Aviation Investigation Final Report

Location:	Marshall, Missouri	**Accident Number:**	CEN17LA303
Date & Time:	August 4, 2017, 09:00 Local	**Registration:**	N3047J
Aircraft:	Cessna A188B	**Aircraft Damage:**	Substantial
Defining Event:	Loss of control in flight	**Injuries:**	1 None
Flight Conducted Under:	Part 137: Agricultural		

Analysis

After takeoff for the agricultural application flight and when the commercial pilot reduced engine power to climb, the engine "surged." He increased the throttle, but the engine "surged" again. He subsequently applied full throttle, but he was unable to maintain a positive climb rate. The airplane gradually settled into a bean field off the end of the runway. The airplane impacted a fence before coming to rest in an adjacent field. The pilot stated that the airplane seemed to be "sagging" after takeoff but that the engine instrument indications appeared to be normal.

Postaccident engine examination did not reveal evidence of any preimpact anomalies that would have precluded normal operation. The reason for the engine surging reported by the pilot could not be determined. According to the pilot, the airspeed indicator was inoperative at the time of the accident. It is likely that the pilot's inability to monitor the airspeed due to the lack of an operative airspeed indicator led to the pilot's failure to maintain adequate airspeed, his exceedance of the airplane's critical angle of attack and the subsequent aerodynamic stall/mush and degraded climb performance.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's inability to accurately monitor the airplane's airspeed after takeoff due to an inoperative airspeed indicator, which resulted in the pilot's failure to maintain adequate airspeed and his exceedance of the airplane's critical angle of attack and the subsequent aerodynamic stall/mush and degraded climb performance.

Findings

Personnel issues	Aircraft control - Pilot
Aircraft	Angle of attack - Capability exceeded
Aircraft	Airspeed - Not attained/maintained
Aircraft	Climb rate - Not attained/maintained
Aircraft	Instrument panel - Inoperative
Environmental issues	Fence/fence post - Contributed to outcome

Factual Information

History of Flight

Takeoff	Miscellaneous/other
Takeoff	Loss of control in flight (Defining event)
Emergency descent	Off-field or emergency landing
Emergency descent	Controlled flight into terr/obj (CFIT)

This report was modified on March 8, 2018. Please see the docket for this accident to view the original report.

On August 4, 2017, about 0900 central daylight time, a Cessna A188B airplane, N3047J, was substantially damaged when it settled into a bean field after takeoff from runway 18 (5,006 feet by 75 feet, concrete) at the Marshall Memorial Municipal Airport (MHL), Marshall, Missouri. The pilot was not injured. The airplane was registered to and operated by private individuals as a 14 *Code of Federal Regulations* Part 137 flight. Visual meteorological conditions prevailed. The flight was not operated on a flight plan. The local aerial application flight was originating at the time of the accident.

The pilot stated that the airplane was loaded with about 120 gallons of fertilizer and 54 gallons of fuel at the time of the accident takeoff. The pretakeoff run-up was normal. After takeoff, he reduced engine power for climb. When he did so, the engine "surged." He responded by increasing the throttle "a little," but the engine "surged" again. He subsequently applied full throttle, but was unable to maintain a positive rate of climb. The airplane settled into a bean field and encountered a fence before coming to rest in the adjoining corn field.

The pilot informed a Federal Aviation Administration (FAA) inspector that the airplane seemed to be "sagging" after takeoff. The engine indications appeared to be normal before the accident. The airplane had a full load of fertilizer and fuel at the time of the accident takeoff. The pilot also informed the inspector that the airspeed indicator had been inoperative for some time.

A postaccident engine examination conducted by FAA inspectors did not reveal any anomalies consistent with a preimpact loss of engine power. The wing flaps were positioned at 20 degrees deflection at the time of the exam.

The airplane flight manual noted that the recommended takeoff wing flap setting for restricted category airplanes was 10 degrees. The approved takeoff range for normal category airplanes was 0 to 20 degrees. The information manual indicated that optimum takeoff performance at heavy weights is obtained using 10 degrees wing flaps.

FAA regulations (14 CFR 91.205) require an operational airspeed indicator for civil aircraft operating under a standard airworthiness certificate. The accident airplane was operating under a restricted category airworthiness certificate and was not required to comply with that regulation.

Pilot Information

Certificate:	Commercial	**Age:**	22,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Single
Other Aircraft Rating(s):	None	**Restraint Used:**	Lap only
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 Without waivers/limitations	**Last FAA Medical Exam:**	April 26, 2017
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	April 7, 2017
Flight Time:	475 hours (Total, all aircraft), 210 hours (Total, this make and model), 210 hours (Last 90 days, all aircraft), 99 hours (Last 30 days, all aircraft), 0 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N3047J
Model/Series:	A188B	**Aircraft Category:**	Airplane
Year of Manufacture:	1979	**Amateur Built:**	
Airworthiness Certificate:	Restricted (Special)	**Serial Number:**	18803596T
Landing Gear Type:	Tricycle	**Seats:**	1
Date/Type of Last Inspection:	May 23, 2017 Annual	**Certified Max Gross Wt.:**	4200 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	7845.1 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	Not installed	**Engine Model/Series:**	IO-540-S1A5
Registered Owner:	On file	**Rated Power:**	300 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	Agricultural aircraft (137)

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	MHL,779 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	08:55 Local	**Direction from Accident Site:**	180°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	6 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	300°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.17 inches Hg	**Temperature/Dew Point:**	17°C / 11°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Marshall, MO (MHL)	**Type of Flight Plan Filed:**	None
Destination:	Marshall, MO (MHL)	**Type of Clearance:**	None
Departure Time:	09:00 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	Marshall Memorial Muni MHL	**Runway Surface Type:**	Concrete
Airport Elevation:	779 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	18	**IFR Approach:**	None
Runway Length/Width:	5006 ft / 75 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	39.095554,-93.202774(est)

Administrative Information

Investigator In Charge (IIC):	Sorensen, Timothy
Additional Participating Persons:	David S Johnson; FAA Flight Standards; Kansas City, MO
Original Publish Date:	March 14, 2018
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=95756