Aviation Investigation Final Report

Location:	Canton, Illinois	**Accident Number:**	CHI03LA221
Date & Time:	July 21, 2003, 20:39 Local	**Registration:**	N2968C
Aircraft:	Navion L-17A	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	1 Minor
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The airplane was substantially damaged during a forced landing following a complete loss of engine power. The pilot stated: "Boost pump was turned on [in preparation for landing]; engine immediately hesitated for 1-2 seconds and then failed (to windmill state)." The pilot's attempts to restart the engine were not successful. Unable to make the runway, the pilot decided to execute a forced landing straight ahead; approximately one-quarter mile from of the airport. The aircraft impacted a bean field and struck a berm, shearing off the landing gear. According to the pilot, approximately ten miles from the destination and prior to the engine failure, he switched from the main fuel tanks to the auxiliary fuel tank. He reported the "switch over was made using boost pump for approximately 30 seconds. Engine operation after switch over was smooth." He noted the elasped flight time at the time the tanks were changed was about 3 hours. The aircraft's main fuel tank capacity was 39-1/2 gallons and fuel burn rate was about 12 gallons per hour. A total of four gallons of fuel was recovered from the main fuel tanks. The auxiliary fuel tank was about half full. The fuel selector was set to the aux tank. A post-accident inspection of the engine revealed that when the electric fuel pump was activated, fuel was observed leaking from the carburetor. The carburetor was subsequently bench tested and torn down. Movement of the mixture control was "sluggish." Of the ten data points measured during the bench test, flow rates at two were determined to be slightly out of acceptable standards. All other test points measured within acceptable limits. No external leakage was observed. Upon teardown, the mixture control needle and spring were found to be covered with grease. According to the manufacturer, the anomalies noted during the carburetor exam would not be expected to significantly affect engine performance or contribute to the loss of power reported by the pilot. According to the Federal Aviation Administration Type Certificate Data Sheet for the L-17A, all auxiliary fuel tank installations are required to have a placard in clear view of the pilot restricting use of the aux tank to level flight only. A placard was not present in the aircraft when inspected after the accident.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: A complete loss of engine power during landing approach for undetermined reasons, as well as the unsuitable terrain for a forced landing encountered by the pilot. Contributing factors were the berm and the crops.

Findings

Occurrence #1: LOSS OF ENGINE POWER(TOTAL) - MECH FAILURE/MALF
Phase of Operation: APPROACH - VFR PATTERN - FINAL APPROACH

Findings
1. (C) REASON FOR OCCURRENCE UNDETERMINED
2. PROCEDURES/DIRECTIVES - NOT FOLLOWED - PILOT IN COMMAND

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

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

Findings
3. (C) UNSUITABLE TERRAIN OR TAKEOFF/LANDING/TAXI AREA - ENCOUNTERED - PILOT IN COMMAND
4. (F) TERRAIN CONDITION - BERM
5. (F) TERRAIN CONDITION - CROP

Factual Information

On July 21, 2003, at 2039 central daylight time, a Navion L-17A, N2968C, owned and piloted by an airline transport pilot, was substantially damaged during a forced landing following a loss of engine power about one-quarter mile east of the Ingersoll Airport (CTK), Canton, Illinois. The airplane was on final approach to runway 27 (3,295 feet by 60 feet, asphalt) at CTK. The personal flight was operating under 14 CFR Part 91 and was not on a flight plan. Visual meteorological conditions prevailed at the time of the accident. The pilot reported minor injuries. The flight departed the Delaware Municipal Airport, Delaware, Ohio, at 1715 central daylight time. The final destination was Manhattan Regional Airport, Manhattan, Kansas, with a planned fuel stop at CTK.

The pilot reported the engine lost power completely as the electric fuel boost pump was turned on in preparation for landing. He stated: "As flight neared final for [runway] 27 at CTK, aircraft was slowed to gear/flap speed (100 mph, [indicated airspeed]), gear lowered and (full) flaps deployed. Boost pump was turned on; engine immediately hesitated for 1-2 seconds and then failed (to windmill state)." He noted the aircraft was at 800 feet above ground level when the engine failed. With the landing gear and flaps extended, and the propeller windmilling, the descent rate was "high, approximately 1,000 [feet per minute]," according to the pilot.

The pilot's attempts to restart the engine were not successful. Unable to make the runway, the pilot decided to executed a forced landing straight ahead; approximately one-quarter mile from the airport. The aircraft impacted a bean field and struck a berm, shearing off the landing gear.

