Aviation Investigation Final Report

Location:	Zeeland, Michigan	**Accident Number:**	CHI05LA233
Date & Time:	August 13, 2005, 11:00 Local	**Registration:**	N8828H
Aircraft:	North American Navion A (L-17B)	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	2 Serious
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The airplane impacted terrain following a total loss of engine power after takeoff. Examination of the airplane revealed internal and external leakage of the fuel selector. The airplane manufacturer issued a service bulletin about 13 months before the accident calling for the removal and replacement of fuel selectors which encompassed the accident airplane. This service bulletin was not complied with by the airplane owner who was also the pilot-in-command of the airplane. An engine test run was performed and no anomalies that precluded normal operation were noted. The engine exceeded the engine manufacturer recommend time between overhaul of twelve years. The airplane was not certified and not equipped with shoulder harnesses. The pilot and passenger sustained serious injuries.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The loss of engine power after takeoff due to a fuel selector valve leak and low altitude and low airspeed at the time of power loss. A factor was the recommended maintenance service for the fuel selector not performed by the airplane owner/pilot.

Findings

Occurrence #1: LOSS OF ENGINE POWER(TOTAL) - NONMECHANICAL
Phase of Operation: TAKEOFF

Findings

1. (C) FUEL SYSTEM,SELECTOR/VALVE - LEAK

Occurrence #2: FORCED LANDING
Phase of Operation: EMERGENCY LANDING AFTER TAKEOFF

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

Findings
2. TERRAIN CONDITION - GROUND
3. (C) ALTITUDE - LOW
4. (C) AIRSPEED - LOW
5. MAINTENANCE,OVERHAUL,MAJOR - NOT PERFORMED - PILOT IN COMMAND
6. (F) MAINTENANCE,SERVICE OF AIRCRAFT/EQUIPMENT - NOT PERFORMED - PILOT IN COMMAND

Factual Information

On August 13, 2005, at 1100 eastern daylight time, a North American Navion A (L-17B), N8828H, owned and piloted by a private pilot, received substantial damage on impact with terrain following a total loss of engine power after takeoff from Ottawa Executive Airport, Zeeland, Michigan. Visual meteorological conditions prevailed at the time of the accident. The 14 CFR Part 91 personal flight was not operating on a flight plan. The pilot and passenger sustained serious injuries. The flight was originating at the time of the accident and was en route to Grand Haven, Michigan.

The pilot departed from runway 02 (3,800 feet by 60 feet, asphalt) and about 100-150 feet above ground level the airplane experienced a total loss of engine power. The pilot then "pushed the nose over and moved to the right on grass, landed very hard on [the] grass next to [the] runway."

The North American Navion A (L-17B), serial number NAV-4-828, was registered to the pilot on May 10, 2004. The airplane was manufactured in 1947 and certified under Civil Air Regulations Part 3. Type certificate data sheet information indicated that the airplane was originally certified with a Continental E-185-3 or -9, or an optional IO-470-H engine, and a fuel capacity of 39.5 gallons.

Airplane records show that Brittain Industries 20-gallon wing tip tanks, through supplemental type certificate SA4-915, were installed on June 29, 1992, at a tachometer time of 312 hours. The tachometer was changed during the history of the airplane.

The last logbook entry noting the fuel selector dated October 27, 2003, states that the fuel selector O-ring was replaced at a tachometer time of 235 hours.

The engine was last inspected during an annual inspection dated July 5, 2005, at a total time of 5,188.6 hours and a time since major overhaul of 872.55 hours.

Inspection of the airplane by the Federal Aviation Administration (FAA) and representatives from Sierra Hotel Aero, revealed that 18 gallons of 100 low lead aviation fuel was drained from the main fuel tank, the left fuel tip tank had a few gallons of fuel and the right tip tank was empty. The fuel selector was then removed and upon removal fuel began to pour out from the left tip tank line. Fuel did not pour out of the right tip tank. The fuel strainer was half full of fuel and had grass packed into the drain valve handle. Fuel was puddled under the gascolator.

