Aviation Investigation Final Report

Location:	Ramona, California	**Accident Number:**	WPR17FA063
Date & Time:	February 12, 2017, 14:10 Local	**Registration:**	N2179L
Aircraft:	Cessna 172	**Aircraft Damage:**	Substantial
Defining Event:	Controlled flight into terr/obj (CFIT)	**Injuries:**	1 Fatal, 2 Minor
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The airplane departed on an instructional flight with a flight instructor in the right front seat, a student pilot in the left front seat, and a passenger in the right rear seat. They completed maneuvers in a practice area, flew to a valley located in mountainous terrain, and performed a simulated engine failure maneuver. The flight instructor and the student pilot provided differing accounts of the events that followed the simulated engine failure maneuver. According to the flight instructor, after performing the simulated engine failure maneuver, the student pilot advanced the throttle to full power and turned east toward rising terrain. The flight instructor reported that the gauges all read normal, but the airplane would not outclimb the approaching terrain. He took over the controls but could not turn left or right due to the rising terrain on both sides of the airplane. According to the instructor, he had no choice but to crash the airplane.

According to the student pilot, the flight instructor told him to turn east towards the rising terrain and then took control of the airplane. The student reported that the flight instructor made a comment about demonstrating the airplane's performance, added full power, leaned the mixture, flew straight for 5 seconds, and then said an expletive shortly before the airplane crashed into a mountain.

Flight track data recovered from a personal electronic device onboard the airplane showed that, after the simulated engine failure maneuver, the airplane climbed and turned east entering terrain that rose in front and on both sides of the airplane. The track continued to climb for about 1 minute 5 seconds before reaching the accident site.

Postaccident examination of the airplane revealed no evidence of any preimpact mechanical malfunctions or failures that would have precluded normal operation. According to the pilot's operating handbook for the airplane, at its maximum gross weight, under standard conditions, with no flaps and full throttle, the airplane was capable of climbing at a maximum rate of 625 ft per minute, at 73 knots indicated airspeed, at 2,000 ft mean sea level (msl).

The flight track data for the final 1 minute 5 seconds of the flight indicated that the airplane climbed about 584 ft, corresponding to a rate of climb slightly less than the published maximum rate of climb. During the climb, the left turn towards the east would have decreased the rate-of-climb performance, which likely accounts for the rate of climb being less than the published maximum.

During the impact sequence, a tree penetrated up through the center of the cabin floor just behind the front seats and exited through the cabin roof. The airplane came to rest upright. The instructor was able to unbuckle his seatbelt but had to cut the student pilot's seatbelt to free him. After examining the passenger, the instructor realized that her seatbelt was not latched and that her injuries were fatal.

The autopsy of the passenger determined her cause of death to be blunt force injuries of the head and neck. These injuries were likely due to impact with the tree that penetrated the cabin area.

Probable Cause and Findings

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

The flight instructor's failure to ensure that adequate clearance from terrain was maintained after performance of a simulated engine failure maneuver, which resulted in controlled flight into terrain.

Findings

Personnel issues	Monitoring environment - Instructor/check pilot
Personnel issues	Delayed action - Instructor/check pilot
Environmental issues	Mountainous/hilly terrain - Decision related to condition

Factual Information

History of Flight

Maneuvering-low-alt flying	Simulated/training event
Maneuvering-low-alt flying	Attempted remediation/recovery
Maneuvering	Controlled flight into terr/obj (CFIT) (Defining event)

On February 12, 2017, about 1410 Pacific standard time, a Cessna 172S airplane, N2179L, impacted terrain while maneuvering near the Pamo Valley about 5 miles north of Ramona, California. The flight instructor and the student pilot sustained minor injuries, and the passenger was fatally injured. The airplane sustained substantial damage. The airplane was registered to American Aviation Academy, Inc, Gillespie, California, and operated by the company under the provisions of Title 14 *Code of Federal Regulations* Part 91. Visual meteorological conditions prevailed, and no flight plan was filed for the local instructional flight, which originated from Gillespie Field Airport (SEE), Gillespie, California about 1325.

A witness saw the airplane flying northbound from his home located in the Pamo Valley, about 1 mile southwest of the accident site. The witness watched as the airplane turned and flew straight towards his location. The airplane passed over the witness about 100-150 ft above ground level (agl) when he made "eye contact" with the pilot. After the airplane passed by, the witness heard the "full acceleration of the engine" as it flew towards the mountain to the east of the witness's location. He watched as the airplane turned towards the northeast; he then lost sight of it over a ridge.

