



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

# Aviation Investigation Final Report

<b>Location:</b>	MARSHALL, Alaska	<b>Accident Number:</b>	ANC00FA081
<b>Date &amp; Time:</b>	June 30, 2000, 22:20 Local	<b>Registration:</b>	N63MR
<b>Aircraft:</b>	Cessna 337C	<b>Aircraft Damage:</b>	Destroyed
<b>Defining Event:</b>		<b>Injuries:</b>	1 Fatal
<b>Flight Conducted Under:</b>	Part 91: General aviation - Positioning		

## Analysis

The pilot was unable to start the aft engine. A witness suggested the pilot delay the flight until a new starter could be obtained. The pilot insisted he could takeoff, and said he had performed single engine takeoffs previously in the airplane. He chose a point on the dry, 1,940 feet long, 90 feet msl, gravel runway where he would abort if the airplane was not airborne. The witness said that as the airplane passed the abort point, the nose wheel was lifting off the ground. The airplane climbed to about 50 feet, the wings rocked slightly, and the airplane passed out of sight behind a low hill and impacted in a lake. The pilot received fatal injuries. There is no published procedure for taking off with either engine inoperative. The landing gear was retracted in-flight, and the gear doors were shut. The rear propeller was not feathered. The emergency procedures for a single-engine failure after takeoff or during climb states, in part: 'Single-engine climb performance with the rear engine operating is better than with the front engine operating by approximately 85 FPM....The landing gear should not be retracted until all immediate obstacles are cleared, regardless of which engine is out....Airplane drag with the landing gear doors opened and the gear partially extended is greater than the drag with the landing gear fully extended. Corresponding rate-of-climb penalties are -240 ft/min and -110 ft/min respectively.' The best rate of climb airspeed is 100 mph. The performance specifications provided in the Cessna 337C Owner's Manual for rate of climb are in part: 'Rate of climb at sea level, 4,000 pounds gross weight, best rate of climb airspeed, landing gear retracted, rear engine feathered, front engine operating only = 425 ft/min.' Postmortem toxicology samples from the pilot revealed the presence of Chlorpheniramine, an over-the-counter medication which causes drowsiness and impairs cognitive and motor tasks.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The pilot's attempted takeoff with known deficiencies in equipment (an inoperable rear engine) and an inadvertent stall. Factors associated with the accident were the pilot's improper retraction of the landing gear, his over confidence in the airplane's ability, and his impairment from an over-the-counter cold/allergy drug.

## Findings

### Occurrence #1: AIRFRAME/COMPONENT/SYSTEM FAILURE/MALFUNCTION

Phase of Operation: STANDING - PRE-FLIGHT

#### Findings

1. ENGINE ACCESSORIES,ENGINE STARTER - INOPERATIVE
2. (C) OPERATION WITH KNOWN DEFICIENCIES IN EQUIPMENT - INTENTIONAL - PILOT IN COMMAND
3. (F) OVERCONFIDENCE IN AIRCRAFT'S ABILITY - PILOT IN COMMAND

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### Occurrence #2: LOSS OF CONTROL - IN FLIGHT

Phase of Operation: TAKEOFF - INITIAL CLIMB

#### Findings

4. (F) GEAR RETRACTION - IMPROPER USE OF - PILOT IN COMMAND
5. (C) STALL - INADVERTENT - PILOT IN COMMAND
6. (F) IMPAIRMENT(DRUGS) - PILOT IN COMMAND

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### Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER

Phase of Operation: DESCENT - UNCONTROLLED

#### Findings

7. TERRAIN CONDITION - WATER

## Factual Information

### HISTORY OF FLIGHT

On June 30, 2000, about 2220 Alaska daylight time, a Cessna 337C airplane, N63MR, was destroyed when it collided with water shortly after takeoff from the Marshall Airport, Marshall, Alaska. The solo commercial pilot was fatally injured. The flight was operated by Missionary Aviation Repair Center of Soldotna, Alaska, under 14 CFR Part 91, as a positioning flight to Unalakleet, Alaska. Visual meteorological conditions prevailed at the time of the accident, and no flight plan was filed.

A witness, who is also a pilot, told the NTSB investigator-in-charge (IIC) during a telephone interview on July 1, that prior to the flight the pilot was unable to start the aft engine because of an inoperative starter motor. The witness said he suggested to the pilot that he delay the flight until a new starter could be obtained, and offered to fly the pilot to get a replacement. The witness said the pilot insisted he could takeoff, and said he had performed single engine takeoffs previously in the airplane.

The witness and pilot chose a predetermined point on the dry, gravel runway, which would be the abort point if the airplane were not airborne. The witness said that as the airplane passed the abort point, the nose wheel was lifting off the ground. He said the airplane climbed to about 50 feet, the wings rocked slightly, and the airplane passed out of sight behind a low hill. No other contact was received from the accident pilot.

