National Transportation Safety Board
Aviation Accident Final Report

Location:	ELKO, NV	**Accident Number:**	LAX97LA250
Date & Time:	07/21/1997, 1349 PDT	**Registration:**	N776BF
Aircraft:	de Havilland DHC-6-300	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	2 None
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

Before departing from Reno the aircraft had been ramp-checked by the FAA with no discrepancies noted. The private pilot was responsible for landing, while the airline transport pilot was responsible for completing the before landing checklist, which included checking the position of the nose wheel steering tiller. Upon touchdown, the aircraft veered left of the centerline. The private pilot attempted to brake with right rudder input. The aircraft slowed down but continued to veer to the left. The propellers were put into beta, but the aircraft continued to veer off the left side of the runway, struck a light, and collapsed the nose gear. After repairs, the airline transport pilot ferried the aircraft to an airport in California, with no discrepancies noted. A report submitted by the owner of the aircraft indicates nose gear difficulties dating back to August 1992. The report further stated that if the actuator cables were improperly tensioned the tiller could visually be indicating a horizontal position without the nose wheel being centered. Witnesses reported that upon landing they saw a cloud of smoke emanating from the nose gear. Signature marks found at the initial point of touchdown on the runway are consistent with the nose gear not being in the centered position. The aircraft traveled approximately 200 to 300 feet and then was left of centerline. No discrepancies were noted with the aircraft's braking system. Examination of the nose gear steering cables did reveal that the cables were significantly under tensioned.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The failure of maintenance personnel to correctly diagnose and correct a reoccurring nose gear steering problem, and the improperly tensioned nose wheel steering actuator cables which provided the pilot with an erroneous cockpit indication that the nose gear was centered when it was cocked.

Findings

Occurrence #1: LOSS OF CONTROL - ON GROUND/WATER
Phase of Operation: LANDING - ROLL

Findings
1. (C) LANDING GEAR,NOSE GEAR ASSEMBLY - UNDERTORQUED
2. (C) MAINTENANCE,ADJUSTMENT - INADEQUATE - OTHER MAINTENANCE PERSONNEL
3. (C) LANDING GEAR,STEERING SYSTEM - OTHER
4. GROUND LOOP/SWERVE - INADVERTENT

Occurrence #2: ON GROUND/WATER COLLISION WITH OBJECT
Phase of Operation: LANDING - ROLL

Findings
5. OBJECT - RUNWAY LIGHT

Occurrence #3: GEAR COLLAPSED
Phase of Operation: LANDING - ROLL

Findings
6. LANDING GEAR,NOSE GEAR STRUT - OVERLOAD

Factual Information

On July 21, 1997 at 1349 hours Pacific daylight time, a DeHavilland DHC-6-300, N776BF, collapsed the nose gear on landing at the Elko Municipal Airport, Elko, Nevada. The aircraft, owned and operated by Continental Aviation Services of Naples, Florida, was substantially damaged. The private pilot and an airline transport rated pilot, the sole occupants, were not injured. Visual meteorological conditions existed for the personal flight and no flight plan was filed. The flight originated from the Reno, Nevada, airport at 1145 on the day of the accident.

The private pilot reported that airport information was obtained and a straight in approach was to be flown. He stated that the before landing checklist was conducted by the airline transport pilot, which included checking the position of the nose gear steering tiller. The pilot reported that the approach was stabilized and normal with no crosswinds, turbulence, or any other adverse flight conditions. He stated that he landed the aircraft left of centerline, and applied brake pressure; however, the aircraft continued a turn to the left. The pilot neutralized the propellers thinking that the problem was either the left brake or something was wrong with the propellers. At this point the pilot reported that the airline transport pilot was calling for more brakes, which he applied, but that the aircraft was half way to the left edge of the 150-foot-wide runway. After exiting the runway the nose wheel struck a runway light base and snapped off, causing the aircraft to pitch down.

The airline transport pilot reported that he visually checked the tiller position and that it was in the correct position. He reported that touchdown was slightly right of centerline and when the nose gear touched down, the aircraft started to veer to the left. The pilot reported calling for more brakes on the right side and "seeing no results I applied right brake hard but got little results. . . ."

Repairs to the aircraft were completed, and on July 29, 1997, the airline transport pilot reported that he ferried the aircraft to Palomar Airport, Carlsbad, California, and that no discrepancies were noted.

