



National Transportation Safety Board Aviation Accident Final Report

Location:	AUSTIN, TX	Accident Number:	FTW99LA045
Date & Time:	11/27/1998, 1405 CST	Registration:	N787WB
Aircraft:	Lockheed L-1329	Aircraft Damage:	Substantial
Defining Event:		Injuries:	3 None
Flight Conducted Under:	Part 91: General Aviation - Business		

Analysis

During the landing roll, the nose gear settled onto the runway, and the aircraft veered hard to the right. Application of the left brake had no effect. The airplane skidded, exited the runway, struck a runway marker, and collapsed the nose landing gear. The steering actuator had failed, the hydraulic fluid was lost from the steering actuator, and the fuselage received structural damage. The steering actuator assembly, p/n 1501-4, had accumulated 5,938.0 hours since new and had not been repaired or overhauled. Examination of the nose gear steering actuator cylinder by the metallurgist revealed that the cylinder fracture was the result of fatigue cracking initiated by an abrupt machining transition from the 45 degree thread ring chamfer to the straight wall of the cylinder. The engineering drawings appear to depict the radius at the fatigue origin as a continuation of the 0.03 inch to 0.06 inch radius adjacent to the fracture. However, the drawing is not clear on the specific intent of the transition between the nearby radius and the internal threads for the nut.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The steering actuator fatigue failure resulting from inadequate procedure documentation for the manufacturing process.

Findings

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

Phase of Operation: LANDING - ROLL

Findings

1. (C) LANDING GEAR,STEERING SYSTEM - FATIGUE
2. (C) PROCEDURE INADEQUATE - MANUFACTURER
3. (C) INADEQ SUBSTANTIATION PROCESS,INADEQ DOCUMENTATION - MANUFACTURER

Occurrence #2: ON GROUND/WATER COLLISION WITH OBJECT

Phase of Operation: LANDING - ROLL

Findings

4. OBJECT - AIRPORT SIGN/MARKER

Occurrence #3: ON GROUND/WATER ENCOUNTER WITH TERRAIN/WATER

Phase of Operation: LANDING - ROLL

Factual Information

On November 27, 1998, at 1405 central standard time, a Lockheed L-1329, 4 engine jet airplane, N787WB, impacted an airport sign and terrain following a loss of nose wheel steering during the landing roll on runway 13R, Robert Mueller Municipal Airport, Austin, Texas. The airplane was owned and operated by Banair, Inc., of Houston, Texas, under Title 14 CFR Part 91. The two airline transport rated crew members and the passenger were not injured, and the airplane sustained substantial damage. Visual meteorological conditions prevailed for the business flight which originated from Houston, Texas, at 1335. An IFR flight plan was filed.

The pilot reported hearing a loud pop as the nose gear settled onto the runway. The aircraft veered hard to the right and application of the left brake had no effect. The airplane skidded 978 feet before exiting the runway near taxiway Papa. The airplane struck a runway marker and subsequently collapsed the nose landing gear. The aircraft traveled an additional 120 feet before coming to rest. Upon examining the nose gear area, the pilot/mechanic and the FAA inspector found the steering actuator failed and hydraulic fluid was lost from the steering actuator. The FAA inspector reported structural damage to the fuselage.

A review of the maintenance records from May through November 1998, by the FAA inspector, did not reveal any entries specific to the nose wheel steering. The pilot/mechanic reported that the aircraft was scheduled for the AAIP (OPS #2) inspection to commence on November 30, 1998. He further stated that the steering actuator assembly, part number 1501-4, had accumulated 5,938.0 hours since new, and there was no history that it had ever been repaired or overhauled.

The nose gear steering actuator cylinder was forwarded to the NTSB Materials Laboratory for examination. The metallurgist reported that examination of the fracture surfaces found fatigue arrest markings on the majority of the fracture surfaces. The fatigue initiated at the inner diameter surface of the cylinder and progressed "rapidly" outward. The fatigue initiated at a multitude of origin sites and dispersed completely around the inner diameter surface. No evidence of mechanical damage was noted at the origins.

The fatigue origins were located at the abrupt transition from the 45 degree thread ring chamfer to the straight wall of the cylinder. The engineering drawing for the cylinder does not clearly define the machining details in this region of the cylinder, but shows a large radius without dimensions. The nearby radius between the cylinder wall and a vertical surface measured approximately 0.042 inches. The engineering drawing calls for a 0.03 to 0.06 inch radius. See the enclosed report for additional details.

Pilot Information

Certificate:	Airline Transport	Age:	39, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Left
Other Aircraft Rating(s):	Helicopter	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	None	Toxicology Performed:	No
Medical Certification:	Class 1 Valid Medical--w/ waivers/lim.	Last FAA Medical Exam:	03/02/1998
Occupational Pilot:		Last Flight Review or Equivalent:	
Flight Time:	8350 hours (Total, all aircraft), 750 hours (Total, this make and model), 7680 hours (Pilot In Command, all aircraft), 72 hours (Last 90 days, all aircraft), 30 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Lockheed	Registration:	N787WB
Model/Series:	L-1329 L-1329	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Transport	Serial Number:	5210
Landing Gear Type:	Retractable - Tricycle	Seats:	11
Date/Type of Last Inspection:	05/21/1998, AAIP	Certified Max Gross Wt.:	445000 lbs
Time Since Last Inspection:	96 Hours	Engines:	4 Turbo Jet
Airframe Total Time:	5938 Hours	Engine Manufacturer:	ALLIED SIGNAL
ELT:		Engine Model/Series:	TFE-731-3-1F
Registered Owner:	BANAIR, INC.	Rated Power:	3700 lbs
Operator:	BANAIR, INC.	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Night/Dark
Observation Facility, Elevation:	, 0 ft msl	Distance from Accident Site:	0 Nautical Miles
Observation Time:	0000	Direction from Accident Site:	0°
Lowest Cloud Condition:	Unknown / 0 ft agl	Visibility	10 Miles
Lowest Ceiling:	Broken / 7000 ft agl	Visibility (RVR):	0 ft
Wind Speed/Gusts:	5 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	140°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30 inches Hg	Temperature/Dew Point:	21° C / 17° C
Precipitation and Obscuration:			
Departure Point:	HOUSTON, TX (HOU)	Type of Flight Plan Filed:	IFR
Destination:	(AUS)	Type of Clearance:	IFR
Departure Time:	1935 CST	Type of Airspace:	Class C

Airport Information

Airport:	ROBERT MUELLER MUNICIPAL (AUS)	Runway Surface Type:	Asphalt
Airport Elevation:	632 ft	Runway Surface Condition:	Dry
Runway Used:	13R	IFR Approach:	Visual
Runway Length/Width:	7269 ft / 150 ft	VFR Approach/Landing:	Full Stop

Wreckage and Impact Information

Crew Injuries:	2 None	Aircraft Damage:	Substantial
Passenger Injuries:	1 None	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	3 None	Latitude, Longitude:	

Administrative Information

Investigator In Charge (IIC):	JOYCE ROACH	Report Date:	02/16/2001
Additional Participating Persons:	HENRY L GAMEZ; SAN ANTONIO, TX		
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.nts.gov/pubdms/ .		

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](#).