



# National Transportation Safety Board Aviation Accident Final Report

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<b>Location:</b>	Nikolai, AK	<b>Accident Number:</b>	ANC03LA021
<b>Date &amp; Time:</b>	12/28/2002, 1230 AST	<b>Registration:</b>	N3904
<b>Aircraft:</b>	de Havilland DHC-3	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>		<b>Injuries:</b>	2 None

**Flight Conducted Under:** Part 91: General Aviation - Positioning

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## Analysis

The commercial certificated pilot reported that just after takeoff in a wheel/ski equipped airplane, he heard a very loud bang, followed by a loud rattling noise. As he turned towards the departure airstrip, he had difficulty using the airplane's rudder pedals. Using a combination of aileron input and the remaining amount of rudder control, he was able to maneuver the airplane for a landing on the airstrip. He said that as the airplane passed over the approach end of the airstrip, it drifted to the right, and he initiated a go-around. The airplane subsequently collided with a stand of trees bordering the airstrip, and sustained structural damage to the wings, fuselage, and empennage. In a written statement to the NTSB, the pilot stated that he suspected that the right elevator's outboard and center hinges or hinge pins failed, allowing the right elevator to swing rearward and jam the airplane's rudder. An FAA airworthiness inspector traveled to the accident scene to examine the airplane. He reported that the right elevator was discovered about 150 feet behind the airplane, within the wreckage debris path through a stand of trees. He said that the right elevator sustained a significant amount of damage along the leading edge, which would normally be protected by the horizontal stabilizer. The FAA inspector examined the airplane's horizontal stabilizer in the area where the right and left elevators connect, and noted signs of new paint on the rivets that held the torque tube support assembly, indicating recent reinstallation or replacement of the torque tube support assembly. He indicated that the torque tube support assembly was installed at a slight angle to the right, which allowed the right elevator to eventually slip off of the center and outboard hinge pins. The inspector said that witness marks on the center and outboard hinge pins showed signs of excessive wear towards the outboard portion of each pin. The inspector noted that a review of the airplane's maintenance records failed to disclose any entries of repair/replacement of the elevator torque tube support assembly.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: An improper and undocumented major repair of the elevator torque tube support assembly by an unknown person, which resulted in an in-flight disconnection of the airplane's right elevator, and a jammed rudder. A factor associated with the accident is the inadequate inspection of the airplane by company maintenance personnel.

### Findings

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

Phase of Operation: CLIMB

#### Findings

1. (C) FLIGHT CONTROL,ELEVATOR ATTACHMENT - ASYMMETRICAL
  2. (C) MAINTENANCE,MAJOR REPAIR - IMPROPER - UNKNOWN
  3. (F) MAINTENANCE,INSPECTION - INADEQUATE - COMPANY MAINTENANCE PERSONNEL
  4. (C) FLIGHT CONTROL,ELEVATOR - DISCONNECTED
  5. (F) FLIGHT CONTROL,RUDDER - JAMMED
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Occurrence #2: LOSS OF CONTROL - IN FLIGHT

Phase of Operation: EMERGENCY DESCENT/LANDING

#### Findings

6. RUDDER - RESTRICTED
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Occurrence #3: IN FLIGHT COLLISION WITH OBJECT

Phase of Operation: GO-AROUND (VFR)

#### Findings

7. OBJECT - TREE(S)

## Factual Information

On December 28, 2002, about 1230 Alaska standard time, a wheel/ski-equipped de Havilland DHC-3 (Otter) airplane, N3904, sustained substantial damage when it collided with trees during an attempted emergency landing and subsequent go-around, at a private airstrip, located about 35 miles east of Nikolai, Alaska. The pilot reported a partial flight control malfunction just after takeoff, and was attempting to return to the departure airstrip. The airplane was being operated as a visual flight rules (VFR) cross-country positioning flight under Title 14, CFR Part 91, when the accident occurred. The airplane was owned by Chinook Air, LLC, and operated by Grasshopper Aviation, Wasilla, Alaska. The commercial certificated pilot, and the one passenger aboard, were not injured. Visual meteorological conditions prevailed, and VFR company flight following procedures were in effect. The flight originated at the accident airstrip, about 1225, and was en route to the Wasilla Airport, Wasilla, Alaska.

During a telephone conversation with the National Transportation Safety Board (NTSB) investigator-in-charge on December 28, the pilot said that the purpose of the flight was to deliver a load of fuel oil to a remote lodge located about 35 miles east of Nikolai. He said that the outbound flight and arrival at the lodge's private airstrip were uneventful, with no mechanical anomalies noted. He added that the airplane remained on the ground for about 45 minutes while the fuel oil was unloaded, and that the airplane was empty for the return flight to Wasilla.

The pilot reported that just after a normal westerly takeoff from the 1,000 by 30 foot snow-covered airstrip, as the airplane climbed to about 800 feet above the ground, and the airspeed increased to about 55 knots, he heard a very loud bang, followed by a loud rattling noise. The pilot said that as he was attempting to turn the airplane around and return to the departure airstrip, he experienced considerable difficulty in maintaining directional control using the airplane's rudder pedals. Using a combination of aileron control, and the remaining amount of rudder control, he was able to maneuver the airplane for an easterly landing on the airstrip. The pilot said that as the airplane passed over the approach end of the airstrip, the airplane drifted to the right, and he initiated a go-around. The airplane subsequently collided with a stand of trees on the south side of the airstrip, and sustained substantial damage to the wings, fuselage, and empennage.

