# National Transportation Safety Board
# Aviation Accident Final Report

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| **Location:** | Schenectady, NY | **Accident Number:** | IAD01LA022 |
| **Date & Time:** | 01/04/2001, 1547 EST | **Registration:** | N435JL |
| **Aircraft:** | Learjet 35 | **Aircraft Damage:** | Substantial |
| **Defining Event:** | | **Injuries:** | 3 None |
| **Flight Conducted Under:** | Part 91: General Aviation - Positioning - Air Medical (Medical Emergency) | | |

## Analysis

The captain stated that prior to departure the flight controls were tested, with no abnormalities noted, and the takeoff trim was set to the "middle of the takeoff range," without referring to any available pitch trim charts. During the takeoff roll, the pilot attempted to rotate the airplane twice, and then aborted the takeoff halfway down the 4,840 foot long runway, because the controls "didn't feel right." The airplane traveled off the departure end of the runway and through a fence, and came to rest near a road. The pilot reported no particular malfunction with the airplane. Examination of the airplane revealed that the horizontal stabilizer was positioned at -4.6 degrees, the maximum nose down limit within the takeoff range. The horizontal stabilizer trim and elevator controls were checked, and moved freely through their full ranges of travel. According to the AFM TAKEOFF TRIM C.G. FUNCTION chart, a horizontal stabilizer trim setting of -7.2 was appropriate with the calculated C.G. of 20% MAC. Additionally, Learjet certification testing data stated that the pull force required at a trim setting of -6.0 degrees, the "middle of the takeoff range", was 33 pounds. With the trim set at the full nose down position (-1.7 degrees), 132 pounds of force was required.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's improper trim setting, which resulted in a runway overrun and impact with a fence.

## Findings

Occurrence #1: OVERRUN
Phase of Operation: TAKEOFF - ABORTED

Findings
1. (C) TRIM SETTING - IMPROPER - PILOT IN COMMAND
2. ABORT ABOVE V1 - PERFORMED - PILOT IN COMMAND
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Occurrence #2: ON GROUND/WATER COLLISION WITH OBJECT
Phase of Operation: TAKEOFF - ABORTED

Findings
3. OBJECT - FENCE

## Factual Information

HISTORY OF FLIGHT

On January 4, 2001, at 1547 eastern standard time, a Learjet 35, N435JL, was substantially damaged during an aborted takeoff at the Schenectady County Airport (SCH), Schenectady, New York. The certificated airline transport pilot, commercial pilot, and passenger were not injured. Visual meteorological conditions prevailed, and an IFR flight plan was filed for the air response medical flight conducted under 14 CFR Part 91.

In a statement, the captain wrote:

"After completing all required checklist items and a takeoff briefing, we proceeded onto the active runway. A standing start was performed. After takeoff power was set, the brakes were released and a routine takeoff roll followed. As the Learjet 35 accelerated down the runway all speed callouts were made. At the V1 call my hand was removed from the thrust levers and placed on the control yolk. When the ROTATE call was made, I verified the airspeed and began to ease back on the control yolk. The nose of the airplane did not rise. I released the back pressure and pulled again. There was no response. The decision to abort the take off was made.

The aborted takeoff procedure commenced and max braking was used to try to stop the aircraft on the remaining runway. The aircraft rolled off the end of the runway and dropped off a small embankment. The aircraft continued to slide into a chain link fence where it came to rest near a road.

The crew then shut down the engines and batteries and evacuated the aircraft. Emergency vehicles arrived within minutes."

In a telephone interview, the captain reported the flight was destined for LaGuardia Airport (LGA), New York, to pick up a medical patient. He stated that "everything seemed normal" during taxi, and when the flight controls were tested, no abnormalities were noted. The captain stated that he attempted to rotate the airplane at 125 knots; however, it did not respond to the control inputs. The captain released the back pressure, and attempted to rotate again with no success. When the airplane was about half-way down the runway, the captain decided to abort the takeoff, and he applied maximum braking. The airplane departed the end of the runway, impacted a snow bank, and went through a fence before coming to rest near a road.

The captain estimated that the airplane reached a maximum speed of 140 knots before the takeoff was aborted. He reported that the flaps and pitch trim were both set to their respective "takeoff positions," prior to departure. Additionally, the captain stated that during the attempted rotation, he was able to move the control yoke to its full aft position; however, the yoke did not have its "normal resistance." The captain did not report any particular mechanical malfunction of the airplane.

