



# National Transportation Safety Board Aviation Accident Final Report

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|--------------------------------|--------------------------------------|-------------------------|------------|
| <b>Location:</b>               | Juneau, AK                           | <b>Accident Number:</b> | ANC02FA028 |
| <b>Date &amp; Time:</b>        | 04/10/2002, 1625 AKD                 | <b>Registration:</b>    | N686Q      |
| <b>Aircraft:</b>               | Beech E18S                           | <b>Aircraft Damage:</b> | Destroyed  |
| <b>Defining Event:</b>         |                                      | <b>Injuries:</b>        | 1 Fatal    |
| <b>Flight Conducted Under:</b> | Part 91: General Aviation - Personal |                         |            |

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## Analysis

The certificated airline transport pilot was departing on a 14 CFR Part 91 personal flight. The purpose of the flight was to deliver a load of wooden roofing shakes to a friend's remote lodge. Witnesses reported that just after takeoff, as the airplane climbed to about 200 to 300 feet above the ground, the airplane abruptly pitched up about 70 degrees, and drifted to the right. The airplane continued to turn to the right as the nose of the airplane lowered momentarily. As the airplane flew very slowly the landing gear was extended. The nose of the airplane pitched up again, the right wing dropped, and the airplane descended. One witness described the descent as: "The wings rocked back and forth as it descended, like a card in the wind, with the nose of the airplane slightly higher." The airplane impacted shallow water in an area of tidal mud flats. A postaccident investigation revealed that the estimated gross weight of the airplane at takeoff was 11,500.8 pounds, 1,400.8 pounds in excess of the airplane's maximum takeoff gross weight. The airplane's center of gravity could not be calculated due to the fact that the exact location/station of the cargo could not be determined. Examination of the airplane revealed no evidence of any preimpact mechanical anomalies.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's excessive loading of the airplane that precipitated an inadvertent stall/mush during the initial climb.

## Findings

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

### Findings

1. AIRCRAFT PERFORMANCE - DETERIORATED
  2. (C) AIRCRAFT WEIGHT AND BALANCE - EXCEEDED - PILOT IN COMMAND
  3. (C) AIRSPEED - NOT MAINTAINED - PILOT IN COMMAND
  4. STALL/MUSH - INADVERTENT - PILOT IN COMMAND
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Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER  
Phase of Operation: DESCENT - UNCONTROLLED

### Findings

5. TERRAIN CONDITION - MUDDY

## Factual Information

### HISTORY OF FLIGHT

On April 10, 2002, about 1625 Alaska daylight time, a Beech E18S airplane, N686Q, was destroyed when it impacted terrain following a loss of control during initial takeoff climb from the Juneau International Airport, Juneau, Alaska. The airplane was being operated as a visual flight rules (VFR) cross-country personal flight under Title 14, CFR Part 91, when the accident occurred. The airplane was owned by Aleutian Air Limited, of Juneau. The certificated airline transport pilot, the sole occupant, received fatal injuries. Visual meteorological conditions prevailed, and no flight plan was filed. The flight originated about 1620 from the Juneau International Airport.

During a brief on-scene conversation with the National Transportation Safety Board (NTSB) investigator-in-charge (IIC) on April 11, a personal acquaintance of the accident pilot related that the purpose of the flight was to deliver a load of wooden roofing shakes to a friend's remote lodge. He said that the accident flight was the pilot's second load of roofing shakes that day to the lodge. Two individuals, who helped the accident pilot load the airplane prior to the accident flight, estimated that about 50 bundles of roofing shakes were loaded on board, but were unsure exactly how many bundles were ultimately loaded. Both individuals said that the airplane was completely full, and that the retaining straps on some of the shingle bundles were cut to allow individual shingles to fill as much of the cabin as possible.

