Aviation Investigation Final Report

Location:	Columbus, Indiana	**Accident Number:**	CHI02FA197
Date & Time:	July 18, 2002, 03:45 Local	**Registration:**	N158GA
Aircraft:	Piper PA-60	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	1 Fatal
Flight Conducted Under:	Part 135: Air taxi & commuter - Non-scheduled		

Analysis

The airplane was destroyed by impact forces and fire after it impacted the intersection of runway 23 and 32 while attempting a missed-approach. The pilot's crew day started at 1300 and the 14 hour duty limit was 0300 the following morning. The second leg of the flight was delayed 1 hour and 36 minutes due to a freight delay. The operator reported the pilot exceeded his 14 hour crew day by 45 minutes as a result of the freight delay. The flight was cleared for the runway 23 ILS instrument approach. A witness, who was monitoring the Unicom radio frequency, reported that he heard clicking sounds on the Unicom frequency (to bring up the runway light intensity), but the pilot did not make any radio transmissions. The witness reported the ground fog was very thick. Two witnesses reported they heard the airplane's engines. They then heard the engines go to "full power," and then they heard the airplane impact the ground. They saw an initial flash, but could not see the airplane on fire from 2,500 feet away. FAR 135.213 requires that, "Weather observations made and furnished to pilots to conduct IFR operations at an airport must be made at the airport where those IFR operations are conducted." The destination did not have authorized weather reporting, and the operator's Operating Specifications did not list an alternate weather reporting source. At 0253, the observed weather 20 miles to the north, indicated the following: winds 190 at 4 knots, 1/4 statute mile visibility, fog, indefinite ceilings 100 feet, temperature 22 degrees C, dew point 22 degrees C, altimeter 30.00. From the initial point of impact (POI), the wreckage path continued for about 210 feet on a heading of about 180 degrees. The outboard section of the left wing outboard of the nacelle was found on runway 32, about 85 feet from the POI. Separated, unburned, portions of the left aileron and left flap were also found on the runway. The remaining pieces of the left wing were located with the main wreckage. The right wing was located with the main wreckage and the entire span of the right wing from the wing root to the wingtip exhibited continuity. The inspection of the airplane revealed no preexisting anomalies.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's failure to maintain control of the airplane during a missed approach. Additional factors included the operator's inadequate oversight, the pilot's improper in-flight decision, conditions conducive to pilot fatigue, fog, and night.

Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: MISSED APPROACH (IFR)

Findings
1. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND
2. (F) IN-FLIGHT PLANNING/DECISION - IMPROPER - PILOT IN COMMAND
3. (F) IMPROPER DECISION - PILOT IN COMMAND
4. (F) INADEQUATE SURVEILLANCE OF OPERATION - COMPANY/OPERATOR MGMT
5. (F) FATIGUE (CONDITIONS CONDUCIVE TO PILOT FATIGUE) - PILOT IN COMMAND
6. (F) LIGHT CONDITION - DARK NIGHT
7. (F) WEATHER CONDITION - FOG

Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings
8. AIRPORT FACILITIES,RUNWAY/LANDING AREA CONDITION - RUNWAY

Factual Information

HISTORY OF FLIGHT

On July 18, 2002, at 0345 eastern standard time, a Piper PA-60, N158GA, operated by Grand Aire Express, Inc., was destroyed when it impacted runway 23 (6,401 feet by 150 feet, asphalt) at the Columbus Municipal Airport (BAK), Columbus, Indiana. The commercial pilot received fatal injuries. The 14 CFR Part 135 cargo flight departed Cleveland-Hopkins International Airport (CLE), Cleveland, Ohio, at 0225. The flight was on an instrument flight rules (IFR) flight plan. Night visual meteorological conditions were being reported at Indianapolis International Airport (IND), Indianapolis, Indiana, located approximately 33 miles northwest of BAK.

The pilot reported for duty at 1300 on July 17, 2002. His first flight was as an additional crewmember (ACM) that was scheduled to depart at 1400. After he completed the first ACM flight at 2150, the pilot accepted to fly as pilot-in-command on a second trip.

The pilot received a flight briefing and a printout of the DUATS weather for the first leg of the scheduled trip from the company's non-licensed dispatcher. The first flight leg of the flight had a scheduled departure time of 2300 from Toledo Express Airport (TOL), Toledo, Ohio, on July 17, 2002. The destination was CLE with a scheduled time en route of 49 minutes. The flight from TOL to CLE was uneventful.

The second leg of the flight was scheduled to depart Cleveland one hour later at 0049. However, the operator reported that due to a freight delay in Cleveland, the cargo was not loaded on the airplane as scheduled. Instead of departing at 0049, the flight departed CLE at 0225. The final destination airport was BAK with a scheduled time en route of 1 hour and 35 minutes. Due to the freight delay, the flight did not arrive at BAK until 0345.

