Aviation Investigation Final Report

Location:	Colorado Springs, Colorado	**Accident Number:**	CEN18LA335
Date & Time:	August 16, 2018, 11:00 Local	**Registration:**	N146AC
Aircraft:	Cessna R172E	**Aircraft Damage:**	Substantial
Defining Event:	Unknown or undetermined	**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The flight instructor reported that the student pilot was flying the airplane during the first takeoff of an instructional flight. The engine sounded normal and was operating properly with a fuel flow of about 14 gallons per hour and between 2,800 to 2,900 rpm. The instructor stated that, during the takeoff roll, the student rotated the airplane about 60 mph. Initially, the pitch was high, but then the student lowered the airplane's nose to the horizon. Subsequently, the airplane reached about 100 ft above ground level but then stopped climbing, and the airspeed began decreasing. The instructor reported that the fuel flow and rpm were still normal.

The instructor stated that he took the flight controls, lowered the flaps to 10°, and lowered the airplane's nose to hold 55 to 60 mph, "hoping that the ground effect would enable a speed increase." He turned the airplane right to avoid a tree line and conducted a forced landing in a field. The airplane landed on its main wheels, but the nose landing gear impacted rough terrain, and the airplane nosed over, which resulted in substantial damage to the wings and fuselage.

Postaccident examination of the airframe, engine, and propeller governor revealed no evidence of any preaccident mechanical malfunctions or failures that would have precluded normal operation. Therefore, the reason for the airplane's failure to maintain a climb could not be determined.

Probable Cause and Findings

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

The airplane's failure to maintain a climb after takeoff, which resulted in a forced landing on unsuitable terrain; the reason for the airplane's failure to climb could not be determined based on the available evidence.

Findings

Not determined	(general) - Unknown/Not determined
Environmental issues	Rough terrain - Effect on operation

Factual Information

History of Flight

Takeoff	Unknown or undetermined (Defining event)
Landing	Off-field or emergency landing
Landing-landing roll	Collision with terr/obj (non-CFIT)

On August 16, 2018, about 1100 mountain daylight time, a Cessna R172E, N146AC, sustained substantial damage during a forced landing after takeoff from the USAF Academy Airfield (AFF), Colorado Springs, Colorado. The flight instructor and student pilot were not injured. The airplane was owned and operated by the United States Air Force under the provisions of Title 14 *Code of Federal Regulations* Part 91 as an instructional flight. Visual meteorological conditions prevailed at the time of the flight, which was not on a flight plan. The flight was departing from AFF on a local flight.

The flight instructor reported that the preflight and run-up were normal. He stated that he intended to stay in the traffic pattern to practice landings. He reported that the student pilot was flying the airplane during takeoff from the 4,480 ft by 75 ft asphalt runway. The engine was operating properly with a fuel flow of about 14 gallons per hour and 2,800 – 2,900 rpm, and the engine sounded normal. During the takeoff roll, the student pilot rotated about 60 mph. Initially, the pitch was high but then she lowered the nose to the horizon. The flight instructor reported that the airplane attained about 100 ft of altitude above ground level; however, the airplane was not climbing, and the airspeed was decreasing with normal fuel flow and rpm. The flight instructor took the controls, lowered the flaps to 10°, and lowered the nose to hold 55 – 60 mph, "hoping that the ground effect would enable a speed increase." He turned the airplane to the right to avoid a tree line and executed a forced landing in a field. The airplane landed on its main wheels, but the nose landing gear impacted rough terrain and the airplane nosed over, resulting in substantial damage to the wings and fuselage.

The airplane's maintenance logbooks indicated that the last annual maintenance inspection was performed on January 7, 2018. The airplane had a total time of 10,571.8 hours with an engine hour meter indicating 1,566.6 hours. The engine logbook indicated that the engine had been installed on the airplane during the last annual maintenance inspection on January 7, 2018. The engine was a 210 horsepower Continental IO-360-DB, serial number 808785-R, with a rated rpm of 2,800 rpm. The engine had 5,680.1 hours total time and 0.0 hours since major overhaul. The tach time on the day of the accident was 1,634.9 hours and it had operated 68.3 hours since the last annual inspection.