The flight instructor reported that this was his third instructional flight of the day. The passenger was a student pilot who joined the flight when her own instructional flight was cancelled. During the preflight of the airplane, the passenger was added to the company's manifest, and she sat in the rear right seat. The student pilot and the flight instructor were seated in the forward left and right seats respectively. The flight instructor reported they performed the usual protocols before the engine start up until prior to takeoff. They departed a practice area about 8 miles north of Ramona and performed flight training maneuvers.

After departing the practice area, they performed a simulated engine failure maneuver over Pamo Valley about 1.5 miles west of the accident site. According to the flight instructor, the maneuver was completed at least 700 ft agl, and the student pilot advanced the throttle to full power and turned left about 90° to an east heading, toward rising terrain. The flight instructor stated that the gauges all read normal, but the airplane could not outclimb the rising terrain ahead. He verified that all settings were normal and took over the controls from the student pilot. The flight instructor stated that he could not turn left or right due to the rising terrain on both sides and decided to stay centered over the narrow and wooded ravine that ascended the mountain. He stated that he had no choice but to crash the airplane. He further stated that before impacting terrain, he brought back the throttle halfway then advanced it to full power to cushion the impact with the trees. The airplane came to rest upright. The flight instructor was able to unbuckle his seatbelt but had to cut the student pilot's seatbelt to free him. After examining the

passenger, he realized that her seatbelt was not latched and that she was fatally injured. First responders arrived on scene about an hour after the accident.

According to the student pilot, while flying south over Pamo Valley, the flight instructor told him to turn left toward the east. He looked up and said "mountain, mountain." The flight instructor then took control of the airplane saying, "I have control, I have the plane." The student stated that the airplane was running fine and that there were no power output problems. According to the student, the flight instructor said, "I will show you performance like Big Bear," added full power, leaned the mixture, flew straight for 5 seconds, and then said an expletive shortly before the airplane crashed into the mountain.

A personal electronic device was recovered from the airplane and revealed the accident flight track data was obtained from the ForeFlight application on the device. The track data depicted the airplane departing SEE and performing maneuvers between 2,000 and 5,100 ft agl in a practice area about 5 miles west of the accident site. The airplane departed the practice area to the east and made multiple turns over Pamo Valley, descending to about 285 ft agl. The airplane then climbed and turned east entering an area of terrain that rose in front and on both sides of the airplane. The track continued to climb for about 1 minute 5 seconds, about 584 ft, before reaching the accident site. Refer to Figure 1.

