



National Transportation Safety Board Aviation Accident Final Report

Location:	Pittsburgh, PA	Accident Number:	IAD02FA018
Date & Time:	11/22/2001, 1305 EST	Registration:	N5UJ
Aircraft:	Gates Learjet 25B	Aircraft Damage:	Destroyed
Defining Event:		Injuries:	2 Fatal
Flight Conducted Under:	Part 91: General Aviation - Positioning		

Analysis

A commercial pilot, who observed the airplane during the takeoff attempt, stated that it used "lots" of runway, and that the nose lifted "too early and way too slow." The airplane "struggled" to get in the air, and it appeared tail heavy, with "extreme" pitch, about 45 degrees nose-up. It also appeared that the only thing keeping the nose up was ground effect. The airplane became airborne for "a very short time," then sank to the ground, and veered off the left side of the runway. The nose was "up" the whole time, the airplane never "rolled off on a wing," and the wings never wobbled. The engines were "really loud," like a "shriek," and engine noise was "continuous until impact." Another witness at a different location confirmed the extreme nose-high takeoff attitude and the brief time the airplane was airborne. It seemed odd to him that an airplane with that much power used so much runway. A runway inspection revealed no evidence of foreign objects or aircraft debris. Tire tracks from the airplane's main landing gear veered off the left side of the paved surface, at a 20-degree angle, about 3,645 feet from the runway's approach end. They continued for about 775 feet, then turned back to parallel the runway for another 650 feet, before ending about 50 feet prior to a chain link fence. There was no evidence that the nose wheel was on the ground prior to the fence. The fence, which was about 1,300 feet along the airplane's off-runway ground track and 200 feet to the left of the runway edge stripe, was bent over in the direction of travel. Ground scars began about 150 feet beyond the fence, and the main wreckage came to rest 300 feet beyond the beginning of the ground scars. The first officer advised a witness that he'd be making the takeoff; however, the pilot at the controls during the accident sequence could not be confirmed. When asked prior to the flight if he'd be making a high-performance takeoff, the captain replied that he didn't know. There was no evidence of mechanical malfunction.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The (undetermined) pilot-at-the-controls' early, and over rotation of the airplane's nose during the takeoff attempt, and his failure to maintain directional control. Also causal, was the captain's inadequate remedial action, both during the takeoff attempt and after the airplane departed the runway.

Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings

1. (C) ROTATION - PREMATURE - UNKNOWN
 2. (C) ROTATION - EXCESSIVE - UNKNOWN
 3. (C) DIRECTIONAL CONTROL - NOT MAINTAINED - UNKNOWN
 4. (C) REMEDIAL ACTION - INADEQUATE - PILOT IN COMMAND
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Occurrence #2: ON GROUND/WATER COLLISION WITH OBJECT
Phase of Operation: TAKEOFF - ROLL/RUN

Findings

5. OBJECT - FENCE
 6. (C) REMEDIAL ACTION - INADEQUATE - PILOT IN COMMAND
-

Occurrence #3: ON GROUND/WATER ENCOUNTER WITH TERRAIN/WATER
Phase of Operation: TAKEOFF - ROLL/RUN

Findings

7. TERRAIN CONDITION - GROUND

Factual Information

HISTORY OF FLIGHT

On November 22, 2001, at 1305 eastern daylight time, a Gates Learjet 25B, N5UJ, operated by Universal Jet Aviation, Inc., Boca Raton, Florida, was destroyed when it veered off runway 28 Left (28L) during an attempted takeoff at Pittsburgh International Airport (PIT), Pittsburgh, Pennsylvania. The certificated airline transport pilot and the certificated commercial pilot were fatally injured. Visual meteorological conditions prevailed, and an instrument flight rules flight plan had been filed for a flight to Boca Raton Airport (BCT), Boca Raton, Florida. The positioning flight was conducted under 14 CFR Part 91.

According to the president of Universal Jet Aviation, the pilots dropped off passengers at a general aviation fixed base operator (FBO) the previous evening and spent the night in Pittsburgh. On the morning of the accident, the pilots were anticipating a revenue flight to Washington, D.C., but the flight was cancelled, and they planned to return to their home base.

A witness to the accident, an employee of the fixed base operator, wrote:

"On Nov 22, 2001, a Lear 25 (N5UJ) taxied out from the FBO full of fuel. When an old airplane, especially an old Lear, takes off, I make sure I get to see it. I like to hear the noisy engines and watch them rocket out of the airport. On this morning, I stood on the airstairs of a chartered 737 on the ramp of the FBO.