The accident was witnessed by a number of individuals located at various locations around the Juneau International Airport. The witnesses consistently reported that the airplane departed runway 08, and climbed to about 200 to 300 feet above the ground. During the climb, as the airplane approached the departure end of the runway, the nose of the airplane abruptly pitched up about 70 degrees, and drifted to the right. The witnesses added that the airplane continued to turn to the right as the nose of the airplane lowered momentarily. As the airplane flew very slowly, in a southerly direction, the landing gear was extended. The nose of the airplane pitched up again, the right wing dropped, and the airplane descended. One witness described the descent as: "The wings rocked back and forth as it descended, like a card in the wind, with the nose of the airplane slightly higher." The airplane descended into an area of tidal mud flats, and subsequently collided with shallow ocean water.

### CREW INFORMATION

The pilot held an airline transport pilot certificate with an airplane multiengine land rating, and a multiengine sea rating, limited to Visual Flight Rules (VFR) operations only. He also held commercial pilot privileges with single-engine land, and sea ratings. The pilot held a flight instructor certificate with airplane single-engine, and multiengine land ratings. The most recent first-class medical certificate was issued to the pilot on January 4, 2002, and contained the limitation that he wear corrective lenses. An additional limitation noted on the medical certificate read: " Not valid for any class after July 31, 2002."

No personal flight records were located for the pilot. On the pilot's medical certificate application, dated January 4, 2002, the pilot indicated that his total aeronautical experience consisted of 22,820 hours, of which 600 were accrued in the previous 6 months.

A review of available company records that were provided by the pilot's part-time employer indicated that the pilot had accrued about 22,000 hours of flight time, and 2,000 hours of

night flight. The document provided by the employer was dated June 10, 2001.

#### AIRCRAFT INFORMATION

No aircraft records or log books were located for the accident airplane. Various acquaintances of the accident pilot reported to the NTSB IIC that a good friend of the accident pilot, who was also an experienced aircraft mechanic, routinely provided maintenance services on the accident airplane. The acquaintances added that the accident pilot stored his maintenance records in a large file cabinet located in a leased hangar where the airplane was routinely housed and maintained.

On April 12, with the permission of the hangar's owner, the NTSB IIC, accompanied by an FAA operations inspector from the Juneau Flight Standards District Office, as well as an officer from the Juneau Police Department, examined the file cabinet where the records were reportedly stored. The file cabinet was found empty, with the exception of empty hanging file folders.

On April 12, the NTSB IIC conducted a brief interview with the aircraft mechanic who routinely provided maintenance services on the accident airplane. When asked by the NTSB IIC about the location of the accident airplane's log books and historical records, the mechanic reported that all of the airplane's records were on board the airplane at the time of the accident.

The NTSB IIC conducted interviews with personnel from the Juneau Fire Department, Juneau Police Department, and other rescue personnel who initially responded to the accident scene. None of the personnel interviewed reported seeing anything in the airplane wreckage that appeared to be aircraft records. A review of photos taken by rescue personnel failed to show anything that resembled aircraft records.

#### METEOROLOGICAL INFORMATION

The closest official weather observation station is located at the Juneau International Airport. On April 10, 2002, at 1638, a special weather observation was reporting, in part: Wind, 240 degrees at 8 knots; visibility, 10 statute miles; ceiling and clouds, clear; temperature, 42 degrees F; dew point, 26 degrees F; altimeter, 29.73 in Hg.

#### COMMUNICATIONS

Review of the air-ground radio communications tapes maintained by the FAA at the Juneau International Airport, revealed the pilot contacted the Juneau Air Traffic Control Tower (ATCT), about 1610. According to FAA air traffic control transcripts, the pilot stated: "Juneau Tower, eight six Quebec, ready at alpha." The ATCT specialist on duty responded by saying: "November.. hu.. Beech...eight six Quebec, Juneau Tower, runway eight at Alpha, cleared for takeoff." The pilot said: Thank you, eight six Quebec." No further radio contact from the accident airplane was received.