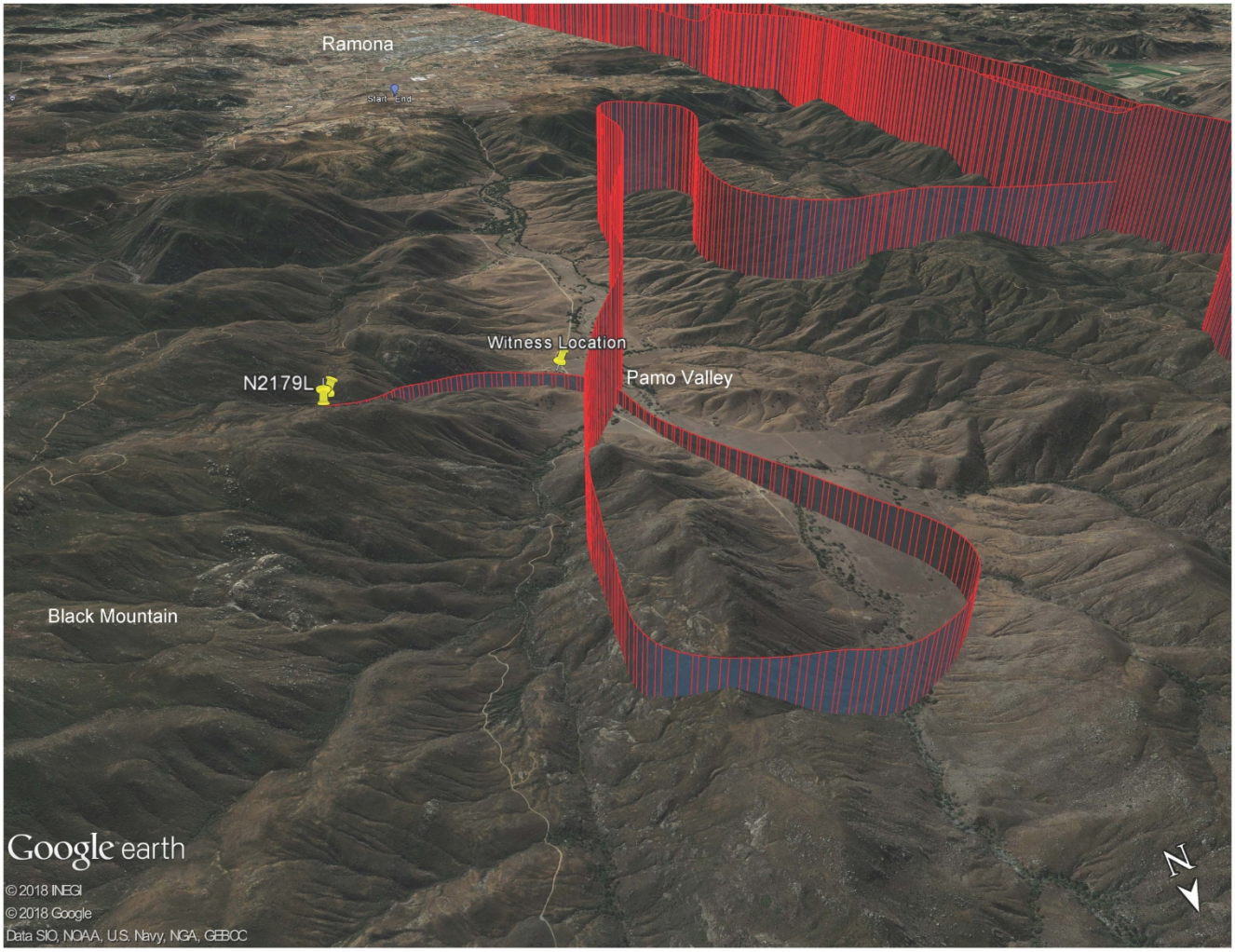

Figure 1-Aerial View of Accident Flight Track

PERSONNEL INFORMATION

The flight instructor held commercial pilot and flight instructor certificates with airplane single- and multi-engine land and instrument ratings. He was issued an FAA second-class airman medical certificate on March 30, 2016, with no limitations. According to the operator, the flight instructor had accumulated 954 total hours of flight experience, of which 649 hours were as a flight instructor. He had accumulated 195 hours as an instructor in the accident make and model airplane and had flown 190 hours in the last 90 days.

The student pilot had accumulated 71 total hours of flight experience , all in the accident airplane make and model. He was issued an FAA first-class airmen medical certificate on August 24, 2016.

AIRCRAFT INFORMATION

The four-seat, high-wing airplane, serial number 17259633, was manufactured in 2004. It was powered by a Continental Motors IO-360-L2A engine. According to the operator, the last 100-hour inspection was completed on February 1, 2017, at which time the engine had accumulated about 1,000 hours since major overhaul and the airframe had accumulated 8,564 hours of total time.

The operator reported that the airplane was topped off with fuel before departing on the accident flight and calculated the airplane's weight at 2,363 pounds at the time of the accident.

According to the airplane's Pilot's Operating Handbook (POH), when flying at the airplane's maximum certificated gross weight of 2,550 pounds, under standard conditions, with no flaps and full throttle, at 2,000 ft mean seal level (msl) and, 73 knots indicated airspeed, the airplane's maximum rate of climb is 625 ft per minute.

METEOROLOGICAL INFORMATION

At 1353, Ramona Airport (RNM), Ramona, California, elevation 1,395ft, located 5 miles south of the accident site, reported wind 300° at 10 knots, visibility 10 miles or greater, scattered clouds at 3,000 ft agl, temperature 21°C, dew point 8°C, and an altimeter setting of 29.99 inches of mercury.

Based on the RNM wind, the climb to the east from Pamo Valley would have had an approximate 10 knot left-quartering tailwind. Local temperature, humidity, and elevation conditions at the time of the accident resulted in a density altitude of about 2,300 ft.