According to the pilot, approximately ten miles from CTK, he switched from the main fuel tanks to the auxiliary fuel tank. He reported the "switch over was made using boost pump for approximately 30 seconds. Engine operation after switch over was smooth." He noted the elasped flight time at the time the tanks were changed was about 3 hours. The aircraft's main fuel tank capacity was 39-1/2 gallons and fuel burn rate was about 12 gallons per hour.

A post-accident examination was conducted. The landing gear had collapsed and the aircraft was resting upright on the ground. The fuselage skin was wrinkled on both sides immediately aft of the cabin area/wing root fairing. The engine and cowling remained intact. The propeller was oriented horizontally at the accident site. The right side (descending) blade was bent aft about 45 degrees at a point approximately 1/3 of the span from the spinner. No other damage to either propeller blade was observed.

A total of four gallons of fuel was recovered from the main fuel tanks. The auxiliary fuel tank was about 1/2 full. The fuel selector was set to the aux tank. A fuel smell was present in the engine compartment. The auxilary fuel tank was located under the rear passenger seat and had an approximate capacity of 20 gallons. The outlet was located at the aft center portion, on

the bottom of the tank. The fuel outlet fed into a small header tank.

Engine continuity was verified through crankshaft rotation. Compression was present at all cylinders. The magnetos and spark plugs operated properly when tested. The fuel selector functioned properly, however, the selector leaked air under suction. No sign of leakage was detected when pressure was applied. Fuel flow was observed through the electric fuel boost pump when power was applied to the pump. However, fuel was observed leaking from the carburetor when the pump was activated. The carburetor was removed for further inspection.

The carburetor was returned to the manufacturer for examination under supervision of the NTSB. An external inspection observed no damage to the carburetor. The throttle control rotated smoothly. All fittings and levers were present and in good condition. Movement of the mixture control, however, was "sluggish."

A bench flow test of the carburetor was conducted. Of the ten data points measured, flow rates at two were determined to be out of acceptable standards. Specifically, test point 4 measured 34.0 pounds per hour (pph), where the acceptable range was 34.85 - 36.95 pph. Test point 5 measured 46.5 pph, where the acceptable range was 46.7 - 49.5 pph. All other test points measured within acceptable limits. No external leakage was noted during the bench test.

Upon teardown, the mixture control needle and spring were found to be covered with grease. The fuel inlet screen was clean; all passages, bleeds and jets were unobstructed; and the gaskets and diaphrams appeared undamaged.

According to the Federal Aviation Administration Type Certificate Data Sheet for the L-17A, all auxiliary fuel tank installations are required to have a placard in clear view of the pilot restricting use of the aux tank to level flight only. A placard was not present in the aircraft when inspected after the accident.

Pilot Information

Certificate:	Airline transport	**Age:**	49,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	Airplane; Helicopter	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	December 13, 2002
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	September 19, 2002
Flight Time:	5700 hours (Total, all aircraft), 400 hours (Total, this make and model), 5500 hours (Pilot In Command, all aircraft), 40 hours (Last 90 days, all aircraft), 15 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Navion	**Registration:**	N2968C
Model/Series:	L-17A	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal; Utility	**Serial Number:**	NAV-4-1070
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	April 1, 2003 Annual	**Certified Max Gross Wt.:**	2750 lbs
Time Since Last Inspection:	32 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	5300 Hrs at time of accident	**Engine Manufacturer:**	Continental
ELT:	Installed	**Engine Model/Series:**	E-185-9
Registered Owner:	On file	**Rated Power:**	205 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Dusk
Observation Facility, Elevation:	PIA,660 ft msl	**Distance from Accident Site:**	18 Nautical Miles
Observation Time:	20:54 Local	**Direction from Accident Site:**	70°
Lowest Cloud Condition:	Few / 6000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	3 knots / 0 knots	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	300°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.8 inches Hg	**Temperature/Dew Point:**	22°C / 17°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Delaware, OH (DLZ)	**Type of Flight Plan Filed:**	None
Destination:	Canton, IL (CTK)	**Type of Clearance:**	None
Departure Time:	17:15 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	Ingersoll CTK	**Runway Surface Type:**	
Airport Elevation:	684 ft msl	**Runway Surface Condition:**	
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:**	40.570835,-90.080276

Administrative Information

Investigator In Charge (IIC):	Sorensen, Timothy
Additional Participating Persons:	James Balazs; FAA – Springfield FSDO; Springfield, IL
Original Publish Date:	September 1, 2004
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=57563