As the plane began its takeoff roll, I noticed for an empty Lear 25; it was sure using lots of runway. The nose then came up off the ground but it seemed too early and way too slow. The airplane struggled to get in the air. It looked like the airplane was tail heavy because the pitch was extreme.

The plane started to veer to the left side of the runway because I could see the engines kicking up dust and dirt. The plane became airborne for a very short time, but it still struggled due to the extreme nose-up attitude. The plane then sank into the ground left of the runway, about [half] way down the runway. There was lots of smoke and a huge fire."

The witness was subsequently interviewed at the airport on November 24, 2001. He described the crew's arrival at the FBO, their discussions about a possible revenue flight, and the fueling of the airplane. When questioned about his flying experience, the witness responded that he was a commercial pilot with about 400 hours of flight experience, and ratings for airplane single engine land, multi-engine land, and instrument airplane. He also stated:

"I love to watch the old Learjets get up and go. I always make a point of going out to watch them take off.

For an empty Learjet, he was using a lot more runway than usual. The nose came up, and he was in an extreme nose-up attitude. I mean it was extreme. He was riding the tail and he did it for a long time. The nose was almost 45 degrees, even more, pitch up.

From the beginning of the takeoff roll, it just didn't seem to be going fast enough to take off. I don't know if it was because he was stalling the wing, because the nose was high. Very high. It was like he was doing a short field takeoff. Yoke back, and then as you lift off, you push the nose over, but he never pushed the nose over.

It was like he was stalling the wing, and the only thing keeping the nose up was the ground

effect.

When he veered off the runway, the nose was up the whole time. The airplane never rolled off on a wing. The wings never wobbled, and the nose never came down. I didn't realize he was off the side of the runway until all the dust and dirt started flying. I mean it was a lot."

When asked about the engine noise, the witness stated:

"It sounded like a regular old Learjet. I didn't hear anything weird, and there were no pops. It just seemed like a regular old Learjet. It didn't seem right, or quite loud enough at first, but when he got the nose up, it was loud.

The engines were loud, they were really loud. Like they were really trying to get it off the ground. It was like a shriek. When he went off the side of the runway, it was extremely, extremely loud, and the engine noise was continuous until impact.

You ever watch the Blue Angels? When the guy flies really low and slow down the runway with the nose really high in the air? When the only thing holding him up is thrust? That's what it looked like. That's what it reminded me of."

The witness estimated that the nose of the airplane lifted off the runway approximately 3,000 to 3,500 feet beyond the approach end of runway 28L.

The witness also stated that he had briefly spoken to both pilots when they paid for the fuel. He asked who would be flying the next leg, and the "younger pilot" said that he would be flying it. When the witness noted that the airplane was not carrying passengers, he asked the captain, "Would you be able to pull a high performance takeoff?" According to the witness, the captain responded, "I don't know."

In a written statement, an Air Force Staff Sergeant reported that he was performing security duty for the 171st Pennsylvania Air National Guard when he saw the accident airplane. According to the Sergeant:

"At approximately 1300 hrs, I noticed a white Learjet come off the taxiway onto 28L. My eyes were fixed on the aircraft because through the course of the day I had spent time watching the airplanes take off and land.

I witnessed the nose upon takeoff come off the ground, but from my angle the nose of the aircraft seemed to be very high and the tail seemed to be very low. At this point, I could see the thrust from the aircraft engines were causing a large cloud of dirt and debris. Years of being around aircraft told me this isn't normal.

The climbing of the aircraft still appeared to be tail heavy. Within seconds of witnessing the clouds of dirt that the engines of the aircraft were kicking up, the plane still appeared to be tail heavy.

From my position, it would appear the aircraft was approximately 100 ft. off the ground. At this point, I could see the aircraft starting to go down, and it went out of sight. Immediately a very large fireball and smoke appeared from the area of where I lost sight."

During a follow-up telephone interview, the Sergeant stated:

"He did a right turn off the taxiway, throttled up and went. It was a rolling takeoff. It seemed odd that an aircraft that small, with that much power, used so much runway. That guy used a lot of runway, the nose came up and the nose was very high and the tail was very low.

The nose was extremely high, and with the nose very high, the airplane went off to the left. The thrust kicked up this giant whirlwind of dust and dirt. Then, it looked like the airplane got airborne, but it was hard for me to judge exactly how high.

The airplane disappeared from view and then there was this huge ball of fire. I mean, it was huge, and it lasted a few seconds."

A preliminary review of air traffic control (ATC) tapes revealed that there were no radio transmissions from the airplane to report any problems or emergencies. ATC personnel described the radio conversations as "routine".