The pilot contacted the Indianapolis Air Traffic Control (ATC) at 0328:28. He requested radar vectors for the ILS RWY 23 instrument approach to BAK.

At 0337:36, N158GA was 10 miles from the ILS outer marker and ATC cleared N158GA for the approach.

At 0341:07, ATC informed N158GA that radar service was terminated.

At 0341:16, the pilot responded, "Roger, change to the (unintelligible) and we'll call you for cancellation, Golf Alpha." There were no further radio transmissions from N158GA.

A witness, who was working at the terminal building at BAK, was monitoring the Unicom radio frequency. He had been notified that N158GA would be arriving at BAK for a cargo delivery.

He reported that he heard clicking sounds on the Unicom frequency (to bring up the runway light intensity), but he reported that the pilot did not make any radio transmissions. He walked outside to wait for the airplane. He, along with another witness who was waiting for N158GA's arrival, reported that at the time of the accident, the ground fog was very thick. He reported that the light on the windsock located 100 yards away was "just a glow," and that the runway lights could not be seen. The witness reported that he made the comment, "He's gonna go missed," because the fog was so thick. Both witnesses reported they heard the airplane's engines. They then heard the engines go to "full power," and then they heard the airplane impact the ground. They saw an initial flash, but could not see the airplane on fire from 2,500 feet away.

Two Indiana State Police troopers, who were on duty at the Columbus Airport, heard the sound of the airplane impacting the ground. A trooper reported, "We drove down the runways and tried to find the plane crash. We got within 50-75 yards of the crash before we were able to see the flames from the crash due to the heavy fog in the area."

The airplane impacted the runway at the northeast corner of the intersection of runways 23/05 and 32/14, approximately 2,600 feet from the approach end of runway 23.

PERSONNEL INFORMATION

The 25-year old pilot was a commercial pilot with single and multi-engine land ratings. He was a certified flight instructor with ratings as a single and multi-engine land instructor and as an instrument instructor. He held a First Class medical certificate. He had a total of about 2,378 hours of flight time, with about 281 hours in multi-engine aircraft and about 150 hours of instrument time.

Company records indicated the pilot started his company ground school courses on May 11, 2002. He completed courses in Basic Indoctrination, Hazardous Materials, General Emergency Situations, and Aircraft Ground instruction. He flew 9.5 hours during his PA-60 flight training. The pilot completed an initial pilot-in-command flight check from a company check airman on May 23, 2002. The pilot's date of hire at the company was May 24, 2002. Flight and duty records indicate the pilot flew 29.3 hours in June and 11.9 hours in July. The pilot had a total of about 51 hours of flight time in PA-60 airplanes.

AIRCRAFT INFORMATION

The airplane was a twin engine Piper PA-60. The airplane was utilized in cargo operations that seated two, and had a maximum gross weight of 5,520 pounds. The engines were 300 horsepower Lycoming IO-520-S1A5 engines. The last airplane inspection was conducted on June 27, 2002. The airplane had flown 12.5 hours since the last inspection and had a total of 6,288 hours.

METEOROLOGICAL INFORMATION

The control tower at BAK provides weather information between 0700 and 2200 when the tower is in operation. After 2200, there is no weather reporting available at BAK since the airport is not equipped with an Automated Weather Observing System (AWOS) or an Automated Surface Observing System (ASOS).

The last BAK weather observation available to N158GA on July 17 was the 2150 observation, which was: winds calm, 8 statute miles visibility, scattered clouds 15,000 feet, temperature 24 degrees C, altimeter 30.04.

The first BAK weather observation on July 18 when the tower opened at 0700, was: winds calm, 2 statute miles visibility, mist, overcast 600 feet, temperature 21 degrees, altimeter 30.04

At 0253, the weather observation at GEZ, Shelbyville, Indiana, located 20 miles to the north of BAK, indicated the following: winds 190 at 4 knots, 1/4 statute mile visibility, fog, indefinite ceilings 100 feet, temperature 22 degrees C, dew point 22 degrees C, altimeter 30.00.

At 0353, the weather observation at GEZ indicated the following: winds 180 at 5 knots, 1/4 statute mile visibility, fog, indefinite ceilings 100 feet, temperature 21 degrees C, dew point 21 degrees C, altimeter 29.99.

At 0255, the weather observation at IND, located about 33 miles to the northwest of BAK, indicated the following: winds 220 at 6 knots, 6 statute miles visibility, mist, few clouds 6,000 feet, broken clouds 8,500 feet, temperature 22 degrees C, dew point 22 degrees C, altimeter 30.00.

At 0355, the weather observation at IND indicated the following: winds 210 at 4 knots, 5 statute miles visibility, mist, few clouds 6,000 feet, scattered clouds 8,500 feet, temperature 21 degrees C, dew point 21 degrees C, altimeter 30.00.