According to witnesses, on landing they saw a cloud of smoke emanating from the nose gear. The witnesses then saw the airplane veer off the runway to the left and the nose gear collapse.

The aircraft operator, Continental Aviation Services, submitted a detailed report to a Federal Aviation Administration (FAA) inspector, from the Reno Flight Standards District Office. According to the report, this aircraft has a history of nose gear difficulties dating from August 1992 to November 1996. Examination of the aircraft squawk sheet revealed numerous entries noting that the tiller was hard to turn to the right forcing the aircraft to taxi to the left. Corrective action taken in each case was the disassembly of the nose gear. The nose gear was cleaned, reinstalled, and checked in an airworthy condition. Approximately a year later in October 1993, the same problem occurred with the nose gear being disassembled, cleaned, reinstalled, and returned to service. For the next 1 1/2 years, to August 1995, the squawk sheets shows that the aircraft nose gear assembly had problems approximately every 7 months which required that the nose gear to be disassembled, cleaned, and returned to service.

RW Martin provided a report to Continental Aviation Services regarding their examination of the nose gear assembly. The actuator cables connecting the nose steering actuator and the cockpit steering tiller were found to be significantly under tensioned. The report stated that, "improperly tensioned actuator cables could provide erratic cockpit visual indication of the

nose wheel position. It would seem that the tiller could be visually indicating a horizontal position without centering of the nose wheel." See attached report.

An FAA inspector ramp checked the aircraft the day of the accident at the Reno airport and no discrepancies were found. At Elko, the FAA reported that signature marks found at the initial point of touchdown on the runway are consistent with the nose gear not being in the centered position. The aircraft traveled approximately 200 to 300 feet, and then proceeded left of centerline. No discrepancies were noted with the aircraft's braking system.

Pilot Information

Certificate:	Private	**Age:**	57, 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):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim.	**Last Medical Exam:**	11/18/1997
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	1561 hours (Total, all aircraft), 2 hours (Total, this make and model), 898 hours (Pilot In Command, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	de Havilland	**Registration:**	N776BF
Model/Series:	DHC-6-300 DHC-6-300	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	672
Landing Gear Type:	Tricycle	**Seats:**	14
Date/Type of Last Inspection:	07/07/1997, Continuous Airworthiness	**Certified Max Gross Wt.:**	12500 lbs
Time Since Last Inspection:	2 Hours	**Engines:**	2 Turbo Prop
Airframe Total Time:	12152 Hours	**Engine Manufacturer:**	P&W
ELT:	Installed, not activated	**Engine Model/Series:**	PT6A-27
Registered Owner:	CONTINENTAL AVIATION SERVICES	**Rated Power:**	750 hp
Operator:	CONTINENTAL AVIATION SERVICES	**Air Carrier Operating Certificate:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	EKO, 5153 ft msl	**Observation Time:**	1356 PDT
Distance from Accident Site:	0 Nautical Miles	**Direction from Accident Site:**	0°
Lowest Cloud Condition:	Unknown / 0 ft agl	**Temperature/Dew Point:**	31°C / 5°C
Lowest Ceiling:	Broken / 700 ft agl	**Visibility**	30 Miles
Wind Speed/Gusts, Direction:	4 knots, 50°	**Visibility (RVR):**	0 ft
Altimeter Setting:	30 inches Hg	**Visibility (RVV):**	0 Miles
Precipitation and Obscuration:			
Departure Point:	RENO, NV (RNO)	**Type of Flight Plan Filed:**	None
Destination:	(EKO)	**Type of Clearance:**	VFR
Departure Time:	1145 PDT	**Type of Airspace:**	Class D

Airport Information

Airport:	ELKO (EKO)	**Runway Surface Type:**	Asphalt
Airport Elevation:	5153 ft	**Runway Surface Condition:**	Dry
Runway Used:	5	**IFR Approach:**	None
Runway Length/Width:	7100 ft / 150 ft	**VFR Approach/Landing:**	Full Stop; Straight-in

Wreckage and Impact Information

Crew Injuries:	2 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	N/A	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	

Administrative Information

Investigator In Charge (IIC):	TEALEYE C CORNEJO	**Adopted Date:**	05/04/1998
Additional Participating Persons:	BEN HENDERSON; RENO, NV		
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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