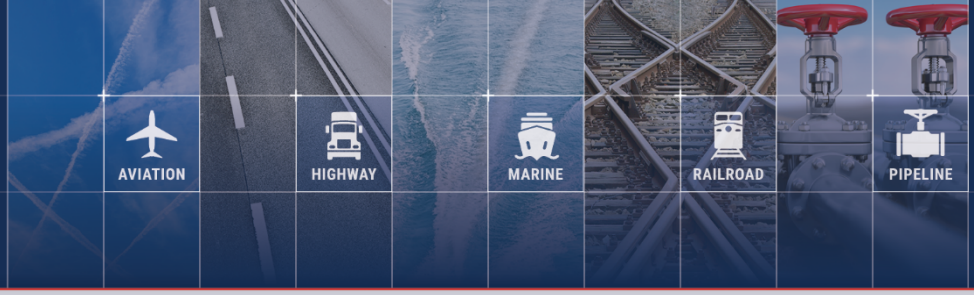

Aviation Investigation Final Report

Location:	Santa Fe, New Mexico	**Accident Number:**	DEN08LA015
Date & Time:	October 20, 2007, 11:10 Local	**Registration:**	N5104K
Aircraft:	Ryan Navion	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	1 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

According to the pilot, the engine start, taxi, and engine run-up prior to takeoff were normal, without issues, or anomalies. The airplane departed from runway 28. After raising the landing gear, the pilot noted that the engine rpms were dropping through 2,100 rpm. The pilot communicated with the air traffic control tower, performed a 90 degree turn to the left to avoid terrain and obstacles, and performed a forced landing to rough, uneven terrain. During the landing the nosegear assembly and the right main landing gear separated. The airplane rotated 90 degrees to the right, slid, and came to rest on the right wing, resulting in substantial damage. An examination of the engine revealed no anomalies. The fuel selector valve was removed for further examination and testing. The valve exhibited fuel staining on the main tank inlet and fuel line fitting. The gascolator exhibited fuel staining on the top left side of the casting and on the bottom at the fuel sump location. During the vacuum test the valve bled down more than 10 inches in one minute. The gascolater was compromised and leaked severely. Leaks in the fuel selector valve and gascolator can allow air into the fuel system and result in the loss of engine power.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: A leak in the fuel selector valve and gascolator that resulted in fuel starvation during takeoff. Contributing to the accident was a lack of suitable terrain for a forced landing.

Findings

Occurrence #1: LOSS OF ENGINE POWER
Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings
1. (C) FUEL SYSTEM,SELECTOR/VALVE - LEAK
2. (C) FUEL SYSTEM,GASCOLATOR - LEAK
3. (C) FLUID,FUEL - STARVATION

Occurrence #2: FORCED LANDING
Phase of Operation: EMERGENCY DESCENT/LANDING

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: EMERGENCY DESCENT/LANDING

Findings
4. (F) TERRAIN CONDITION - NONE SUITABLE
5. TERRAIN CONDITION - GROUND

Factual Information

On October 20, 2007, approximately 1110 mountain daylight time, a Ryan Navion N5104K, piloted by a commercial pilot, was substantially damaged during a forced landing after departing the Santa Fe Municipal Airport (SAF), Santa Fe, New Mexico. Visual meteorological conditions prevailed at the time of the accident. The personal flight was being conducted under the provisions of Title 14 Code of Federal Regulations Part 91 on a visual flight rules flight plan. The pilot sustained minor injuries. The cross country flight was originating at the time of the accident and was en route to Moriarty, New Mexico.

In a telephone conversation with the pilot, he reported that the engine start, taxi, and engine run-up prior to take-off were normal, without issues or anomalies. The airplane departed from runway 28 (6,300 feet by 75 feet, asphalt). After raising the landing gear, the pilot noted that the engine rpms were dropping through 2,100 rpm. The pilot communicated with the air traffic control tower, performed a 90 degree turn to the left to avoid terrain and obstacles, and performed a forced landing to rough, uneven terrain. During the landing, the nose gear assembly and the right main landing gear separated. The airplane rotated 90 degrees to the right, slid, and came to rest on the right wing.

The airplane was examined by an airworthiness inspector with the Federal Aviation Administration (FAA) Flight Standards District Office (FSDO) out of Albuquerque, New Mexico. The rear spar on the right wing was bent, the right landing gear spar was twisted, and the keel member below the engine was bent. An examination of the engine revealed no anomalies.

