

On October 5, 2019, about 1030 central daylight time, a Zenair Zenith CH-701 airplane, N701BJ, impacted terrain near Garden Ridge, Texas, following a partial loss of engine power after takeoff. The private pilot and passenger were not injured. The airplane was substantially damaged. The airplane was registered to the pilot and operated as a Title 14 *Code of Federal Regulations Part 91* personal flight. Visual meteorological conditions prevailed, and the flight which was operating without a flight plan. The flight was originating from Kitty Hawk Flying Field Ultralight Flightpark (TS67), Garden Ridge, Texas, when the accident occurred.

The pilot reported the airplane was fully loaded with fuel, it started normally, and all preflight checks were normal. The airplane reached 10-15 ft above the ground during takeoff when the engine RPM rolled back "opposite of a surge." The pilot pulled the throttle control back to idle and landed straight ahead in an area of brush off the end of the runway. The right main gear and nose gear collapsed, and the fuselage exhibited buckling.

An examination of the engine and airframe was conducted by a representative of Rotech and a Federal Aviation Administration inspector. No anomalies were found during the airframe examination. When first examined, the engine was attached to the engine mount and firewall of the airplane, and the engine cowling was still in place. The retaining nut for the 2/4 cylinder carburetor choke lever was not present and the choke lever was found detached at the control valve. The fuel feed line to the mechanical fuel pump was badly cracked. The carburetor float bowls were removed and inspected. Some debris was found in the 2/4 carburetor; however, the main jet was clear of any obstructions. Examination also found there was no fuel return line installed in the airplane as recommended by the engine manufacturer, the No. 3 cylinder exhaust pipe was loose, and the air filters were dirty.

The damaged propeller was removed from the engine and a new propeller was installed for test run purposes. No other repairs were made to the engine. The engine was turned over with the use of the engine's electric starter. After a few rotations the engine started and ran at idle. The throttle was then advanced to around 3,500 rpm and then to 4,000 RPM. All engine parameters appeared normal after several minutes and the engine was shut down. No anomalies were noted during the engine test run.

The pilot reported at the time of the accident the temperature was 80° F and the dewpoint was 72° F. A review of the Federal Aviation Administration's carburetor icing probability chart indicated that weather conditions at the time of the accident were conducive to serious carburetor icing at glide power.~~A review of multiple carburetor icing probability charts was inconclusive as to whether the airplane was operating in conditions conducive to carburetor icing. Different icing probability charts indicated conditions varying from no probability of icing, light icing at cruise or descent power, moderate icing at cruise power, and serious icing at descent power.~~