PILOT INFORMATION

The captain, age 41, held an airline transport pilot certificate with ratings for airplane single engine land, multi-engine land, and instrument airplane. He also held a flight instructor certificate with ratings for airplane single engine land, multi-engine land, and ground instructor. His most recent first class medical certificate was issued June 4, 2001.

The operator reported that the captain had 5,952 hours of flight experience, 3,030 hours of which were in Learjets. His most recent biennial flight review was completed September 6, 2001.

The first officer, age 34, held a commercial pilot certificate with ratings for airplane single engine land, multi-engine land, and instrument airplane. He also held a flight instructor certificate with ratings for airplane single engine land and instrument airplane. His most recent second-class medical certificate was issued January 24, 2000.

The operator reported that the first officer had 1,240 hours of flight experience, 300 hours of which were in Learjets. His most recent biennial flight review was completed October 6, 2000.

According to a witness, he saw the "older pilot" in the left seat. Neither pilot discussed the upcoming takeoff in the presence of the witness.

AIRCRAFT INFORMATION

The airplane was a 1972 Gates Learjet Model 25B. The airplane had accrued 10,004 hours of total flight time. The operator reported that the airplane was on an Approved Aircraft Inspection Program, and that a 600-hour inspection was completed on November 9, 2001. The airplane had accrued 12.8 hours since the inspection.

Interviews with FBO employees and a review of fuel records revealed that the airplane was serviced with 676 gallons of Jet A fuel, which completely filled the tanks. Immediately after the accident, the fuel truck was removed from service. A sample of fuel was drawn from the truck and tested. Specific gravity, and clear and brite tests were within the acceptable ranges per American Petroleum Institute specifications.

According to a representative of the Bombardier Aerospace (Learjet) Company, the distance between the two main landing gear on the Learjet 25B was 8 feet 3 inches.

METEOROLOGICAL INFORMATION

The weather recorded at Pittsburgh International Airport, at 1310, included clear skies with 10 miles of visibility, winds from 190 degrees at 7 knots, temperature 54 degrees F, dew point 21 degrees F, barometric pressure 30.04 inches Hg.

AIRPORT INFORMATION

Runway 28L was 11,500 feet long and 200 feet wide.

WRECKAGE AND IMPACT INFORMATION

The wreckage was examined at the site on November 22 and 23, 2001, and all major components were accounted for at the scene.

The Allegheny County Airport Authority inspected runway 28L and the grass apron on the south side of the runway immediately after the accident. The inspection revealed no evidence of foreign objects or aircraft debris.

Examination of the runway revealed tire tracks that crossed the left runway edge stripe 3,420 feet from the approach end. The tracks veered off the paved surface and onto the grass apron about 3,645 feet from the approach end.

Parallel tracks in the grass, about 8 feet wide, continued along a 260-degree magnetic heading. About 275 feet off the runway, they began to cross over a dirt road that paralleled runway 28. They crossed the road, and onto more grass, for a total distance of about 775 feet on the 260-degree heading. The tracks then turned back to a 280-degree heading for another 650 feet, and ended about 50 feet prior to an 8-foot chain link fence topped with three strands of barbed wire. There was no evidence of a center (nose wheel) track within the other tracks leading toward the fence. Bare patches along the tracks exhibited unblemished, deep tire-tread imprints.

The chain link fence was oriented approximately north-south, and was located at the edge of a depression about 30 feet deep and 500 feet across. The fence, which was about 1,300 feet along the airplane's off-runway ground track, and 200 feet to the left of the runway edge stripe, was bent over in the direction of travel, and the three strands of barbed wire were broken.

Ground scars in the depression began about 150 feet beyond the fence. The main wreckage came to rest 300 feet beyond the beginning of the ground scars, and about 1,925 feet beyond the point where the tire tracks departed the runway, and 2,150 feet from where they crossed the runway left-side stripe.

The two main landing gear, the nose gear, the landing gear struts, the wheels, tires, and the landing gear doors were scattered between the beginning of the ground scars and the main wreckage. Both wing tip tanks were destroyed and separated from the wings.

The airplane came to rest upright, facing about 360 degrees magnetic. The exterior was extensively damaged by fire. All exterior windows were exposed to heat, and were blackened and dimpled. Subsequent to the accident, rescue personnel had cut the pilot's windshield and the main cabin door.

The right wing was extensively damaged by fire. The wing was burned through at a point about 2 feet outboard the fuselage attach point. The flap, aileron, and spoiler were consumed by fire.

The left wing was intact. Impact and rescue personnel damaged the wing, flap, spoiler, and aileron.