The witness said he then departed the airport, and saw no indication of the airplane. About one hour later, the witness discovered the pilot had not arrived at his destination, and he began a search. He returned to Marshall and saw oil sheen on the surface of a lake just beyond the departure end of the runway. The pilot's body and the airplane were later recovered from the lake.

### INJURIES TO PERSONS

The pilot received fatal injuries.

### DAMAGE TO AIRCRAFT

The airplane was destroyed by impact forces.

### PERSONNEL INFORMATION

The pilot held a commercial pilot certificate with ratings for single and multiengine land

airplanes. He held an instrument rating. His second-class medical certificate, issued on September 7, 1999, contained the restriction that he "shall wear corrective lenses." The pilot held an airframe and power plant mechanic certificate.

According to the pilot's logbook, and the NTSB Pilot/Operator report submitted by the company, he had accumulated 1,556 hours of total flight experience at the time of the accident. Approximately 600 hours were in the Cessna 337C. In the previous 90 days, the pilot had flown about 100 hours. In the previous 30 days, he had flown about 30 hours. On the day of the accident he had flown about 6 hours.

His most recent biennial flight review, and instrument competency check, was conducted on February 11, 2000, in a Piper PA-31 airplane. Initial training in the Cessna 337C was conducted on May 22, 1998, by a company check pilot. The check pilot stated that during the six hours of training provided in the Cessna 337C, no emphasis was placed on performing takeoffs with one engine inoperative, and no special emphasis was placed on cycling the landing gear if an engine failed during takeoff.

#### AIRCRAFT INFORMATION

The airplane was a 1968 Cessna 337C, equipped with two Teledyne Continental Motors, IO-360C engines, each rated at 210 horsepower. The engines were configured with McCauley D2AF34C59 constant speed, manually featherable, propellers. The most recent annual inspection was completed on April 22, 2000, at 5,042 airframe hours. At the time of the last annual inspection, the rear engine had accumulated 1,688 hours time in service, and 203 hours since the last major overhaul. The front engine had accumulated 2,092 hours time in service, and 592 hours since the last major overhaul.

The airplane was equipped with a Robertson Short Take Off and Landing (STOL) kit, installed under STC number SA1627WE.

#### METEOROLOGICAL INFORMATION

The weather was described by the witness as calm winds favoring neither runway, 65 degrees Fahrenheit, and clear.

#### AERODROME INFORMATION

The airport elevation is 90 feet above mean sea level. The 1,940 feet long by 30 feet wide, gravel runway is oriented 110 degrees magnetic. The pilot who witnesses the accident airplane takeoff stated the runway was dry. There is a shed and windsock located about 1/3 of the distance from the approach end of runway 11. The witness pilot indicated the windsock was working. The runway slopes slightly downhill in the direction of takeoff.

#### WRECKAGE AND IMPACT INFORMATION

The airplane came to rest in fresh water. No on site inspection of the airplane was conducted by the NTSB or FAA. Photographs of the wreckage were provided to the NTSB by the Alaska State Troopers, and the owner, and reviewed by the NTSB IIC. The wreckage was recovered by the owner on July 3, and transported via fishing boat to the runway at Marshall. After being photographed, it was further transported to the company's Kako Landing Retreat, near Russian Mission, Alaska.

The leading edges of both wings were crushed aft to the forward spars.

The trailing edge flaps were extended to the 1/3 down position. The front and rear engine cowl flaps were open. All three landing gear were retracted and the gear doors were shut.

The landing gear control handle was in the "UP" position. The trailing edge flaps control handle was in the full down position. The flap indicator was in the 1/3 down position. The rudder trim indicator was in the centered (neutral) position. The elevator trim indicator was in the full nose down position.

The rear propeller was in the flat pitch, (not feathered) position.

#### MEDICAL AND PATHOLOGICAL INFORMATION

The Alaska State Medical Examiner, 5700 East Tudor Avenue, Anchorage, Alaska, performed a postmortem examination on July 3, 2000. The cause of death was noted to be fresh water drowning due to multiple deceleration injuries.

Toxicological samples were tested at the FAA Civil Aeromedical Institute, Oklahoma City, Oklahoma, on September 6, 2000. Chlorpheniramine was present in the pilot's urine, and in the pilot's blood at a level of 0.085 (ug/ml, ug/g).

Chlorpheniramine is an antihistamine, commonly used in over-the-counter cold and allergy preparations. According to the Physicians Desk Reference, in therapeutic doses, the medication may result in drowsiness, and has negative effects on the performance of complex cognitive and motor tasks. Chlorpheniramine has a long half-life (about 24 hours). According to Federal Air Regulations, a pilot is precluded from taking any medication that adversely affects their ability to safely pilot an aircraft.

#### SURVIVAL ASPECTS

The Cessna 337C has two doors, one on each side of the cabin, adjacent to the front seats. According to the Alaska State Trooper who visited the scene, the pilot was found floating in the water, outside the airplane. After the airplane was recovered, the pilot's door was found open, and the pilot's seatbelt was found unbuckled. The pilot was not wearing an inflatable life jacket.

