National Transportation Safety Board
Aviation Accident Final Report

Location:	Grand Junction, CO	**Accident Number:**	DEN04LA023
Date & Time:	11/18/2003, 0721 MST	**Registration:**	N332BA
Aircraft:	Fairchild Swearingen SA226TC	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	1 None
Flight Conducted Under:	Part 135: Air Taxi & Commuter - Non-scheduled		

Analysis

According to the pilot, he was told to enter left base and was cleared to land. The pilot stated that, when he reduced the airspeed to lower the landing gear, he "heard the gear come down," and he verified "three green in the [landing] gear indicator." He landed the airplane on its "main [landing gear] wheels first" and slowly let the nose of the airplane drop. Although both main landing gear assemblies remained down and locked, the nose landing gear collapsed, allowing the nose of the airplane and both propellers to strike the runway. The airplane slid approximately 3,000 feet, coming to a stop on the right edge of the runway. Several fractured propeller pieces impacted the left and right sides of the fuselage substantially damaging two fuselage station bulkheads. The fuselage bulkhead, forward of the nose landing gear well, was also substantially damaged due to contact with the runway. The pilot said that, during the approach, from base to final, he did not hear a landing gear warning horn. An air traffic control specialist, stated that he told the pilot to enter a left base and that he was cleared to land. The specialist stated that he observed the airplane roll out on a 2-mile final "with the gear down." As the airplane was rolling down the runway the "nose wheel collapsed." An FAA inspector examined the airplane and noted that, according to the Fairchild SA226 Maintenance Manual, the nose landing gear's up-lock mechanism was not properly lubricated, a "critical clearance" measurement between the nose landing gear's bell crank roller and positioning cam was found to be out of tolerance, and when the throttles were retarded, the landing gear warning horn activated, but it was "barely audible." According to the Fairchild SA226 Maintenance Manual, the landing gear should be lubed every 200 hours. The FAA inspector stated that the approved maintenance inspection sheet for the operator, did not show the requirement for the main landing gear or nose landing gear to be lubed every 200 hours.

Probable Cause and Findings

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

the operator's improper maintenance and servicing of the airplane's nose landing gear assembly, resulting in the collapse of the nose landing gear during the landing roll. Contributing factors include the nose section of the airplane's subsequent contact with the runway, the impact of several fractured propeller pieces into the fuselage, and the operator's inadequate maintenance and servicing procedures.

Findings

Occurrence #1: NOSE GEAR COLLAPSED
Phase of Operation: LANDING - ROLL

Findings
1. (C) LANDING GEAR,NOSE GEAR ASSEMBLY - COLLAPSED
2. (C) LANDING GEAR,GEAR LOCKING MECHANISM - NOT ENGAGED
3. LANDING GEAR,GEAR WARNING SYSTEM - MALFUNCTION
4. LANDING GEAR,GEAR INDICATING SYSTEM - FALSE INDICATION
5. (C) LANDING GEAR,NOSE GEAR - IMPROPERLY SERVICED
6. (F) MAINTENANCE,LUBRICATION - INADEQUATE - COMPANY MAINTENANCE PERSONNEL
7. (F) CONDITION(S)/STEP(S) INSUFFICIENTLY DEFINED - COMPANY/OPERATOR MANAGEMENT
8. INSUFF STANDARDS/REQUIREMENTS,OPERATION/OPERATOR - COMPANY/OPERATOR MGMT
9. (C) MAINTENANCE,SERVICE OF AIRCRAFT/EQUIPMENT - IMPROPER - COMPANY MAINTENANCE PERSONNEL
10. INADEQ CERTIFICATION/APPROVAL,OPERATION/OPERATOR - FAA(ORGANIZATION)

Occurrence #2: ON GROUND/WATER ENCOUNTER WITH TERRAIN/WATER
Phase of Operation: LANDING - ROLL

Findings
11. (F) TERRAIN CONDITION - RUNWAY

Factual Information

On November 18, 2003, at 0721 mountain standard time, a Swearingen SA226TC, N332BA, owned and operated by Key Lime Air Corp., Wilsonville, Oregon, was substantially damaged when it impacted terrain during landing roll at Walker Field (GJT), Grand Junction, Colorado. The pilot, the sole occupant on board, was not injured. Visual meteorological conditions prevailed. No flight plan had been filed for this non-scheduled cargo flight being conducted under the provisions of Title 14 CFR Part 135. The flight originated at Rifle, Colorado, at approximately 0709.

According to the pilot, he was cleared to enter left base for a landing on runway 11. The pilot stated that, as he reduced the airspeed to 160 knots, he lowered the landing gear. He stated that he "heard the gear come down," and he verified "three green in the [landing] gear indicator." He stated that he reduced engine power to flight idle as he entered the "base-leg." During the final approach, he had to add engine power, and then just over the runway threshold, he reduced engine power back to flight idle. He landed the airplane on its "main [landing gear] wheels first" and slowly let the nose of the airplane drop. Although both main landing gear assemblies remained down and locked, the nose landing gear collapsed, allowing the nose of the airplane and both propellers to strike the runway. The airplane slid approximately 3,000 feet, coming to a stop on the right edge of the runway. When the propellers struck the runway, several fractured propeller pieces impacted the left and right sides of the fuselage resulting in substantial damage to two fuselage bulkheads. The fuselage bulkhead, forward of the nose landing gear well, was also substantially damaged due to contact with the runway. The pilot said that, during the approach, from base to final, he did not hear a landing gear warning horn.