The fuselage was open aft of the wing, and forward of the engines. The opening was about 2 feet wide, and extensively damaged by fire. All exposed surfaces at the point of the break were

fire-damaged, or completely melted away. The cockpit and cabin areas were damaged and blackened by heat, smoke, and ash.

The fuselage and tail section aft of the break lay flat on a descending slope of approximately 15 degrees. The vertical fin, rudder, horizontal stabilizer, and elevator were largely intact.

The left engine nacelle and pylon were intact but fire-damaged. The nacelle exhibited some aft buckling and some upward crush on the bottom. The right engine was separated from the pylon and lay on the ground. The nacelle was extensively damaged by impact and fire.

Control cable continuity was established from the cockpit to both wings. Rudder control continuity was established from the rudder pedals to the rudder. Elevator control cable continuity was established from the elevator forward to the cockpit area. The fuselage was lifted, and examination of the nose-wheel well revealed impact damage through the airframe to the control column. Examination of the damage established elevator control continuity from the elevator to the break in the column, and from the break to the yoke.

On February 20 and 21, 2002, the engines were examined under FAA supervision. According to the disassembly report:

With the gearbox removed, the left engine was rotated freely by hand. Two consecutive variable inlet guide vanes exhibited trailing edge dents. A heavily-scraped triangular piece of metal that appeared to be aluminum and had soot deposit on it, was removed from immediately aft the stage 1 compressor blades. There were scrapes and rubs through the soot deposit.

Stage 1 compressor blades all had light, shiny rubs on all trailing edge pressure faces. "Very light" nicks and dents were also visible on the trailing edges of most blades, in the direction of rotation. Eight blades, of random distribution, were bent opposite the direction of rotation. Four adjacent blades exhibited leading edge tip curling and tearing.

Six stage 2 blades exhibited leading edge tip curling opposite the direction of rotation. Six blades exhibited leading edge dents and tears opposite the direction of rotation.

Stage 3-7 blades exhibited some "very" light nicks and tip curling opposite the direction of rotation.

All stage 8 blades were "uniformly" curled opposite the direction of rotation. Tip curling was "light," and most noticeable towards the trailing edges.

All airfoils in the stage 1 vanes exhibited a "light shiny rub along approximately 1 inch of the leading edge, towards the outboard ends." Stages 2-7 did not exhibit any damage.

There was also no damage to the turbine section.

The right engine was rotated freely by hand, and there was no damage to the stage 1 compressor blades.

The leading edge and trailing edge tip corners of all stage 2 compressor blades were "heavily curled" opposite the direction of rotation. All but about 15 stage 3 blades exhibited "sharp but small" leading edge tip curling opposite the direction of rotation.

Stages 3-8 all exhibited some small blade tip curling opposite the direction of rotation.

Stages 1-6 vanes exhibited "mild bending" in the direction of rotation, while stage 7 vanes

exhibited no damage.

There was no damage to the turbine section.

MEDICAL AND PATHOLOGICAL INFORMATION

On November 23, 2001, autopsies were performed on both pilots by the Office of the Coroner, County of Allegheny, Pittsburgh, Pennsylvania. According to the Coroner's reports, both pilots succumbed to smoke inhalation and carbon monoxide poisoning.

Toxicological testing was performed by both the Coroner's Office, and the FAA's Toxicology and Accident Research Laboratory, Oklahoma City, Oklahoma, and confirmed the presence of carbon monoxide.

SURVIVAL ASPECTS

According to the airport's operations logbook, at 1306, the crash phone alarm indicated an accident on runway 28L. At 1310, airport fire and rescue personnel were reported cutting through a fence to access the accident scene. At 1313, the flames were reported extinguished.

According to Coroner Office records, both pilots were found in the cabin area, near the cabin door. The pilot identified as the captain was found next to the cabin door. The first officer was found on the right side of the cabin, slightly forward of the captain.

An FAA investigator subsequently sat in the left cockpit seat, and attempted an emergency egress. The inspector was about 15 pounds lighter and 3 inches shorter than the captain. The inspector reported that during the egress from the cockpit to the cabin door, he had to take three breaths of air.

There was no evidence of smoke hoods in the airplane, nor were they required. The flight crew masks were normally stowed behind the pilots' seats. After the accident, captain's oxygen mask was found between his seat and the center pedestal, and the first officer's mask was found on his seat, partially underneath some aircraft manuals.

During an interview at the scene, an airport firefighter stated that upon his arrival, the main cabin door handle was in the locked position, and the handle had not been actuated. The firefighter actuated the handle, but could not immediately open the door. The upper cabin door was then cut along the top and sides with a rescue saw, and the door "fell open."