## TESTS AND RESEARCH

A review of the Cessna 337 operating handbook revealed no published procedure for taking off with either engine inoperative. The emergency procedures for a single-engine failure after takeoff or during climb states, in part: "Single-engine climb performance with the rear engine operating is better than with the front engine operating by approximately 85 FPM....The landing gear should not be retracted until all immediate obstacles are cleared, regardless of which engine is out....Airplane drag with the landing gear doors opened and the gear partially extended is greater than the drag with the landing gear fully extended. Corresponding rate-of-climb penalties are -240 ft/min and -110 ft/min respectively."

The best rate of climb airspeed is 100 mph. The best angle of climb airspeed is 90 mph.

The performance specifications provided in the Cessna 337 Owner's Manual for rate of climb are in part: "Rate of climb at sea level, 4,000 pounds gross weight, best rate of climb airspeed, landing gear retracted, rear engine feathered, front engine operating only = 425 ft/min."

The NTSB IIC estimated the gross weight of the airplane at the time of the attempted takeoff to be 3,462 pounds, calculated as follows: Empty weight 2,910 pounds, oil 108 pounds, pilot 204 pounds, baggage 40 pounds, fuel 200 pounds. Maximum allowable takeoff weight was 4,630 pounds.

The Robertson STOL takeoff procedures state, in part: (1) Wing Flaps - "2/3" down (3) Power - Full throttle and 2800 rpm (6) Elevator Control-Lift nose at 50 MPH (7) Accelerate to 65 MPH over 50' obstacle (8) Accelerate to 100 MPH after clearing 50' obstacle. (10) Wing Flaps - Retract to "1/3" down after reaching 100 MPH (11) Landing Gear - Retract after reaching 10 MPH (12) Accelerate to climb speed -110 to 120 MPH (13) Wing Flaps - Retract to "UP"

## ADDITIONAL INFORMATION

None of the wreckage was taken into custody of the Safety Board. The aircraft, engine, and propeller logbooks, were returned to the company on August 2, 2000.

## Pilot Information

<b>Certificate:</b>	Commercial	<b>Age:</b>	40,Male
<b>Airplane Rating(s):</b>	Single-engine land; Multi-engine land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 2 Valid Medical-w/ waivers/lim	<b>Last FAA Medical Exam:</b>	September 7, 1999
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	1556 hours (Total, all aircraft), 600 hours (Total, this make and model), 1387 hours (Pilot In Command, all aircraft), 100 hours (Last 90 days, all aircraft), 30 hours (Last 30 days, all aircraft), 6 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Cessna	<b>Registration:</b>	N63MR
<b>Model/Series:</b>	337C 337C	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	337-0915
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	4
<b>Date/Type of Last Inspection:</b>	April 22, 2000 Annual	<b>Certified Max Gross Wt.:</b>	4650 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	2 Reciprocating
<b>Airframe Total Time:</b>		<b>Engine Manufacturer:</b>	Continental
<b>ELT:</b>	Installed, not activated	<b>Engine Model/Series:</b>	IO-360-C
<b>Registered Owner:</b>	MISSIONARY AVIATION REPAIR CNT	<b>Rated Power:</b>	210 Horsepower
<b>Operator:</b>		<b>Operating Certificate(s) Held:</b>	None
<b>Operator Does Business As:</b>		<b>Operator Designator Code:</b>	

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>		<b>Distance from Accident Site:</b>	
<b>Observation Time:</b>		<b>Direction from Accident Site:</b>	
<b>Lowest Cloud Condition:</b>	Clear	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	None	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	5 knots / None	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	360°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>		<b>Temperature/Dew Point:</b>	18°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	(MLL )	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	UNALAKLEET (UNK )	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>	22:15 Local	<b>Type of Airspace:</b>	Class G

## Airport Information

<b>Airport:</b>	MARSHALL MLL	<b>Runway Surface Type:</b>	Gravel
<b>Airport Elevation:</b>	90 ft msl	<b>Runway Surface Condition:</b>	Dry
<b>Runway Used:</b>	11	<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>	1940 ft / 30 ft	<b>VFR Approach/Landing:</b>	

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Fatal	<b>Aircraft Damage:</b>	Destroyed
<b>Passenger Injuries:</b>		<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	1 Fatal	<b>Latitude, Longitude:</b>	61.920333,-162.290512(est)



## Administrative Information

Investigator In Charge (IIC):	Thomas, Matthew
Additional Participating Persons:	ANTHONY ACCURSO(FAA FSDO); ANCHORAGE , AK SPENCER HILL(FAA FSDO); ANCHORAGE , AK
Original Publish Date:	July 10, 2001
Last Revision Date:	
Investigation Class:	<a href="#">Class</a>
Note:	
Investigation Docket:	<a href="https://data.nts.gov/Docket?ProjectID=50944">https://data.nts.gov/Docket?ProjectID=50944</a>

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The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).