The pilot stated that the flight was uneventful except for a problem on the previous leg of the flight from Denver International Airport (DEN), Denver, Colorado, to Garfield County Regional Airport (RIL), Rifle, Colorado. During the previous leg, the airplane's "out of trim" warning buzzer came on as he climbed through 16,000 feet msl. He said that it stayed on during the entire flight while at flight level 180 (18,000 feet msl). As he descended through 14,000 feet msl, the warning buzzer turned off.

According to an air traffic control specialist, who was working in the Walker Field/Grand Junction Airport Control Tower, he told N332BA to enter a left base for runway 11 and that he was cleared to land. He stated that he observed N332BA roll out on a 2-mile final "with the gear down." As the airplane was rolling down the runway the "nose wheel collapsed."

According to another pilot, who had flown N332BA on November 11, 2003, he had problems extending the landing gear while on approach to DEN. On the fourth try, the landing gear extended and locked, and he was able to land. According to the pilot, maintenance personnel examined the airplane that evening. The landing gear was cycled several times. No deficiencies were noted.

On December 12, 2003, two FAA maintenance inspectors examined N332BA. Several extension and retraction test were completed while the airplane was in a hanger, on aircraft maintenance jacks, and connected to ground hydraulic power. The landing gear extended and retracted properly. Furthermore, an uneventful free-fall test was completed as well. The FAA inspector stated that, although the landing gear preformed as normal on the first series of tests, he was able to duplicate the nose gear extension failure by manipulating the landing gear's

"bypass-valve." Upon examination of the nose landing gear's up-lock mechanism, he noted that it was not properly lubricated in accordance with the Fairchild SA226 Maintenance Manual. Further examination of the nose landing gear assembly revealed that a "critical clearance," between the nose landing gear's bell crank roller and positioning cam, measured in accordance with the Fairchild SA226 Maintenance Manual, was found to be out of tolerance. After properly servicing the up-lock mechanism, the gear problem could no longer be duplicated.

The FAA inspector also stated that, during the operation of the landing gear, the engine throttles were advanced to keep the landing gear warning horn from constantly sounding. At one point, when the throttles were retarded, the landing gear warning horn did activate, but it was "barely audible." It was noted that, when moving the throttles fore and aft, the buzz, of the landing gear warning horn, was intermittently below reasonable hearing volume.

According to the Fairchild SA226 Maintenance Manual, the landing gear should be lubed every 200 hours. The FAA inspector stated that the approved maintenance inspection sheet for Key Lime Air, did not show the requirement for the main landing gear or nose landing gear to be lubed every 200 hours.

Pilot Information

Certificate:	Airline Transport; Flight Instructor	**Age:**	42, 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:**	No
Instructor Rating(s):	Airplane Multi-engine; Airplane Single-engine; Instrument Airplane	**Toxicology Performed:**	
Medical Certification:	Class 1 Valid Medical--w/ waivers/lim.	**Last Medical Exam:**	07/14/2003
Occupational Pilot:		**Last Flight Review or Equivalent:**	09/09/2003
Flight Time:	2419 hours (Total, all aircraft), 140 hours (Total, this make and model), 2261 hours (Pilot In Command, all aircraft), 206 hours (Last 90 days, all aircraft), 77 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Manufacturer:	Fairchild Swearingen	**Registration:**	N332BA
Model/Series:	SA226TC	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	TC-222E
Landing Gear Type:	Tricycle	**Seats:**	3
Date/Type of Last Inspection:	10/01/2003, Continuous Airworthiness	**Certified Max Gross Wt.:**	12500 lbs
Time Since Last Inspection:	80.5 Hours	**Engines:**	2 Turbo Prop
Airframe Total Time:	23972 Hours	**Engine Manufacturer:**	Garrett
ELT:	Installed, not activated	**Engine Model/Series:**	TPE-331-100A
Registered Owner:	Key Lime Air Corp	**Rated Power:**	840 hp
Operator:	Key Lime Air Corp	**Air Carrier Operating Certificate:**	Air Cargo

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Day
Observation Facility, Elevation:	KGJT, 4858 ft msl	**Observation Time:**	0731 MST
Distance from Accident Site:		**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Temperature/Dew Point:**	-3°C / -6°C
Lowest Ceiling:	None	**Visibility**	10 Miles
Wind Speed/Gusts, Direction:	10 knots, 110°	**Visibility (RVR):**	
Altimeter Setting:	30.33 inches Hg	**Visibility (RVV):**	
Precipitation and Obscuration:			
Departure Point:	Rifle, CO (RIL)	**Type of Flight Plan Filed:**	None
Destination:	Grand Junction, CO (GJT)	**Type of Clearance:**	VFR
Departure Time:	0709 MST	**Type of Airspace:**	Class D

Airport Information

Airport:	Walker Field (GJT)	**Runway Surface Type:**	Asphalt
Airport Elevation:	4858 ft	**Runway Surface Condition:**	Dry
Runway Used:	110	**IFR Approach:**	None
Runway Length/Width:	10501 ft / 150 ft	**VFR Approach/Landing:**	Traffic Pattern

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	N/A	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	39.121667, -108.526667

Administrative Information

Investigator In Charge (IIC):	David C Bowling	**Adopted Date:**	06/30/2004
Additional Participating Persons:	Paul Durrence; Salt Lake City FAA FSDO; Salt Lake City, UT Will L Hicks; Denver FAA FSDO; Denver, CO		
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/.		