137 knots and the rotation speed (VR) as 142 knots.

Flight data recorder (FDR) data for the accident flight started about 0558:50. The FDR showed that, at some point before the start of the accident flight recording, the pilots' heading bugs had been set to 227°, which corresponded to the magnetic heading for runway 22.

About 0559:14, the captain stated that the airplane was ready to push back from the gate. FDR data showed that, about 0600:08 and 0600:55, the left and right engines, respectively, were started.


About 0602:01, the first officer notified the controller that the airplane was ready to taxi. The controller then instructed the flight crew to taxi the airplane to runway 22. This instruction authorized the airplane to cross runway 26 (the intersecting runway) without stopping. The first officer responded, "taxi two two." FDR data showed that the captain began to taxi the airplane about 0602:17. About the same time, SkyWest flight 6819 departed from runway 22.

About 0602:19, the captain called for the taxi checklist. Beginning about 0603:02, the first officer made two consecutive statements, "radar terrain displays" and "taxi check's complete," that were spoken in a yawning voice. About 0603:38, American Eagle flight 882 departed from runway 22.

From about 0603:16 to about 0603:56, the flight crew engaged in conversation that was not pertinent to the operation of the flight. About 0604:01, the first officer began the before takeoff checklist and indicated again that the flight would be departing from runway 22.

FDR data showed that, about 0604:33, the captain stopped the airplane at the holding position, commonly referred to as the hold short line, for runway 26. Afterward, the first officer made an announcement over the public address system to welcome the passengers and completed the before takeoff checklist. About 0605:15, while the airplane was still at the hold short line for runway 26, the first officer told the controller that "Comair one twenty one" was ready to depart at his leisure; about 3 seconds later, the controller responded, "Comair one ninety one ... fly runway heading. Cleared for takeoff." Neither the first officer nor the controller stated the runway number during the request and clearance for takeoff. FDR data showed that, about 0605:24, the captain began to taxi the airplane across the runway 26 hold short line. The CVR recording showed that the captain called for the lineup checklist at the same time.

About 0605:40, the controller transferred responsibility for American Eagle flight 882 to the Indianapolis Air Route Traffic Control Center (ARTCC). FDR data showed that, about 1 second later, Comair flight 5191 began turning onto runway 26. About 0605:46, the first officer called the lineup

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checklist complete.

About 0605:58, the captain told the first officer, "all yours," and the first officer acknowledged, "my brakes, my controls." FDR data showed that the magnetic heading of the airplane at that time was about 266°, which corresponded to the magnetic heading for runway 26. About 0606:05, the CVR recorded a sound similar to an increase in engine rpm. Afterward, the first officer stated, "set thrust please," to which the captain responded, "thrust set." About 0606:16, the first officer stated, "[that] is weird with no lights," and the captain responded, "yeah," 2 seconds later.

About 0606:24, the captain called "one hundred knots," to which the first officer replied, "checks." At 0606:31.2, the captain called, "V one, rotate," and stated, "whoa," at 0606:31.8. FDR data showed that the callout for V1 occurred 6 knots early and that the callout for VR occurred 11 knots early; both callouts took place when the airplane was at an airspeed of 131 knots. FDR data also showed that the control columns reached their full aft position about 0606:32 and that the airplane rotated at a rate of about 10° per second.

The airplane impacted an earthen berm located about 265 feet from the end of runway 26, and the CVR recorded the sound of impact at 0606:33.0. FDR airspeed and altitude data showed that the airplane became temporarily airborne after impacting the berm but climbed less than 20 feet off the ground.

The CVR recorded an unintelligible exclamation by a flight crewmember at 0606:33.3. FDR data showed that the airplane reached its maximum airspeed of 137 knots about 0606:35. The aircraft performance study for this accident showed that, at that time, the airplane impacted a tree located about 900 feet from the end of runway 26. The CVR recorded an unintelligible exclamation by the captain at 0606:35.7, and the recording ended at 0606:36.2.

In a postaccident interview, the controller stated that he did not see the airplane take off. The controller also stated that, after hearing a sound, he saw a fire west of the airport and activated the crash phone (the direct communication to the airport's operations center and fire station) in response. The air traffic control (ATC) transcript showed that the crash phone was activated about 0607:17 and that the airport operations center dispatcher responded to the crash phone about 0607:22. According to the ATC transcript, the controller announced an "alert three" and indicated that a Comair jet taking off from runway 22 was located at the west side of the airport just off the approach end of runway 8 (which is also the departure end of runway 26). Section 1.15.1 discusses the emergency response.

FINDINGS

1) The captain and the first officer were properly certificated and qualified under Federal regulations. There was no evidence of any medical or behavioral conditions that might have adversely affected their performance during the accident flight. Before reporting for the accident flight, the flight crewmembers had rest periods that were longer than those required by Federal regulations and company policy.

2) The accident airplane was properly certified, equipped, and maintained in accordance with Federal regulations. The recovered components showed no evidence of any structural, engine, or system failures.

3) Weather was not a factor in this accident. No restrictions to visibility occurred during the airplane's taxi to the runway and the attempted takeoff. The taxi and the attempted takeoff occurred about 1 hour before sunrise during night visual meteorological conditions and with no illumination from the moon.