The fuel selector valve was removed on February 6, 2008, for further testing. The valve exhibited fuel staining on the main tank inlet and fuel line fitting. The valve was not stamped with any part numbers or insignia. The fitting was stamped with the number 6 on one side and the letters ASP on the reverse side. The gascolater exhibited fuel staining on the top left side of the casting and on the bottom at the fuel sump location. Koehler 2201B, ASSY K22 0B was cast in the top cover of the gascolater.

On March 1, 2008, the fuel selector valve and gascolater assembly was tested at the FAA FSDO in Fresno, California. This FSDO has a test bench specifically designed for testing these fuel selector valves. According to the email from the inspector who tested assembly, the valve leaked "more than is allowed in the test." "It bled down more than 10 [inches] in one minute." The inspector reported that the "gascolator was compromised and leak[ed] severely." No further testing was conducted. According to the FAA, leaks in the fuel selector valve and gascolator can allow air into the fuel system and result in the loss of engine power.

Sierra Hotel Aero, Inc. (SHA) currently holds the type certificate for the Ryan Navion. In August of 2005, SHA issued Navion Service Bulletin (SB) 101A - Fuel System - Fuel Selector Valve. The

purpose of the SB was to address "wear, causing internal leakage, valve step air ingestion, and improper valve selector positioning." The fuel selector valve was to be removed and replaced with the appropriate valve.

In May of 2007, SHA issued Navion SB 106A - Fuel System - Inspection of the fuel system continued safe operation. The purpose of the SB was to inspect the fuel system for leaks and inspect and test the fuel selector valves for fuel staining, detent positions, and leaks. The SB vacuum test allowed for one inch of bleed down in one minute. If the valve exceeded this, it was to be replaced, following the guidelines in SB 101A.

According to a photocopy of a logbook page, provided by the FAA, the fuel selector valve was replaced during an annual inspection on April 14, 2000, at tach time of 415.4 hours and an airframe total time of 3,129.2 hours. According to the Pilot/Operator Aircraft Accident Report Form (6120.1) submitted by the pilot, the last annual inspection was conducted on January 25, 2006. According to the FAA, there was no record of compliance with either service bulletin. The airframe total time was 3,503 hours.

In April of 2008, the FAA issued an Airworthiness Directive (AD) 2008-05-14 Sierra Hotel Aero, Inc. The purpose of the AD is to "detect and correct fuel system leaks or improperly operating fuel selector valves, which could result in the disruption of fuel flow to the engine. This failure could lead to engine power loss." The AD allows the owner/operator to follow the SB's issued by SHA or the field service bulletin number one issued by the American Navion Society.

Pilot Information

Certificate:	Commercial	**Age:**	66,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Glider	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	June 1, 2007
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	July 1, 2007
Flight Time:	9880 hours (Total, all aircraft), 220 hours (Total, this make and model), 60 hours (Last 90 days, all aircraft), 11 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Ryan	**Registration:**	N5104K
Model/Series:	Navion	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	NAV-4-2004
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	January 1, 2006 Annual	**Certified Max Gross Wt.:**	2750 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	3503 Hrs at time of accident	**Engine Manufacturer:**	Continental
ELT:	Installed, not activated	**Engine Model/Series:**	E-275
Registered Owner:	On File	**Rated Power:**	225 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KSAF,6348 ft msl	**Distance from Accident Site:**	2 Nautical Miles
Observation Time:	10:53 Local	**Direction from Accident Site:**	180°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	5 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	220°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.04 inches Hg	**Temperature/Dew Point:**	16°C / -5°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Santa Fe, NM (KSAF)	**Type of Flight Plan Filed:**	VFR
Destination:	MORIARTY, NM (0E0)	**Type of Clearance:**	None
Departure Time:	11:10 Local	**Type of Airspace:**	

Airport Information

Airport:	SANTA FE COUNTY MUNI SAF	**Runway Surface Type:**	Grass/turf;Gravel
Airport Elevation:	6348 ft msl	**Runway Surface Condition:**	Dry;Rough
Runway Used:		**IFR Approach:**	None
Runway Length/Width:		**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Minor	**Latitude, Longitude:**	35.616943,-106.083885

Administrative Information

Investigator In Charge (IIC):	Kaiser, Jennifer
Additional Participating Persons:	Bruce Jeffcoat; FAA Flight Standards District Office; Albuquerque, NM Chris Gardner; Sierra Hotel Aero, Inc; St. Paul, MN
Original Publish Date:	May 28, 2008
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=66955