



# Aviation Investigation Final Report

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<b>Location:</b>	Aniak, Alaska	<b>Accident Number:</b>	ANC08LA097
<b>Date &amp; Time:</b>	August 4, 2008, 15:50 Local	<b>Registration:</b>	N40YR
<b>Aircraft:</b>	Piper PA-31-350	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Powerplant sys/comp malf/fail	<b>Injuries:</b>	1 Serious, 2 Minor, 5 None
<b>Flight Conducted Under:</b>	Part 135: Air taxi & commuter - Scheduled		

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## Analysis

The airline-transport-certificated pilot was departing in a twin-engine airplane that was about 130 pounds below its maximum gross weight. About 200 feet above the ground, the pilot reported a loss of engine power in the left engine and smoke was seen coming from the left engine by ground witnesses. The pilot indicated that he feathered the left engine, but that the airplane was descending and he elected to make an emergency landing on a gravel bar about .5 mile from the airport. Following the accident, the operator's maintenance personnel removed the left engine from the airframe and shipped it to an engine repair facility for examination. The airplane's left engine, which was equipped with a turbocharger, was placed on a test stand where it was started and ran, but it would not produce power (measured in manifold pressure) above ambient pressure. The engine's turbocharger was removed and replaced. A second engine run, with the new turbocharger installed, resulted in the engine developing full power. The original turbocharger was disassembled and inspected. The inspection revealed that one of the turbine shaft bearings had failed and that the turbine shaft and blades were damaged. One thrust bearing had fractured, with half of the bearing missing.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: A partial loss of engine power during takeoff due to a failure of the left engine's turbocharger as a result of the failure of a turbine shaft bearing. Contributing to the accident was unsuitable terrain for a forced landing.

## Findings

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<b>Aircraft</b>	Turbocharger - Failure
<b>Environmental issues</b>	Rough terrain - Contributed to outcome

## Factual Information

### History of Flight

<b>Initial climb</b>	Powerplant sys/comp malf/fail (Defining event)
<b>Initial climb</b>	Loss of engine power (total)
<b>Emergency descent</b>	Off-field or emergency landing

On August 4, 2008, about 1550 Alaska daylight time, a twin engine Piper PA-31 airplane, N40YR, sustained substantial damage following a loss of engine power during takeoff/initial climb, about 1/2 mile north of Aniak, Alaska. The airplane was being operated as a visual flight rules (VFR) scheduled domestic commuter flight under Title 14, CFR Part 135, when the accident occurred. The airplane was operated as Flight 8606, by Frontier Flying Service Inc., Fairbanks, Alaska. The airline transport certificated pilot was not injured. One passenger received serious injuries, 2 passengers received minor injuries, and 4 passengers were not injured. Visual meteorological conditions prevailed, and VFR company flight following procedures were in effect. The flight was en route to Shageluk, Alaska.

During a telephone conversation with the National Transportation Safety Board (NTSB) investigator-in-charge (IIC), on August 4, the director of operations for the operator reported that the airplane had just departed runway 28 at Aniak. The airplane was about 130 pounds below its maximum gross weight. About 200 feet above the ground, the pilot reported a loss of engine power in the left engine, and smoke was seen coming from the left engine by ground witnesses. The pilot indicated that he feathered the left engine, but the airplane was descending, and he elected to make an emergency landing on a gravel bar with the landing gear extended. During the touchdown, the nose landing gear collapsed. The airplane received structural damage to the fuselage and wings.

Following the accident, the operator's maintenance personnel removed the left engine from the airframe and shipped it to an engine repair facility in Anchorage, Alaska.

On August 15, 2008, the airplane's left engine, which was equipped with a turbocharger, was examined at the engine repair facility. The examination was overseen by an NTSB air safety investigator, and attended by representatives from the operator and the FAA. The engine was placed on a test stand where it was started and ran, but it would not produce power (measured in manifold pressure) above ambient pressure. The engine's turbocharger was removed and replaced. A second engine run, with the new turbocharger installed, resulted in the engine developing full power.

The original turbocharger was disassembled and inspected. The inspection revealed that one of the turbine shaft bearings had failed, and the turbine shaft and blades were damaged. One thrust bearing had fractured and one half of the bearing was missing.

## Pilot Information

<b>Certificate:</b>	Airline transport; 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>	Glider	<b>Restraint Used:</b>	
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	Glider	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 1 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	June 14, 2008
<b>Occupational Pilot:</b>	Yes	<b>Last Flight Review or Equivalent:</b>	July 10, 2008
<b>Flight Time:</b>	3941 hours (Total, all aircraft), 98 hours (Total, this make and model), 2846 hours (Pilot In Command, all aircraft), 293 hours (Last 90 days, all aircraft), 92 hours (Last 30 days, all aircraft), 5 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Piper	<b>Registration:</b>	N40YR
<b>Model/Series:</b>	PA-31-350	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	31-7952008
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	8
<b>Date/Type of Last Inspection:</b>	July 25, 2008 AAIP	<b>Certified Max Gross Wt.:</b>	7368 lbs
<b>Time Since Last Inspection:</b>	14 Hrs	<b>Engines:</b>	2 Reciprocating
<b>Airframe Total Time:</b>	10047 Hrs at time of accident	<b>Engine Manufacturer:</b>	Lycoming
<b>ELT:</b>	Installed, not activated	<b>Engine Model/Series:</b>	TIO-54D
<b>Registered Owner:</b>	Frontier Flying Service Inc.	<b>Rated Power:</b>	350 Horsepower
<b>Operator:</b>	Frontier Flying Service Inc.	<b>Operating Certificate(s) Held:</b>	Commuter air carrier (135)
<b>Operator Does Business As:</b>	Frontier Alaska	<b>Operator Designator Code:</b>	FFSA

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	PANI,88 ft msl	<b>Distance from Accident Site:</b>	1 Nautical Miles
<b>Observation Time:</b>	15:56 Local	<b>Direction from Accident Site:</b>	80°
<b>Lowest Cloud Condition:</b>		<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	Overcast / 3000 ft AGL	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	6 knots /	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	300°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	30.11 inches Hg	<b>Temperature/Dew Point:</b>	13°C / 7°C
<b>Precipitation and Obscuration:</b>			
<b>Departure Point:</b>	Aniak, AK (PANI)	<b>Type of Flight Plan Filed:</b>	Company VFR
<b>Destination:</b>	Shageluk, AK (PAHX)	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>	15:50 Local	<b>Type of Airspace:</b>	

## Airport Information

<b>Airport:</b>	Aniak PANI	<b>Runway Surface Type:</b>	Asphalt
<b>Airport Elevation:</b>	88 ft msl	<b>Runway Surface Condition:</b>	Dry
<b>Runway Used:</b>	28	<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>	6000 ft / 150 ft	<b>VFR Approach/Landing:</b>	Forced landing

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 None	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>	1 Serious, 2 Minor, 4 None	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	1 Serious, 2 Minor, 5 None	<b>Latitude, Longitude:</b>	61.581665,-159.54306

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Erickson, Scott
<b>Additional Participating Persons:</b>	Victor Hutchings; FAA-AL-ANC FSDO 03; Anchorage, AK Erin Talbott; Frontier Flying Service Inc.; Fairbanks, AK
<b>Original Publish Date:</b>	April 15, 2009
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class</a>
<b>Note:</b>	
<b>Investigation Docket:</b>	<a href="https://data.nts.gov/Docket?ProjectID=68681">https://data.nts.gov/Docket?ProjectID=68681</a>

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

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](#).