In subsequent interviews, the captain stated that the flight crew did not perform any weight and balance calculations for the airplane. He reported that they knew the airplane was loaded within CG and weight limits "just by looking at it," without any reference to specific charts. Additionally, the flight crew did not compute any takeoff or landing distances.

When asked where the pitch trim was selected to prior to takeoff, the captain stated, "in the

middle of the takeoff range." He reported that the available pitch trim chart was not referred to. The captain then refused to answer any further questions.

In a statement, the first officer wrote:

"After starting engines, we contacted ground and were assigned RW 28. After double-checking the performance figures, RW 28 was found to be more than adequate. During the taxi, we executed the appropriate checklists and found all items to check out good.

We were asked to hold short of RW 28 and performed a standing start. The brakes are held and the aircraft does not move until takeoff power is set. After brake release, the aircraft quickly accelerated down the runway. All standard call outs were made.

At rotation speed, I called out, 'Rotate.' The captain pulled the control yoke back and the nose would not lift. He released pressure momentarily and then pulled back again even farther, as far as it would go. The nose still would not lift off the ground. He then quickly retarded both throttles, extended the spoilers, and applied maximum braking.

We rolled off the end of the runway at approximately 20 knots and slid down the hill through the fence. After the aircraft came to rest, the flight nurse quickly opened the door and we exited the aircraft and assembled at a safe distance away from the aircraft."

In a telephone interview with the first officer, he stated that he was the non-flying pilot during the accident, and did not touch the flight controls. He reported that during the takeoff roll, he heard the captain say that the takeoff "didn't feel right." The captain then aborted the takeoff about half-way down the runway, and the airplane continued off the departure end.

AIR TRAFFIC CONTROL

In a written statement, an air traffic ground controller on duty at the time of the accident stated that the crew was given instructions to taxi to runway 28. According to the controller, the crew appeared to be unfamiliar with the airport when they missed a left turn in the normal taxi route. The crew was then given progressive taxi instructions to runway 28.

The tower controller observed the airplane during its takeoff roll. He stated that the airplane did not appear to rotate, and slowed slightly before going off the departure end of runway 28.

FLIGHT CREW INFORMATION

The captain held an airline transport pilot certificate with a rating for airplane multi-engine land, and commercial privileges for airplane single engine land. He also held a flight instructor certificate, with ratings for airplane single engine land and instrument airplane. Additionally, the captain received his Learjet type rating on November 9, 1999. The captain reported his total flight experience as 2,570 hours, 1,065 of which were in the Learjet 35. He also reported that he accumulated about 110 hours in the Learjet 35 in the last 90 days.

The captain's most recent Federal Aviation Administration (FAA) first class medical certificate was issued on September 29, 2000, with no restrictions.

The captain was hired by the company in August of 1998, as a first officer. He completed upgrade training in October 1999 at Flight Safety International. His most recent competency check was performed on May 23, 2000, during which he received a "satisfactory" for all maneuvers and procedures demonstrated.

The first officer held a commercial pilot certificate with ratings for airplane single and

multiengine land and instrument airplane. He also held a flight instructor certificate, with ratings for airplane single engine land, multiengine land, and instrument airplane. The first officer's most recent FAA first class medical certificate was issued on February 2, 2000, with a limitation to wear corrective lenses.

The first officer reported 1,600 hours of total flight experience, and 497 hours in make and model.

WRECKAGE INFORMATION

The airplane was examined at the accident site under the supervision of an FAA inspector. It was noted that both wings sustained substantial damage, and that the landing gear nose wheel was torn off the airplane. Examination of the wing flaps and flap indicator revealed the flaps were selected to 8 degrees. The spoilers were extended and no snow or ice contamination was observed on the airplane. Additionally, tire marks indicating "substantial braking" were observed on the runway, beginning 1,000 feet from the departure end of the 4,840-foot-long runway.

A measurement of the horizontal stabilizer position indicated -4.6 degrees, which was the maximum nose down limit within the takeoff range. The horizontal stabilizer trim was checked and moved freely through its full range of travel. The takeoff trim annunciator light was tested and illuminated at its appropriate limits of -4.6 degrees and -7.4 degrees.

Elevator travel was checked and moved smoothly and freely throughout its full range of travel, 15.4 degrees up and down from the neutral position.

Both airspeed indicators were checked for leaks and accuracy, and no malfunctions were observed. The indicators were within 1-2 knots of each other.