In a written statement to the NTSB, the pilot wrote, in part: "It is my conclusion the outboard hinge or pin failed causing the elevator to produce the noise that was initially heard. While attempting to return to the airstrip, the elevator continued to fail until upon short final, the elevator was only held on by the inboard attach point. The elevator then swung rearward and jammed into the rudder. The elevator was hanging below the stabilizer and impacted the first spruce tree. The damage to the stabilizer was subsequent to the elevator being torn off."

A Federal Aviation Administration (FAA) airworthiness inspector, Anchorage Flight Standards District Office, traveled to the accident scene to examine the airplane before recovery efforts were started. The inspector reported that the right hand elevator was discovered about 150 feet behind the airplane, within the wreckage debris path through the stand of trees. He said that the right hand elevator sustained a significant amount of damage along the leading edge, which would normally be protected by the aft portion of the right horizontal stabilizer. He added that the right horizontal stabilizer sustained structural damage during the collision with the stand of trees.

On May 2, the airplane was retrieved from the accident airstrip and transported by insurance personnel to a wreckage storage facility located in Wasilla, Alaska.

On May 29, the FAA airworthiness inspector, along with an FAA metallurgy/composites technical specialist from the Anchorage Aircraft Certification Office (ACO), inspected the airplane wreckage in Wasilla. The FAA inspector related that the elevators on the DHC-3 airplane are attached to the horizontal stabilizer by means of a center hinge bracket and an outboard hinge bracket. The center hinge bracket has a 1/4-inch by 2-inch long pin assembly, and the outboard hinge bracket has a 5/16-inch by 2-inch long pin assembly. The left and right hand elevators are connected to each other by means of a torque tube assembly located mid span within the tail of the airplane. The torque tube assembly is held in place by a torque tube support assembly.

The inspector reported that during a detailed inspection of the accident airplane's horizontal stabilizer, specifically in the area where the right and left elevators connect together, he noted signs of new paint on the rivets that held the torque tube support assembly in place, indicating recent reinstallation or replacement of the torque tube support assembly. He added that the torque tube support assembly was installed at a slight angle to the right, which allowed the right elevator to eventually slip off of the center and outboard hinge pins. The inspector said that witness marks on the center and outboard pins showed signs of excessive wear towards the outboard portion of each pin.

The inspector added that a review of the accident airplane's maintenance records failed to disclose any maintenance log entries concerning repairs/replacement of the elevator torque tube support assembly.

## Pilot Information

<b>Certificate:</b>	Commercial	<b>Age:</b>	58, Male
<b>Airplane Rating(s):</b>	Single-engine Land; Single-engine Sea	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	Seatbelt, Shoulder harness
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	No
<b>Medical Certification:</b>	Class 2 Valid Medical--w/ waivers/lim.	<b>Last FAA Medical Exam:</b>	01/28/2002
<b>Occupational Pilot:</b>		<b>Last Flight Review or Equivalent:</b>	08/23/2002
<b>Flight Time:</b>	4000 hours (Total, all aircraft), 400 hours (Total, this make and model), 4000 hours (Pilot In Command, all aircraft), 21 hours (Last 90 days, all aircraft), 7 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

## Aircraft and Owner/Operator Information

Aircraft Make:	de Havilland	Registration:	N3904
Model/Series:	DHC-3	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	54
Landing Gear Type:	Tailwheel	Seats:	2
Date/Type of Last Inspection:	04/12/2002, 100 Hour	Certified Max Gross Wt.:	8000 lbs
Time Since Last Inspection:	85 Hours	Engines:	1 Reciprocating
Airframe Total Time:	16437 Hours as of last inspection	Engine Manufacturer:	Pratt & Whitney
ELT:	Installed, not activated	Engine Model/Series:	R-1340-59
Registered Owner:	Chinook Air LLC	Rated Power:	600 hp
Operator:	GLENN, DAVID HAMILTON	Operating Certificate(s) Held:	On-demand Air Taxi (135)
Operator Does Business As:	Grasshopper Avation	Operator Designator Code:	G7HC

## Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:		Distance from Accident Site:	
Observation Time:		Direction from Accident Site:	
Lowest Cloud Condition:	Clear	Visibility	30 Miles
Lowest Ceiling:		Visibility (RVR):	
Wind Speed/Gusts:	Calm /	Turbulence Type Forecast/Actual:	/
Wind Direction:		Turbulence Severity Forecast/Actual:	/
Altimeter Setting:		Temperature/Dew Point:	-27° C
Precipitation and Obscuration:			
Departure Point:	Nikolai, AK (5NI)	Type of Flight Plan Filed:	None
Destination:	Nikolai, AK (5NI)	Type of Clearance:	None
Departure Time:	1230 AST	Type of Airspace:	Class G

## Airport Information

Airport:	Mystic Lake Airstrip	Runway Surface Type:	Unknown
Airport Elevation:	2000 ft	Runway Surface Condition:	Snow--dry
Runway Used:		IFR Approach:	None
Runway Length/Width:	1000 ft / 30 ft	VFR Approach/Landing:	Forced Landing

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 None	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>	1 None	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	2 None	<b>Latitude, Longitude:</b>	62.866667, -153.916667

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Clinton O Johnson	<b>Report Date:</b>	03/02/2004
<b>Additional Participating Persons:</b>	Grant W Chapman; Federal Aviation Administration; Anchorage, AK Dr. David D Swartz; Federal Aviation Administration; Anchorage, AK		
<b>Publish Date:</b>			
<b>Investigation Docket:</b>	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](#).