A transcript of the air-ground radio communications between the pilot, and the Juneau ATCT specialist on duty, is included in the public docket of this report.

#### AERODROME INFORMATION

The Juneau International Airport is equipped with a single hard-surface runway on a 080 to 260 degree magnetic orientation. Runway 08 is 8,456 feet long by 150 feet wide. The airport elevation is 19 feet msl.

## WRECKAGE AND IMPACT INFORMATION

The NTSB IIC examined the airplane wreckage at the accident site on April 11. On April 11 and 12, the wreckage was moved by helicopter to a hangar located at the Juneau International Airport. After the airplane was recovered, the NTSB IIC, and a Federal Aviation Administration (FAA) airworthiness inspector from the Juneau Flight Standards District Office (FSDO), conducted a detailed examination of the airplane wreckage.

The airplane impacted shallow water in an area of tidal mud flats, about one-half mile south of the Juneau International Airport. Prior to the NTSB IIC's arrival on April 11, the airplane wreckage had been subjected to two tidal cycles, which completely submerged the airplane. The longitudinal axis of the fuselage was oriented on a magnetic heading of approximately 010 degrees. (All heading/bearings noted in this report are oriented toward magnetic north.)

All of the airplane's major components were found at the main wreckage area. The left wing remained attached to its fuselage attach point, and exhibited extensive span wise leading edge aft crushing. The left wing was lying flat on the tidal mud flats. The right wing was torn from the fuselage attach points, and was orientated with the leading edge down, on about a 45 degree angle. The wing carry-through was broken, and crushed in an aft direction.

The left main landing gear was collapsed, and pushed aft. The right main landing gear was in the down and locked position.

The nose, cockpit area, and a large portion of the passenger/cargo area were destroyed by impact forces.

The flight control surfaces remained connected to their respective attach points. Due to the impact damage, the flight controls could not be moved by their respective control mechanisms, but the continuity of the flight control cables was established to the cabin/cockpit area. The wing flaps were not extended.

The elevator trim tab was extended to the trailing edge up limit (nose down). Rescue personnel who initially responded to the accident scene reported that the trim tab, upon their arrival, was in the trailing edge up position. A review of rescue personnel photos, taken shortly after arriving on scene, confirmed that the trim tab position did not move throughout the rescue attempt. The elevator trim tab actuator and rod was found extended 14.75 inches. According to the manufacturer, this trim tab actuator and rod extension corresponds to the maximum 18 degrees tab up (nose down) setting. The normal range of trim tab extension is from 18 degrees tab up, to 13 degrees tab down.

Both propeller hubs remained attached to their respective engine crankshaft flanges.

All three of the left engine's propeller blades remained attached to the propeller hub, but were loose in the hub. The three propeller blades had extensive torsional twisting, and extensive aft bending.

Two of the three right engine propeller blades remained attached to the propeller hub, but were loose in the hub. The two remaining propeller blades exhibited extensive torsional twisting, and extensive aft bending. Rescue personnel who initially responded to the accident scene, reported the separated right engine propeller blade was discovered about 100 feet to the right and aft of the main wreckage site. The propeller blade was then carried to the main wreckage site. The third propeller blade also exhibited about 30 degree aft bending about 12 inches outboard from the hub attach fitting, with substantial torsional twisting.

Both the left and right engine exhaust tubes were crushed and folded, producing sharp creases that were not cracked or broken along the creases.

#### MEDICAL AND PATHOLOGICAL INFORMATION

A postmortem examination of the pilot was conducted under the authority of the Alaska State Medical Examiner, 5700 E. Tudor, Anchorage, Alaska, on April 11, 2002. The examination revealed that the cause of death was massive blunt force injuries.

A toxicological examination was conducted by the FAA's Civil Aero Medical Institute (CAMI) on May 23, 2002, and was negative for alcohol or drugs.