COCKPIT VOICE RECORDER

The cockpit voice recorder (CVR) was sent to the Safety Board's Vehicle Recorders Laboratory for readout. According to the Group Chairman's Factual Report, the recording consisted of four channels of fair to unusable quality audio information. Two channels contained the captain and first officer audio information, and two channels contained no usable audio information. All of the conversation heard on the two operative channels pertained to a flight from Colorado to Minneapolis.

AIRCRAFT INFORMATION

According to the FAA inspector, the most recent maintenance performed on the airplane was on January 3, 2001, which consisted of a transponder check. Examination of the maintenance records revealed the airplane's most recent inspection was performed on December 11, 2000, and the airplane had flown 11.7 hours since then.

ADDITIONAL INFORMATION

A calculation of the estimated weight and balance of the airplane was performed. The takeoff weight of the airplane was approximately 15,495 pounds, and the center of gravity was 20% MAC, which was within limits according to the Airplane Flight Manual.

A takeoff distance of 4,100 feet was calculated using the TAKEOFF DISTANCE chart in the Airplane Flight Manual.

A review of Learjet certification testing data revealed that, with the trim set at the nose down

limit (-1.7 degrees), at a C.G. of 16.6% MAC, and a flap setting of 8 degrees, the pull force required to lift the nose of the airplane was 132 pounds. With the trim set at the nose up limit (-8.75 degrees), a push force of 30 pounds was required. Additionally, 23 pounds of force was required per degree of trim change, and a calculation of the pull force required at -6.0 degrees, the "middle of the takeoff range," determined it was 33 pounds.

According to the operator's Director of Operations, the company's manual and operations specifications did not specifically address the trim system, and company pilots were instructed to use the Learjet Crew Checklist and the Airplane Flight Manual for reference. However, company pilots were not required to set the trim according to the pitch trim setting charts in the Airplane Flight Manual, or Learjet Checklist. They were instructed to set the trim in the middle of the takeoff range, and assure that the takeoff trim annunciator light did not illuminate.

Additionally, company pilots were required to sign a FLIGHT LOAD MANIFEST prior to any flight, which included weight and balance, and runway distance information. Flights conducted under 14 CFR Part 135 required that weight and balance be performed, and takeoff and landing distances be calculated. Flights conducted under 14 CFR Part 91 required only that maintenance checks be complied with.

A review of the operator's records revealed that a FLIGHT LOAD MANIFEST was not signed by the captain prior to the accident flight.

According to the AFM TAKEOFF TRIM C.G. FUNCTION chart in the Airplane Flight Manual, a horizontal stabilizer trim setting of -7.2 degrees was appropriate with a C.G. of 20% MAC. A "quick reference" chart, listing the same values, was also available on the TAXI AND BEFORE TAKEOFF checklist.

## WEATHER INFORMATION

The weather reported at an airport 8 miles southeast of SCH, at 1451, was: wind from 270 degrees at 4 knots, visibility 2 statute miles with light snow and mist, few clouds at 100 feet, ceiling 2,300 feet broken, temperature 28 degrees Fahrenheit, dew point 25 degrees Fahrenheit.

At 1551, the weather was: winds from 270 degrees at 7 knots, visibility 10 statute miles, ceiling 3,400 feet broken, temperature 28 degrees Fahrenheit, dew point 23 degrees Fahrenheit.

## Pilot Information

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| **Certificate:** | Airline Transport; Flight Instructor | **Age:** | 26, Male |
| **Airplane Rating(s):** | Multi-engine Land; Single-engine Land | **Seat Occupied:** | Left |
| **Other Aircraft Rating(s):** | None | **Restraint Used:** | Seatbelt, Shoulder harness |
| **Instrument Rating(s):** | Airplane | **Second Pilot Present:** | Yes |
| **Instructor Rating(s):** | Airplane Single-engine; Instrument Airplane | **Toxicology Performed:** | No |
| **Medical Certification:** | Class 1 Valid Medical--no waivers/lim. | **Last Medical Exam:** | 09/29/2000 |
| **Occupational Pilot:** | | **Last Flight Review or Equivalent:** | 11/29/2000 |
| **Flight Time:** | 2570 hours (Total, all aircraft), 1065 hours (Total, this make and model), 1662 hours (Pilot In Command, all aircraft), 117 hours (Last 90 days, all aircraft), 36 hours (Last 30 days, all aircraft) | | |