WRECKAGE AND IMPACT INFORMATION

The accident site, at an elevation of 1,869 ft, was located on the southeast side of Black Mountain, which has an elevation of 4,051 ft at the summit. The elevations of the surrounding peaks are near 4,000 ft.

Examination of the accident site by a Federal Aviation Administration (FAA) inspector revealed that the airplane impacted a large tree in steep terrain. The tree penetrated up through the center of the main cabin floor just behind the front seats and out the roof. The main wreckage remained intact with the

exception of the propeller assembly, which separated and was located near the main wreckage. The wreckage was relocated to a secure facility for further examination.

The follow-up wreckage examination revealed no evidence of any preimpact mechanical malfunctions or failures. For further information see the Wreckage Examination Summary in the docket for this accident.

ADDITIONAL INFORMATION

The County of San Diego, Office of the Medical Examiner, San Diego, California, performed an autopsy of the passenger. The cause of death was blunt force injuries of the head and neck.

Flight instructor Information

Certificate:	Commercial; Flight instructor	**Age:**	25,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:**	No
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	No
Medical Certification:	Class 2 Without waivers/limitations	**Last FAA Medical Exam:**	March 30, 2016
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	954 hours (Total, all aircraft), 363 hours (Total, this make and model), 843 hours (Pilot In Command, all aircraft), 190 hours (Last 90 days, all aircraft), 60 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

Student pilot Information

Certificate:	Student	**Age:**	27,Male
Airplane Rating(s):	None	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 1 Without waivers/limitations	**Last FAA Medical Exam:**	August 24, 2016
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	71 hours (Total, all aircraft), 71 hours (Total, this make and model), 4 hours (Pilot In Command, all aircraft), 35 hours (Last 90 days, all aircraft), 24 hours (Last 30 days, all aircraft)		

Passenger Information

Certificate:		**Age:**	20,Female
Airplane Rating(s):		**Seat Occupied:**	Right
Other Aircraft Rating(s):		**Restraint Used:**	None
Instrument Rating(s):		**Second Pilot Present:**	No
Instructor Rating(s):		**Toxicology Performed:**	No
Medical Certification:		**Last FAA Medical Exam:**	
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:			

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N2179L
Model/Series:	172 S	**Aircraft Category:**	Airplane
Year of Manufacture:	2004	**Amateur Built:**	
Airworthiness Certificate:	Normal; Utility	**Serial Number:**	172S9633
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	February 1, 2017 100 hour	**Certified Max Gross Wt.:**	2299 lbs
Time Since Last Inspection:	23 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	8564 Hrs at time of accident	**Engine Manufacturer:**	LYCOMING
ELT:	C91A installed, not activated	**Engine Model/Series:**	IO-360-L2A
Registered Owner:		**Rated Power:**	180 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	Pilot school (141)

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KRNM,1393 ft msl	**Distance from Accident Site:**	8 Nautical Miles
Observation Time:	21:53 Local	**Direction from Accident Site:**	212°
Lowest Cloud Condition:	Scattered / 3000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots /	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	300°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.98 inches Hg	**Temperature/Dew Point:**	21°C / 8°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	SAN DIEGO/EL CAJON, CA (SEE)	**Type of Flight Plan Filed:**	None
Destination:	SAN DIEGO/EL CAJON, CA (SEE)	**Type of Clearance:**	None
Departure Time:	13:25 Local	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	2 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal, 2 Minor	**Latitude, Longitude:**	33.151111,-116.830833(est)

Administrative Information

Investigator In Charge (IIC):	Swick, Andrew
Additional Participating Persons:	Cody Ingemansen; FAA FSDO; San Diego, CA Pete Basile; Textron Aviation; Wichita, KS Mark Platt; Lycoming Engines; Phoenix, AZ
Original Publish Date:	March 18, 2019
Note:	The NTSB did not travel to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=94707

The National Transportation Safety Board (NTSB), established in 1967, is an independent federal agency mandated by Congress through the Independent Safety Board Act of 1974 to investigate transportation accidents, determine the probable causes of the accidents, issue safety recommendations, study transportation safety issues, and evaluate the safety effectiveness of government agencies involved in transportation. The NTSB makes public its actions and decisions through accident reports, safety studies, special investigation reports, safety recommendations, and statistical reviews.

The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available here.