#### TESTS AND RESEARCH

On April 12, a Federal Aviation Administration (FAA) operations inspector from the Juneau Flight Standards District Office, interviewed an employee at the lumber yard where the roofing shakes were purchased. The lumber yard employee provided the FAA inspector with an invoice for 150 "hand split shakes." The lumber yard employee added that the average weight of each bundle of roofing shakes is about 56 pounds. The employee reported that after hearing about the accident, he received a call from the lodge owner indicating that 73 bundles of roofing shakes were delivered by the accident pilot on his first trip. The lodge owner then placed an additional order for 77 bundles "to replace the ones lost in the accident."

According to the Beech 18 Flight Manual, the maximum takeoff gross weight of the airplane is 9,700 pounds. The accident airplane had been modified to allow operations at a maximum gross weight of 10,100 pounds. The airplane's most current Weight/Balance and Equipment List that was discovered with the airplane wreckage, listed the airplane's empty weight as 6,509.8 pounds, the center of gravity as 109.79 inches, and the moment arm as 714,759.6 inch pounds. The airplane's useful load was listed as 3,590.2 pounds.

A fuel vender located at the Juneau International Airport reported that he added 86.5 gallons of 100LL aviation fuel to the accident airplane before the accident takeoff. He was unsure of the existing fuel quantity before adding fuel. The fuel system was compromised during the accident. For estimating the gross weight of the airplane, only the fuel added at the last refueling was considered. No residual fuel amount in the airplane's fuel tanks, other than the unusable fuel weight already compensated for in the airplane's licensed empty weight, was considered; thus the quantity of fuel in the accident airplane was estimated to be 86.5 gallons (519 pounds).

The following weights were used to estimate the airplane's gross weight at takeoff:

|  |                |
|--|----------------|
| Empty weight of airplane:                        | 6,509.8 pounds |
| Pilot's weight from 01/04/02 medical:            | 160.0 pounds   |
| Fuel, 86.5 gallons:                              | 519.0 pounds   |
| Wooden roofing shakes, 77 bundles x 56 lbs each: | 4,312.0 pounds |

The estimated gross weight of the airplane at takeoff was 11,500.8 pounds, or approximately 1,400.8 pounds in excess of the maximum takeoff gross weight of 10,100 pounds. The wooden roofing shakes were scattered around the accident site, and the exact location/station of the cargo could not be determined.

## Pilot Information

|                                  |  |  |            |
|----------------------------------|--|--|------------|
| <b>Certificate:</b>              | Airline Transport  | <b>Age:</b>                              | 52, Male   |
| <b>Airplane Rating(s):</b>       | Multi-engine Land; Multi-engine Sea; Single-engine Land; Single-engine Sea | <b>Seat Occupied:</b>                    | Left       |
| <b>Other Aircraft Rating(s):</b> | None   | <b>Restraint Used:</b>                   | Seatbelt   |
| <b>Instrument Rating(s):</b>     | Airplane   | <b>Second Pilot Present:</b>             | No         |
| <b>Instructor Rating(s):</b>     | Airplane Multi-engine; Airplane Single-engine                              | <b>Toxicology Performed:</b>             | Yes        |
| <b>Medical Certification:</b>    | Class 1 Valid Medical--w/ waivers/lim.                                     | <b>Last FAA Medical Exam:</b>            | 01/04/2002 |
| <b>Occupational Pilot:</b>       |  | <b>Last Flight Review or Equivalent:</b> | 06/13/2001 |
| <b>Flight Time:</b>              | 22820 hours (Total, all aircraft)  |  |            |