## Co-Pilot Information

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| **Certificate:** | Flight Instructor; Commercial | **Age:** | 27, Male |
| **Airplane Rating(s):** | Multi-engine Land; Single-engine Land | **Seat Occupied:** | Right |
| **Other Aircraft Rating(s):** | None | **Restraint Used:** | Seatbelt, Shoulder harness |
| **Instrument Rating(s):** | Airplane | **Second Pilot Present:** | Yes |
| **Instructor Rating(s):** | Airplane Multi-engine; Airplane Single-engine; Instrument Airplane | **Toxicology Performed:** | No |
| **Medical Certification:** | Class 1 Valid Medical--w/ waivers/lim. | **Last Medical Exam:** | 02/02/2000 |
| **Occupational Pilot:** | | **Last Flight Review or Equivalent:** | 12/09/2000 |
| **Flight Time:** | 1600 hours (Total, all aircraft), 497 hours (Total, this make and model), 900 hours (Pilot In Command, all aircraft), 32 hours (Last 90 days, all aircraft), 0 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft) | | |

## Aircraft and Owner/Operator Information

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| **Aircraft Manufacturer:** | Learjet | **Registration:** | N435JL |
| **Model/Series:** | 35 | **Aircraft Category:** | Airplane |
| **Year of Manufacture:** | | **Amateur Built:** | No |
| **Airworthiness Certificate:** | Normal | **Serial Number:** | 35-018 |
| **Landing Gear Type:** | Retractable - Tricycle | **Seats:** | 8 |
| **Date/Type of Last Inspection:** | 12/11/2000, AAIP | **Certified Max Gross Wt.:** | 18300 lbs |
| **Time Since Last Inspection:** | 11 Hours | **Engines:** | 2 Turbo Fan |
| **Airframe Total Time:** | 16302 Hours | **Engine Manufacturer:** | Garrett |
| **ELT:** | Installed, not activated | **Engine Model/Series:** | TFE 731 |
| **Registered Owner:** | Air Response North Inc. | **Rated Power:** | 3500 lbs |
| **Operator:** | Air Response North Inc. | **Air Carrier Operating Certificate:** | On-demand Air Taxi (135) |

## Meteorological Information and Flight Plan

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| **Conditions at Accident Site:** | Visual Conditions | **Condition of Light:** | Day |
| **Observation Facility, Elevation:** | ALB, 285 ft msl | **Observation Time:** | 1551 EST |
| **Distance from Accident Site:** | 8 Nautical Miles | **Direction from Accident Site:** | 300° |
| **Lowest Cloud Condition:** | | **Temperature/Dew Point:** | -2°C / -5°C |
| **Lowest Ceiling:** | Broken / 3400 ft agl | **Visibility** | 10 Miles |
| **Wind Speed/Gusts, Direction:** | 7 knots, 270° | **Visibility (RVR):** | |
| **Altimeter Setting:** | 29.88 inches Hg | **Visibility (RVV):** | |
| **Precipitation and Obscuration:** | | | |
| **Departure Point:** | Schenectady, NY (SCH) | **Type of Flight Plan Filed:** | IFR |
| **Destination:** | New York, NY (LGA) | **Type of Clearance:** | IFR |
| **Departure Time:** | 1630 EST | **Type of Airspace:** | Class D |

## Airport Information

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| **Airport:** | SCHENECTADY COUNTY AIRPORT (SCH) | **Runway Surface Type:** | Asphalt |
| **Airport Elevation:** | 378 ft | **Runway Surface Condition:** | Dry |
| **Runway Used:** | 28 | **IFR Approach:** | None |
| **Runway Length/Width:** | 4840 ft / 150 ft | **VFR Approach/Landing:** | None |

## Wreckage and Impact Information

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| **Crew Injuries:** | 2 None | **Aircraft Damage:** | Substantial |
| **Passenger Injuries:** | 1 None | **Aircraft Fire:** | None |
| **Ground Injuries:** | N/A | **Aircraft Explosion:** | None |
| **Total Injuries:** | 3 None | **Latitude, Longitude:** | 42.852222, -73.928611 |

## Administrative Information

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| **Investigator In Charge (IIC):** | Jill M Andrews | **Adopted Date:** | 09/10/2002 |
| **Additional Participating Persons:** | Darrell Sodergren; FAA/Albany FSDO; Albany, NY<br>Jim Tidball; Learjet; Witchita, KS | | |
| **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.ntsb.gov/pubdms/. | | |

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