CAR certification standards did not require the installation of shoulder harnesses in the airplane. The accident airplane was not equipped with shoulder harnesses.

Service Bulletin No. 101, dated June 24, 2004, and Service Bulletin No. 101A, dated August 23, 2005, were issued by Sierra Hotel Aero, Inc. regarding the fuel system fuel selector valve, serial number NAV-4-002 thru NAV-4-2561. Both Service Bulletins called for the removal and replacement of the fuel selector. Service Bulletin No. 101A states:

"Previous design has a history of wear, causing internal leakage, valve step air ingestion and improper valve selector positioning. Internal leakage of the valve is suspected in several cases resulting in inadvertent fuel transfer between main and auxiliary tanks. Improper valve selector positioning and air ingestion has been implicated in several crashes - some fatal. The improper position is more likely to occur as detents in the original body wear, making positive tank selection less obvious."

A Special Airworthiness Information Bulletin, CE-06-11, dated November 29, 2005, was issued by the Federal Aviation Administration and recommends the inspection of the Navion fuel system selector valve for proper operation and make sure the valve cannot introduce air into the fuel line system. An appropriately rated mechanic or repair facility should inspect these units for binding, leakage, or improper operation and replace any defective fuel selector valves with a serviceable unit.

There are no known FAA approved field instructions/procedures to repair these fuel selector assemblies.

On August 26, 2005, the fuel selector valve was tested and examined at Sierra Hotel Aero, Inc. under supervision of the Federal Aviation Administration. Identifying information of the valve indicated that the valve was manufactured by Imperial Valve which was one of two valves manufactured by North American and Ryan. The valve was configured, with an STC part number added, with 3 inlet ports, one for the main tank, one for each left and right tips tank. Testing of the valve was not within the Sierra Hotel Aero, Inc.'s test specifications. The valve was then disassembled and was noted to exhibit rework.

On October 13, 2005, an engine test run was performed at Teledyne Continental Motors under the supervision of the Federal Aviation Administration. The test was within Teledyne Continental Motors test specifications.

The FAA, Sierra Hotel Aero, Inc., and Teledyne Continental Motors were parties to the investigation.

Pilot Information

Certificate:	Private	**Age:**	56,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3	**Last FAA Medical Exam:**	September 1, 2004
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	November 1, 2004
Flight Time:	1561 hours (Total, all aircraft), 1326 hours (Total, this make and model), 1561 hours (Pilot In Command, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	North American	**Registration:**	N8828H
Model/Series:	Navion A (L-17B)	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal; Utility	**Serial Number:**	NAV-4-828
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	Annual	**Certified Max Gross Wt.:**	3100 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	Continental
ELT:	Installed	**Engine Model/Series:**	IO-520-B6B
Registered Owner:	Lambert Damstra	**Rated Power:**	285 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:	BIV,684 ft msl	**Distance from Accident Site:**	9 Nautical Miles
Observation Time:	10:53 Local	**Direction from Accident Site:**	225°
Lowest Cloud Condition:	Scattered / 11000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	0 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	0°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.97 inches Hg	**Temperature/Dew Point:**	23°C / 18°C
Precipitation and Obscuration:			
Departure Point:	Zeeland, MI (Z98)	**Type of Flight Plan Filed:**	None
Destination:	Grand Haven, MI	**Type of Clearance:**	VFR
Departure Time:	11:00 Local	**Type of Airspace:**	

Airport Information

Airport:	Ottawa Executive Z98	**Runway Surface Type:**	Asphalt
Airport Elevation:	740 ft msl	**Runway Surface Condition:**	
Runway Used:	02	**IFR Approach:**	None
Runway Length/Width:	3800 ft / 60 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Serious	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Serious	**Latitude, Longitude:**	42.817222,-85.928054

Administrative Information

Investigator In Charge (IIC):	Gallo, Mitchell
Additional Participating Persons:	John Golda; Federal Aviation Administration; Grand Rapids, MI Chris Gardner; Sierra Hotel Aero, Inc.; South St. Paul, MN Terry Horton; Teledyne Continental Motors; Mobile, AL
Original Publish Date:	August 29, 2006
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=62293