4) The captain and the first officer believed that the airplane was on runway 22 when they taxied onto runway 26 and initiated the takeoff roll.

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- 5) The flight crew recognized that something was wrong with the takeoff beyond the point from which the airplane could be stopped on the remaining available runway.
- 6) Because the accident airplane had taxied onto and taken off from runway 26 without a clearance to do so, this accident was a runway incursion.
- 7) Adequate cues existed on the airport surface and available resources were present in the cockpit to allow the flight crew to successfully navigate from the air carrier ramp to the runway 22 threshold.
- 8) The flight crewmembers' nonpertinent conversation during the taxi, which was not in compliance with Federal regulations and company policy, likely contributed to their loss of positional awareness.
- 9) The flight crewmembers failed to recognize that they were initiating a takeoff on the wrong runway because they did not cross-check and confirm the airplane's position on the runway before takeoff and they were likely influenced by confirmation bias.
- 10) Even though the flight crewmembers made some errors during their preflight activities and the taxi to the runway, there was insufficient evidence to determine whether fatigue affected their performance.
- 11) The flight crew's noncompliance with standard operating procedures, including the captain's abbreviated taxi briefing and both pilots' nonpertinent conversation, most likely created an atmosphere in the cockpit that enabled the crew's errors.
- 12) The controller did not notice that the flight crew had stopped the airplane short of the wrong runway because he did not anticipate any problems with the airplane's taxi to the correct runway and thus was paying more attention to his radar responsibilities than his tower responsibilities.
- 13) The controller did not detect the flight crew's attempt to take off on the wrong runway because, instead of monitoring the airplane's departure, he performed a lower-priority administrative task that could have waited until he transferred responsibility for the airplane to the next air traffic control facility.
- 14) The controller was most likely fatigued at the time of the accident, but the extent that fatigue affected his decision not to monitor the airplane's departure could not be determined in part because his routine practices did not consistently include the monitoring of takeoffs.
- 15) The Federal Aviation Administration's operational policies and procedures at the time of the accident were deficient because they did not promote optimal controller monitoring of aircraft surface operations.
- 16) The first officer's survival was directly attributable to the prompt arrival of the first responders; their ability to extricate him from the cockpit wreckage; and his rapid transport to the hospital, where he received immediate treatment.
- 17) The emergency response for this accident was timely and well coordinated.
- 18) A standard procedure requiring 14 Code of Federal Regulations Part 91K, 121, and 135 pilots to confirm and cross-check that their airplane is positioned at the correct runway before crossing the hold short line and initiating a takeoff would help to improve the pilots' positional awareness during surface operations.

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19) The implementation of cockpit moving map displays or cockpit runway alerting systems on air carrier aircraft would enhance flight safety by providing pilots with improved positional awareness during surface navigation.

20) Enhanced taxiway centerline markings and surface painted holding position signs provide pilots with additional awareness about the runway and taxiway environment.

21) This accident demonstrates that 14 Code of Federal Regulations 91.129(i) might result in mistakes that have catastrophic consequences because the regulation allows an airplane to cross a runway during taxi without a pilot request for a specific clearance to do so.

22) If controllers were required to delay a takeoff clearance until confirming that an airplane has crossed all intersecting runways to a departure runway, the increased monitoring of the flight crew's surface navigation would reduce the likelihood of wrong runway takeoff events.

23) If controllers were to focus on monitoring tasks instead of administrative tasks when aircraft are in the controller's area of operations, the additional monitoring would increase the probability of detecting flight crew errors.


24) Even though the air traffic manager's decision to staff midnight shifts at Blue Grass Airport with one controller was contrary to Federal Aviation Administration verbal guidance indicating that two controllers were needed, it cannot be determined if this decision contributed to the circumstances of this accident.


25) Because of an ongoing construction project at Blue Grass Airport, the taxiway identifiers represented in the airport chart available to the flight crew were inaccurate, and the information contained in a local notice to airmen about the closure of taxiway A was not made available to the crew via automatic terminal information service broadcast or the flight release paperwork.

26) The controller's failure to ensure that the flight crew was aware of the altered taxiway A configuration was likely not a factor in the crew's inability to navigate to the correct runway.

27) Because the information in the local notice to airmen (NOTAM) about the altered taxiway A configuration was not needed for the pilots' wayfinding task, the absence of the local NOTAM from the flight release paperwork was not a factor in this accident.

28) The presence of the extended taxiway centerline to taxiway A north of runway 8/26 was not a factor in this accident.