The firefighter said that after the fire was extinguished, there was still electrical power to the airplane. The pilot's window was cut open with a rescue saw, and he attempted to shut off electrical power by pulling circuit breakers and actuating switches through the window. When those attempts failed, he entered the cockpit through the main cabin door.

RECORDER INFORMATION

There was no flight data recorder onboard the accident airplane. The cockpit voice recorder was recovered, and subsequently forwarded to the Safety Board Recorders Laboratory; however, there were no audio signals on the tape.

According to the recorder specialist's factual report, the recorder was returned to the manufacturer, where it tested "adequately" on all four channels. A section of recording tape was also sent to the manufacturer, and verified to be what would have been typically installed. That section of tape was subsequently tested at the Safety Board's audio laboratory, and found to carry a "strong" audio signal on all channels.

ADDITIONAL INFORMATION

On November 25, 2001, the wreckage was released to a representative of the owner's insurance company.

Pilot Information

Certificate:	Airline Transport	Age:	41, Male
Airplane Rating(s):	Multi-engine Land	Seat Occupied:	
Other Aircraft Rating(s):	None	Restraint Used:	
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine	Toxicology Performed:	Yes
Medical Certification:	Class 1 Valid Medical--no waivers/lim.	Last Medical Exam:	06/04/2001
Occupational Pilot:		Last Flight Review or Equivalent:	09/06/2001
Flight Time:	5952 hours (Total, all aircraft), 3030 hours (Total, this make and model), 46 hours (Last 90 days, all aircraft), 24 hours (Last 30 days, all aircraft)		

Co-Pilot Information

Certificate:	Commercial	Age:	34, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	
Other Aircraft Rating(s):	None	Restraint Used:	
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	Airplane Single-engine; Instrument Airplane	Toxicology Performed:	Yes
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim.	Last Medical Exam:	01/24/2000
Occupational Pilot:		Last Flight Review or Equivalent:	10/06/2001
Flight Time:	1240 hours (Total, all aircraft), 300 hours (Total, this make and model), 102 hours (Last 90 days, all aircraft), 27 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	Gates Learjet	Registration:	N5UJ
Model/Series:	25B	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	088
Landing Gear Type:	Retractable - Tricycle	Seats:	
Date/Type of Last Inspection:	11/09/2001, AAIP	Certified Max Gross Wt.:	15000 lbs
Time Since Last Inspection:	12.8 Hours	Engines:	2 Turbo Fan
Airframe Total Time:	10004.7 Hours	Engine Manufacturer:	General Electric
ELT:		Engine Model/Series:	6J610-6
Registered Owner:	Universal Jet Aviation	Rated Power:	2950 lbs
Operator:	Universal Jet Aviation	Air Carrier Operating Certificate:	On-demand Air Taxi (135)

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	PIT	Observation Time:	1304 EST
Distance from Accident Site:		Direction from Accident Site:	
Lowest Cloud Condition:	Clear	Temperature/Dew Point:	12° C / 4° C
Lowest Ceiling:	None	Visibility	10 Miles
Wind Speed/Gusts, Direction:	7 knots, 190°	Visibility (RVR):	
Altimeter Setting:	30.04 inches Hg	Visibility (RVV):	
Precipitation and Obscuration:			
Departure Point:	Pittsburgh, PA (PIT)	Type of Flight Plan Filed:	IFR
Destination:	Boca Raton, FL (BCT)	Type of Clearance:	IFR
Departure Time:	EST	Type of Airspace:	Unknown

Airport Information

Airport:	Pittsburg International (PIT)	Runway Surface Type:	Concrete
Airport Elevation:	1204 ft	Runway Surface Condition:	Dry
Runway Used:	28L	IFR Approach:	None
Runway Length/Width:	11500 ft / 200 ft	VFR Approach/Landing:	None

Wreckage and Impact Information

Crew Injuries:	2 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	N/A	Aircraft Fire:	On-Ground
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 Fatal	Latitude, Longitude:	44.683333, -73.516667

Administrative Information

Investigator In Charge (IIC): Brian C Rayner **Adopted Date:** 08/26/2003

Additional Participating Persons: James Tidball; Bombardier Aerospace (Learjet); Wichita, KS
Mark Taylor; G.E. Aircraft Engines; Lynn, MA
Mike Saraco; Allegheny County Airport Authority; Pittsburgh, PA
Michael Shannon; FAA/FSDO; Allegheny, PA

Publish Date:

Investigation Docket: NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov, or at 800-877-6799. Dockets released after this date are available at <http://dms.nts.gov/pubdms/>.

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report.