Aviation Investigation Final Report

Location:	Maple Lake, Minnesota	**Accident Number:**	CEN18LA237
Date & Time:	June 22, 2018, 18:30 Local	**Registration:**	N736MM
Aircraft:	Zenith STOL CH701	**Aircraft Damage:**	Substantial
Defining Event:	Loss of engine power (total)	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The private pilot and the flight instructor were flying in the airport traffic pattern. The pilot indicated that he smelled a "burnt electrical" smell after takeoff, so they decided to remain in the traffic pattern. After about 10 minutes of flight, the engine began to backfire and then lost total power.

The pilot switched fuel tanks, turned the fuel boost pump on, and attempted a restart of the engine with no success. The pilot reported that he initially decided to attempt a forced landing on the runway. However, he assessed that he would be unable to clear power lines and instead decided to execute a forced landing onto a road. The airplane landed short of the road, impacted a ditch, and came to rest in a grass-covered field. During the forced landing sequence, the nosewheel collapsed, which resulted in substantial damage to the fuselage and engine mount, and the right wing impacted a sign and sustained substantial damage.

Postaccident examination of the airframe and engine revealed no preimpact mechanical malfunctions or failures with the airframe and engine that would have precluded normal operation. However, the engine would not start after multiple attempts. The origin of the "burnt electrical" smell could not be determined. Fuel was found on board; thus, fuel exhaustion did not occur. The reason for the loss of engine power could not be determined based on the available evidence.

Probable Cause and Findings

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

The total loss of engine power for reasons that could not be determined based on the available evidence.

Findings

Not determined	(general) - Unknown/Not determined
Environmental issues	Sign/marker - Contributed to outcome

Factual Information

History of Flight

Approach-VFR pattern downwind	Loss of engine power (total) (Defining event)
Approach-VFR pattern downwind	Attempted remediation/recovery
Approach-VFR pattern downwind	Off-field or emergency landing
Landing	Collision with terr/obj (non-CFIT)

On June 22, 2018, about 1830 central daylight time, an amateur-built experimental Zenith Aircraft Company STOL CH-701 airplane, N736MM, sustained substantial damage during a forced landing after a loss of engine power in the traffic pattern at Maple Lake Municipal Airport (MGG), Maple Lake, Minnesota. The left seat private pilot and the right seat certificated flight instructor (CFI) sustained no injury. The airplane was registered to a private individual and was operated by the pilot under the provisions of Title 14 *Code of Federal Regulations* Part 91 as a visual flight rules personal flight. Day visual meteorological conditions prevailed at the time of the accident, and no flight plan was filed. The flight originated from MGG about 1820.

In a conversation with the National Transportation Safety Board investigator-in-charge on June 26, the pilot reported that the purpose of the local area flight was to fly with his friend, who was a CFI, to help increase his dual pilot flight instruction time. The pilot reported that, upon taking off, he smelled a "burnt electrical" smell in the cockpit. The pilot and the CFI decided to remain in the traffic pattern due to the smell. On the second traffic pattern circuit, while on the downwind leg for runway 10, the smell dissipated, and the engine began to backfire. The backfiring sequence occurred about 10 minutes into the flight. During the backfiring sequence, the pilot observed the engine tachometer "jumping all over the gauge" from zero to a maximum indication. About 10 seconds after the backfiring began, the engine experienced a total loss of power while about 700 ft above ground level and at an airspeed of about 50 miles per hour.

The pilot attempted to troubleshoot the engine failure by switching fuel tanks, turning the fuel boost pump on, and attempting a restart of the engine with no success. The pilot reported he decided to attempt a forced landing to runway 10. However, due to the presence of power lines that he would be unable to maintain clearance over, the pilot attempted a forced landing onto a road. The airplane landed about 20 ft short of the road and impacted a ditch. The airplane came to rest in a grass-covered field about 400 ft to the northwest of the runway threshold for runway 10, as shown below in figure 1. During the forced landing, the nosewheel collapsed resulting in substantial damage to the fuselage and the engine mount. The right wing sustained substantial damage from impacting a street sign.

Figure 1 – View of the front of the airplane (courtesy of the Wright County Sheriff's Office).

The pilot reported that the airplane had an adequate amount of fuel for the flight and there were no known previous issues with the airframe or engine that would have precluded normal operation. The owner of the airplane reported the airplane departed with over ten gallons of fuel onboard.

On June 26, 2018, a Federal Aviation Administration (FAA) aviation safety inspector (ASI) from the FAA Minneapolis Flight Standards District Office traveled to MGG to examine the airframe and engine. Adequate fuel was found onboard the airplane. Flight control continuity was established for the airframe. The airplane's engine originated from a Suzuki Geo Metro subcompact automobile. All components of the engine were present and intact. All engine lines, wires, and hoses appeared to be connected. The engine would not start after multiple attempts. The FAA ASI attempted to use a vehicle code reader; however, no data was gathered because the reader required the vehicle identification number from the Suzuki Geo Metro that the engine originated from. No evidence or a pre or postimpact fire were noted with the airframe and engine. During the examination, no preimpact mechanical malfunctions or failures were found with the airframe and engine.

Pilot Information

Certificate:	Private	**Age:**	52,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	5-point
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	May 9, 2018
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	June 22, 2018
Flight Time:	(Estimated) 3180 hours (Total, all aircraft), 1.5 hours (Total, this make and model), 54 hours (Last 90 days, all aircraft), 19 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Zenith	**Registration:**	N736MM
Model/Series:	STOL CH701	**Aircraft Category:**	Airplane
Year of Manufacture:	2016	**Amateur Built:**	Yes
Airworthiness Certificate:	Experimental (Special)	**Serial Number:**	7-8943
Landing Gear Type:	Tricycle	**Seats:**	2
Date/Type of Last Inspection:		**Certified Max Gross Wt.:**	1100 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	Suzuki / Raven ReDrive
ELT:		**Engine Model/Series:**	1300SVS
Registered Owner:		**Rated Power:**	115 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KMGG,1028 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	23:35 Local	**Direction from Accident Site:**	250°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	None / None
Wind Direction:		**Turbulence Severity Forecast/Actual:**	N/A / N/A
Altimeter Setting:	29.81 inches Hg	**Temperature/Dew Point:**	27°C / 17°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Maple Lake, MN (MGG)	**Type of Flight Plan Filed:**	None
Destination:	Maple Lake, MN (MGG)	**Type of Clearance:**	None
Departure Time:	18:20 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	MAPLE LAKE MUNI-BILL MAVENCAMP MGG	**Runway Surface Type:**	Grass/turf
Airport Elevation:	1028 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	10	**IFR Approach:**	None
Runway Length/Width:	2796 ft / 60 ft	**VFR Approach/Landing:**	Forced landing;Traffic pattern

Wreckage and Impact Information

Crew Injuries:	2 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	45.237777,-93.991386(est)

Administrative Information

Investigator In Charge (IIC):	Hodges, Michael
Additional Participating Persons:	Ray Peterson; FAA Minneapolis FSDO; Minneapolis, MN
Original Publish Date:	June 3, 2020
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=97561

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