## Aircraft and Owner/Operator Information

|                                      |  |                                       |                 |
|--------------------------------------|--|---------------------------------------|-----------------|
| <b>Aircraft Make:</b>                | Beech  | <b>Registration:</b>                  | N686Q           |
| <b>Model/Series:</b>                 | E18S   | <b>Aircraft Category:</b>             | Airplane        |
| <b>Year of Manufacture:</b>          |  | <b>Amateur Built:</b>                 | No              |
| <b>Airworthiness Certificate:</b>    | Normal   | <b>Serial Number:</b>                 | BA-400          |
| <b>Landing Gear Type:</b>            | Retractable - Tailwheel                                | <b>Seats:</b>                         | 2               |
| <b>Date/Type of Last Inspection:</b> |  | <b>Certified Max Gross Wt.:</b>       | 10100 lbs       |
| <b>Time Since Last Inspection:</b>   |  | <b>Engines:</b>                       | 2 Reciprocating |
| <b>Airframe Total Time:</b>          |  | <b>Engine Manufacturer:</b>           | Pratt & Whitney |
| <b>ELT:</b>                          | Installed, activated, did not aid in locating accident | <b>Engine Model/Series:</b>           | R-985-AN-14B    |
| <b>Registered Owner:</b>             | Aleutian Air Limited                                   | <b>Rated Power:</b>                   | 450 hp          |
| <b>Operator:</b>                     | Charles T. Madsen                                      | <b>Operating Certificate(s) Held:</b> | None            |

## Meteorological Information and Flight Plan

|                                  |                   |   |            |
|----------------------------------|-------------------|---|------------|
| Conditions at Accident Site:     | Visual Conditions | Condition of Light:                     | Day        |
| Observation Facility, Elevation: | JUN               | Distance from Accident Site:            |            |
| Observation Time:                | 1638              | Direction from Accident Site:           |            |
| Lowest Cloud Condition:          | Clear             | Visibility                              | 10 Miles   |
| Lowest Ceiling:                  |                   | Visibility (RVR):                       |            |
| Wind Speed/Gusts:                | 8 knots /         | Turbulence Type<br>Forecast/Actual:     | /          |
| Wind Direction:                  | 240°              | Turbulence Severity<br>Forecast/Actual: | /          |
| Altimeter Setting:               | 29.73 inches Hg   | Temperature/Dew Point:                  | 6°C / -3°C |
| Precipitation and Obscuration:   |                   |   |            |
| Departure Point:                 | Juneau, AK (JUN)  | Type of Flight Plan Filed:              | None       |
| Destination:                     | , AK              | Type of Clearance:                      | VFR        |
| Departure Time:                  | 1625 ADT          | Type of Airspace:                       | Class E    |

## Airport Information

|                      |                                    |                           |         |
|----------------------|------------------------------------|---------------------------|---------|
| Airport:             | Juneau International Airport (JNU) | Runway Surface Type:      | Asphalt |
| Airport Elevation:   | 19 ft                              | Runway Surface Condition: | Dry     |
| Runway Used:         | 08                                 | IFR Approach:             | None    |
| Runway Length/Width: | 8456 ft / 150 ft                   | VFR Approach/Landing:     | None    |

## Wreckage and Impact Information

|                     |         |                      |                        |
|---------------------|---------|----------------------|------------------------|
| Crew Injuries:      | 1 Fatal | Aircraft Damage:     | Destroyed              |
| Passenger Injuries: | N/A     | Aircraft Fire:       | None                   |
| Ground Injuries:    | N/A     | Aircraft Explosion:  | None                   |
| Total Injuries:     | 1 Fatal | Latitude, Longitude: | 58.358333, -134.582778 |

## Administrative Information

|                                   |  |              |            |
|-----------------------------------|--|--------------|------------|
| Investigator In Charge (IIC):     | Clinton O Johnson  | Report Date: | 04/18/2003 |
| Additional Participating Persons: | Michael B Sapp; Federal Aviation Administration, Juneau FSDO; Juneau, AK   |              |            |
| 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 <a href="mailto:pubinq@ntsb.gov">pubinq@ntsb.gov</a> , or at 800-877-6799. Dockets released after this date are available at <a href="http://dms.nts.gov/pubdms/">http://dms.nts.gov/pubdms/</a> . |              |            |



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. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).