The following hand written weather information was found in the pilot's flight planning documents:

"High pressure one Columbus India mist fog 250/5 7 mile (illegible writing) 3000 Columbus calm 2 ½ mist 22/22 3002 TAF 06Z 0900 VRR 5 mist OCC 2 mist 0900 2 miles (illegible writing) 270/9 (illegible writing)."

The weather package provided to the pilot by the dispatcher prior to the first leg of the flight did not include an area forecast or a terminal forecast. The area forecast that was valid for the northern portions of Illinois, Indiana, and Kentucky was the following:

"Scattered clouds 12,500 feet, isolated light rain showers, light rain and thunderstorms, cumulonimbus tops 40,000 feet, occasional visibility 3-5 statute miles, mist. Outlook marginal VFR mist becoming VFR at 1600Z."

WRECKAGE AND IMPACT INFORMATION

The initial point of impact (POI) was at the northeast corner of the intersection of runways 23/05 and 32/14. The wreckage path continued for about 210 feet on a heading of about 180 degrees. The main wreckage came to rest next to a HOLD SIGN south of runway 32. The longitudinal heading of the main wreckage was about 150 degrees. Parallel scraping and gouge marks, along with indications of fire, were observed on the runway, and ran from the POI to the main wreckage.

Six parallel impact marks running perpendicular to the direction of travel were observed on the runway. The six marks exhibited characteristics consistent with propeller slash marks on runway pavement. The following information concerns the 6 impact marks:

	Distance from POI	Length of Mark
1.	15 ft.	8 inches
2.	16 ft. 6 inch	10 inches
3.	18 ft. 6 inches	20 inches
4.	19 ft. 8 inches	18 inches
5.	20 ft. 9.5 inches	9.5 inches
6.	21 ft. 10.5 inches	4 inches

Using the above information, the ground speed of the airplane at impact was calculated at approximately 120 knots.

The outboard section of the left wing outboard of the nacelle was found on runway 32, about 85 feet from the POI. It received fire damage. Separated, unburned, portions of the left aileron and left flap were also found on the runway. The remaining pieces of the left wing, including the left main landing gear, left nacelle, and left engine were located with the main wreckage. The inboard portion of the left wing had separated from the fuselage at the wing root.

The right wing was located with the main wreckage and was found inverted, lying on the left side of the wreckage. The wing spars remained attached to the fuselage. The entire span of the right wing from the wing root to the wingtip exhibited continuity. The outboard section of the right wing was partially consumed by fire. The right engine and right engine nacelle remained attached to the wing. The right main landing gear was found fully extended.

The nose of the aircraft exhibited compression, buckling, and scraping marks on the left side

aft to the left side of the cockpit. The cockpit was destroyed by impact forces and fire, although, the aircraft instruments were not consumed. The main cabin and fuselage were consumed by fire.

The empennage was found near the main wreckage aft of the fuselage, resting on its vertical stabilizer and left horizontal stabilizer. The empennage was intact but had received fire damage to the right horizontal stabilizer. The fuselage forward of the empennage was consumed by fire.

The inspection of the airplane's flight controls revealed that the right wing exhibited continuity from the wing root to the aileron attach points. The left aileron attach points exhibited continuity, but the control tubes were broken or destroyed by impact forces and/or fire. The attach points for the rudder and elevator exhibited continuity, but the control tubes forward of the empennage to the cockpit were destroyed by impact forces and/or fire.

The airplane's attitude gyro and housing and the airplane's horizontal situation indicator's gyro and housing were inspected. Neither gyro exhibited rotational scoring.

The inspection of the left engine revealed that the engine was separated from its mounts and had received impact and fire damage. The engine could not be rotated. The top spark plugs from number 1, 4, and 6 cylinders were removed and were light gray in color. A boroscope inspection of the cylinders revealed no anomalies.

The left propeller remained attached to the left engine. All three blades were loose in the hub. One blade was bent aft and was under the left side of the engine. The blade was twisted about 360 degrees on top of itself. It had leading edge gouges, chordwise scratches and gouges, and tip curl. A second blade was bent aft and twisted. The blade had leading edge gouges, chordwise scratching, and tip curl. The third blade was either broken or burned away from the rest of the blade.

The inspection of the right engine revealed the engine remained attached to its mounts and nacelle. The engine was rotated and continuity was confirmed to all the aft gears. Thumb compression and suction was confirmed to all cylinders. A boroscope inspection of the cylinders revealed no anomalies.

The right propeller remained attached to the engine. All three blades were loose in the hub. All three blades were bent and twisted. All three exhibited leading edge gouges and chordwise scratching. One blade exhibited about 270 degrees of tip curl.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot at the Columbus Regional Hospital Morgue.