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Landing Facility/Approach Information					
Airport Name BLUE GRASS	Airport ID: LEX	Airport Elevation 979 Ft. MSL	Runway Used 26	Runway Length 3500	Runway Width 75
Runway Surface Type: Asphalt; Concrete					
Runway Surface Condition: Dry					
Approach/Arrival Flown: NONE					
VFR Approach/Landing: None					
Aircraft Information					
Aircraft Manufacturer Bombardier, Inc.		Model/Series CRJ-100		Serial Number 7472	
Airworthiness Certificate(s): Transport					
Landing Gear Type: Retractable - Tricycle					
Amateur Built Acft? No	Number of Seats: 54	Certified Max Gross Wt. 53000 LBS	Number of Engines: 2		
Engine Type: Turbo Fan	Engine Manufacturer: General Electric	Model/Series: CF-34-3A1	Rated Power: 8729 LBS		
- Aircraft Inspection Information					
Type of Last Inspection Continuous Airworthiness	Date of Last Inspection 08/2006	Time Since Last Inspection 0 Hours	Airframe Total Time 14536 Hours		
- Emergency Locator Transmitter (ELT) Information					
ELT Installed?/Type No	ELT Operated? No	ELT Aided in Locating Accident Site? No			
Owner/Operator Information					
Registered Aircraft Owner First Union National Bank Trustee		Street Address			
		City Charlotte	State NC	Zip Code 28202	
Operator of Aircraft COMAIR INC		Street Address			
		City Erlanger	State KY	Zip Code 41018	
Operator Does Business As:			Operator Designator Code: COMR		
- Type of U.S. Certificate(s) Held:					
Air Carrier Operating Certificate(s): Flag Carrier/Domestic					
Operating Certificate:			Operator Certificate:		
Regulation Flight Conducted Under: Part 121: Air Carrier					
Type of Flight Operation Conducted: Scheduled; Domestic; Passenger Only					

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First Pilot Information

Name On File	City On File	State On File	Date of Birth On File	Age 35
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Sex: M	Seat Occupied: Left	Occupational Pilot?	Certificate Number: On File
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Certificate(s): Airline Transport; Flight Instructor; Commercial; Sport Pilot

Airplane Rating(s): Multi-engine Land; Single-engine Land

Rotorcraft/Glider/LTA: None

Instrument Rating(s): Airplane

Instructor Rating(s): Airplane Multi-engine; Airplane Single-engine; Instrument Airplane

Current Biennial Flight Review? 07/2006

Medical Cert.: Class 1	Medical Cert. Status: With Waivers/Limitations	Date of Last Medical Exam: 08/2006
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- Flight Time Matrix	All A/C	This Make and Model	Airplane Single Engine	Airplane Multi-Engine	Night	Instrument		Rotorcraft	Glider	Lighter Than Air
						Actual	Simulated			
Total Time	4710	3082								
Pilot In Command(PIC)		1567								
Instructor										
Instruction Received										
Last 90 Days	158	158		158						
Last 30 Days	55	55		5						
Last 24 Hours	3	3		3						

Seatbelt Used? Yes	Shoulder Harness Used? Yes	Toxicology Performed? Yes	Second Pilot? Yes
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Flight Plan/Itinerary

Type of Flight Plan Filed: IFR

Departure Point Same as Accident/Incident Location	State	Airport Identifier LEX	Departure Time	Time Zone EDT
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Destination Atlanta	State GA	Airport Identifier ATL	
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Type of Clearance: IFR

Type of Airspace:

Weather Information

Source of Wx Information:

Company; National Weather Service

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Weather Information

WOF ID	Observation Time	Time Zone	WOF Elevation	WOF Distance From Accident Site	Direction From Accident Site
LEX	0605	EDT	Ft. MSL	1 NM	260 Deg. Mag.

Sky/Lowest Cloud Condition: Few	9000 Ft. AGL	Condition of Light: Night/Dark
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Lowest Ceiling: None	Ft. AGL	Visibility: 8	SM	Altimeter: 30.00	"Hg
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Temperature: 24 °C	Dew Point: 19 °C	Weather Conditions at Accident Site: Visual Conditions
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Wind Direction: 200	Wind Speed:	Wind Gusts:
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Visibility (RVR):	Ft.	Visibility (RVV)	SM
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Precip and/or Obscuration:
No Obscuration; No Precipitation

Accident Information

Aircraft Damage: Destroyed	Aircraft Fire: Ground	Aircraft Explosion: None
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- Injury Summary Matrix	Fatal	Serious	Minor	None	TOTAL
First Pilot	1				1
Second Pilot		1			1
Student Pilot					
Flight Instructor					
Check Pilot					
Flight Engineer					
Cabin Attendants	1				1
Other Crew					
Passengers	47				47
- TOTAL ABOARD -	49	1			50
Other Ground					
- GRAND TOTAL -	49	1			50

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Administrative Information

Investigator-In-Charge (IIC)

Joseph M. Sedor

Additional Persons Participating in This Accident/Incident Investigation:

David Keenan
Federal Aviation Administration
Washington, DC

Scott Granger
Air Line Pilot Association
Powell Butte, OR

John Coon
Blue Grass Airport
Lexington, KY

Paul Vislosky
Comair Inc.
Erlanger, KY

Les McVey
GE Transportation Aircraft Engines
Cincinnati, OH

David Supplee
Intl. Assoc. of Machinists and Aerospace Workers
Seminole, FL

Bill Shea
National Air Traffic Controllers Association
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Teamsters Local 513 Airline Division
Florence, KY

Jean-Marc Ledoux
Transportation Safety Board of Canada
Dorval, Canada,