The engine was shipped to the manufacturer for an examination and an engine run in a test stand. During the initial engine run, the engine was able to reach full rpm and produced rated horsepower; however, during subsequent engine runs, it only reached 2,600 rpm. The fuel system was checked, and it was determined that two fuel nozzles were partially clogged. The fuel nozzles were cleaned, and the engine was run again on the test stand. The engine operated normally and reached approximately 2,830 rpm. The engine power was reduced to idle speed and advanced to full throttle several times. The engine

responded without hesitation and reached over 2,800 rpm each time the throttle was advanced to full throttle.

The propeller governor was shipped to the manufacturer for bench testing. The examination and bench test of the propeller governor revealed no indications of any type of governor failure or malfunction prior to impact, and the governor met all the tested specifications.

The 58-year-old pilot held an airline transport certificate with airplane single-engine land, airplane multi-engine land, and airplane instrument ratings, as well as being a flight instructor pilot with airplane single-engine, airplane multi-engine, and airplane instrument ratings. He had a total of 17,631 flight hours which included 2,469 hours in single-engine airplanes, and 20 hours in make and model of the accident airplane.

At 1058, the surface weather observation at AFF was: wind 360° at 9 knots; visibility 10 miles; few clouds at 17,000 ft; scattered clouds at 20,0000 ft and 22,000 ft; temperature 26° C; dew point 6° C; and altimeter 30.29 inches of mercury.

Pilot Information

Certificate:	Airline transport; Flight engineer	**Age:**	68,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane single-engine	**Toxicology Performed:**	No
Medical Certification:	Class 3 Without waivers/limitations	**Last FAA Medical Exam:**	September 6, 2016
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	17631 hours (Total, all aircraft), 20 hours (Total, this make and model), 15527 hours (Pilot In Command, all aircraft), 68 hours (Last 90 days, all aircraft), 42 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

Student pilot Information

Certificate:	None	**Age:**	20,Female
Airplane Rating(s):	None	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	None None	**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	6 hours (Total, all aircraft), 0 hours (Total, this make and model), 6 hours (Last 90 days, all aircraft), 6 hours (Last 30 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N146AC
Model/Series:	R172E	**Aircraft Category:**	Airplane
Year of Manufacture:	1967	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	R1720147
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	January 7, 2018 Annual	**Certified Max Gross Wt.:**	2500 lbs
Time Since Last Inspection:	65 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	10571 Hrs as of last inspection	**Engine Manufacturer:**	Continental Motors
ELT:	Installed, not activated	**Engine Model/Series:**	IO-360-DB
Registered Owner:		**Rated Power:**	210 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:	AFF,6576 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	10:58 Local	**Direction from Accident Site:**	0°
Lowest Cloud Condition:	Few / 17000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	9 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	360°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.29 inches Hg	**Temperature/Dew Point:**	26°C / 6°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Colorado Springs, CO (AFF)	**Type of Flight Plan Filed:**	None
Destination:	Colorado Springs, CO (AFF)	**Type of Clearance:**	VFR
Departure Time:	11:00 Local	**Type of Airspace:**	

Airport Information

Airport:	USAF Academy Airfield AFF	**Runway Surface Type:**	Asphalt
Airport Elevation:	6576 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	34	**IFR Approach:**	None
Runway Length/Width:	4480 ft / 75 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	38.973331,-104.819999

Administrative Information

Investigator In Charge (IIC):	Silliman, James
Additional Participating Persons:	Vaugh Hanson; FAA Denver FSDO; Denver, CO Kurt Gibson; Continental Motors; Mobile, AL
Original Publish Date:	April 20, 2020
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=98087