A Forensic Toxicology Fatal Accident Report was prepared by the FAA Civil Aeromedical

Institute. The report indicated negative results for all tests performed.

ADDITIONAL INFORMATION

Federal Aviation Regulation (FAR) Part 135.213, "Weather Reports and Forecasts," states the following:

"(a) Whenever a person operating an aircraft under this part is required to use a weather report or forecast, that person shall use that of the U.S. National Weather Service, a source approved by the U.S. National Weather Service, or a source approved by the Administrator. However, for operations under VFR, the pilot in command may, if such a report is not available, use weather information based on that pilot's own observations or on those of other persons competent to supply appropriate observations.

(b) For the purposes of paragraph (a) of this section, weather observations made and furnished to pilots to conduct IFR operations at an airport must be taken at the airport where those IFR operations are conducted, unless the Administrator issues operations specifications allowing the use of weather observations taken at a location not at the airport where the IFR operations are conducted. The Administrator issues such operations specifications when, after investigation by the U.S. National Weather Service and the certificate-holding district office, it is found that the standards of safety for that operation would allow the deviation from this paragraph for a particular operation for which an air carrier operating certificate or operating certificate has been issued."

The operator's Operations Specifications, Section A010, "Aeronautical Weather Data" stated the following:

"(1) (1) The current and forecast weather for all departure and destination airports as well as en route weather for the areas being served, shall be obtained from the U.S. National Weather Service, a source approved the U.S. National Weather Service or a source that is approved by the Administrator."

The company's operations officer reported that since BAK did not have approved weather reporting once the tower was closed, an instrument flight to BAK was not authorized. The company did not have a waiver in its Operating Specifications that listed an alternate source of weather reporting for BAK.

FAR 135.267, "Flight Time Limitations and Rest Requirements: Unscheduled One- and Two-pilot Crews," states the following:

"(b) Except as provided in paragraph (c) of this section, during any 24 consecutive hours the total flight time of the assigned flight when added to any other commercial flying by that flight crewmember may not exceed-

(1) 8 hours for a flight crew consisting of one pilot; or

(2) 10 hours for a flight crew consisting of two pilots qualified under this part for the operation being conducted.

(c) A flight crewmember's flight time may exceed the flight time limits of paragraph (b) of this section if the assigned flight time occurs during a regularly assigned duty period of no more than 14 hours."

The operator reported that the pilot's 14 hours crew day started at 1300, and that the pilot's duty limit was 0300. The pilot exceeded the crew day limitation by 45 minutes.

Parties to the investigation included the Federal Aviation Administration, The New Piper Aircraft, and Textron Lycoming.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	25,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	August 28, 2001
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	May 24, 2002
Flight Time:	2378 hours (Total, all aircraft), 51 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N158GA
Model/Series:	PA-60	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	6006087961195
Landing Gear Type:	Retractable - Tricycle	**Seats:**	2
Date/Type of Last Inspection:	June 27, 2002 AAIP	**Certified Max Gross Wt.:**	5520 lbs
Time Since Last Inspection:	12.5 Hrs	**Engines:**	2 Reciprocating
Airframe Total Time:	6288 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	IO-520-S1A5
Registered Owner:	GRAND AIRE EXPRESS INC	**Rated Power:**	300 Horsepower
Operator:		**Operating Certificate(s) Held:**	None
Operator Does Business As:		**Operator Designator Code:**	GXPA

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Night
Observation Facility, Elevation:	IND,797 ft msl	**Distance from Accident Site:**	33 Nautical Miles
Observation Time:	02:55 Local	**Direction from Accident Site:**	315°
Lowest Cloud Condition:	Few / 600 ft AGL	**Visibility**	6 miles
Lowest Ceiling:	Broken / 8500 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots / 0 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	220°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	22°C / 22°C
Precipitation and Obscuration:	N/A - None - Fog		
Departure Point:	Cleveland, OH (CLE)	**Type of Flight Plan Filed:**	IFR
Destination:	Columbus, IN (BAK)	**Type of Clearance:**	IFR
Departure Time:	03:25 Local	**Type of Airspace:**	Class E

Airport Information

Airport:	Columbus Municipal Airport BAK	**Runway Surface Type:**	Asphalt
Airport Elevation:	656 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	23	**IFR Approach:**	ILS
Runway Length/Width:	6400 ft / 150 ft	**VFR Approach/Landing:**	Go around

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:		**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	On-ground
Total Injuries:	1 Fatal	**Latitude, Longitude:**	39.261665,-85.89611

Administrative Information

Investigator In Charge (IIC):	SILLIMAN, JIM
Additional Participating Persons:	Doug Tate; FAA-Indianapolis FSDO; Indianapolis, IN Greg Erikson; Lycoming; Wayne, IL George Hollingsworth; The New Piper Aircraft Company; Renton, VA
Original Publish Date:	December 30, 2003
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=55259