



# Aviation Investigation Final Report

<b>Location:</b>	Veneta, Oregon	<b>Accident Number:</b>	WPR12FA274
<b>Date &amp; Time:</b>	June 23, 2012, 15:13 Local	<b>Registration:</b>	N5781A
<b>Aircraft:</b>	Cessna 172	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Loss of lift	<b>Injuries:</b>	4 Fatal
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

## Analysis

Witnesses located at their residences adjacent to the accident site reported hearing the airplane takeoff from the airport and that the engine sounded normal. Shortly after, the sound of the engine stopped. One witness reported that while he was outside his home, he saw the accident airplane fly over 100-foot tall trees north of his position at an altitude of about 200 feet above ground level (agl) and that the engine sounded normal. The witness said that while he directed his attention away from the airplane momentarily, he heard the engine suddenly stop and he immediately looked back and observed the airplane descend into 100-foot tall trees.

An iPhone was located within the wreckage and contained a 23-second video recording inside the accident airplane. Review of the video revealed that it began as the airplane initiated takeoff roll on the grass runway. The video briefly captured the engine tachometer gauge, which displayed 2,300 revolutions per minute (RPM). Throughout the video, the engine sound was consistent and did not increase or decrease. During the final 8 seconds of the video, after the airplane became airborne, a sound, similar to a stall warning horn was heard until the end of the recording.

Postaccident examination of the airframe and engine run revealed no evidence of any preimpact mechanical malfunction or failure that would have precluded normal operation. Cockpit documentation revealed that the throttle was in the fully extended or idle position, and was bent downwards. Given the idle position of the throttle and downward bend, it is likely that the pilot reduced power prior to impacting trees. The sound of the stall warning horn within the recorded video suggests that the airplane was traveling at a slow airspeed immediately after takeoff and most likely continued in this state throughout the climb. While witnesses reported hearing the engine lose power, it is possible that the witnesses heard the reduction of engine power from a high power setting to an idle power setting prior to impact with trees, thus being similar to a loss of engine power.

Toxicology tests on the pilot were found positive for metabolites of marijuana within the pilot's blood and lung tissue. Most behavioral and physiological effects return to baseline levels within 3-5 hours after drug use, although some residual effects in specific behaviors have been demonstrated up to 24 hours,

such as complex divided attention tasks. Psychomotor impairment can persist after the perceived high has dissipated. In long term users, even after periods of abstinence, selective attention has been shown to be adversely affected with increasing duration of use, and speed of information processing has been shown to be impaired with increasing frequency of use. The exact degree of impairments in cognition, judgment, and motor function were unable to be determined. The pilot's use of marijuana was likely more than five hours before the accident and may have contributed to his failure to successfully manage this flight.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's failure to maintain adequate airspeed and altitude to clear trees during takeoff initial climb.

### Findings

<b>Personnel issues</b>	Use of equip/system - Pilot
<b>Aircraft</b>	Airspeed - Not attained/maintained
<b>Aircraft</b>	Altitude - Not attained/maintained
<b>Environmental issues</b>	Tree(s) - Not specified
<b>Personnel issues</b>	Use of medication/drugs - Pilot

## Factual Information

### History of Flight

Initial climb	Loss of lift (Defining event)
Initial climb	Collision with terr/obj (non-CFIT)

### HISTORY OF FLIGHT

On June 23, 2012, about 1513 Pacific daylight time, a Cessna 172, N5781A, was substantially damaged when it collided with trees and terrain during takeoff initial climb from the Crow-Mag Airport (33OR), near Veneta, Oregon. The commercial pilot and three passengers were fatally injured. The airplane was registered to a private individual and operated by the pilot under the provisions of Title 14 Code of Federal Regulations Part 91, as a personal flight. Visual meteorological conditions prevailed and no flight plan was filed. The local flight was originating at the time of the accident.

Several witnesses located adjacent to the accident site reported hearing the airplane takeoff from the airport nearby their residences. Witnesses stated that the airplane's engine sounded normal and then suddenly just stopped. One witness, who was outside his home, just south of the runway, reported that he saw the accident airplane fly over 100-foot tall trees north of his position at an altitude of about 200 feet above ground level (agl) and that the engine sounded normal. The witness said that while he directed his attention away from the airplane momentarily, he heard the engine suddenly stop and he immediately looked back and observed the airplane descend into 100-foot tall trees.

A friend of the pilot, reported to the National Transportation Safety Board (NTSB) investigator-in-charge (IIC) that the purpose of the accident flight was to provide a scenic tour around the vicinity of the airport for the three passengers. He said that the accident flight was the first flight of the day and that the airplane had been flown for about 1.7 hours since the airplane had been refueled in Cottage Grove, Oregon.

### PERSONNEL INFORMATION

The pilot, age 41, held a commercial pilot certificate with an airplane single-engine land, airplane single-engine sea, airplane multi-engine land, rotorcraft helicopter, glider, and instrument airplane and helicopter ratings. A second-class airman medical certificate was issued on August 23, 2011, with no limitations stated. The pilot reported on his most recent medical certificate application that he had accumulated 1,600 total flight hours. The pilot's most recent logbook was not located.

### AIRCRAFT INFORMATION

The four-seat, high-wing, fixed-gear airplane, serial number (S/N) 28381, was manufactured in 1956. It was powered by a Continental O-300-A engine, serial number 11772-D-6-A, rated at 145 horse power. The airplane was equipped with a McCauley fixed pitch propeller. As of the most recent calculated weight and balance, dated July 2, 2008, the empty weight of the airplane was 1,331.50 pounds. The maximum gross weight was 2,200 pounds.

Review of the maintenance records for the airplane revealed that the most recent annual inspection was completed on August 1, 2011, at an airframe total time of 6,162.56 hours, tachometer time of 1,562.06 hours, and an engine time since major overhaul of 1,170 hours. The engine was overhauled on April 2, 1978, and was installed on the accident airplane on June 1, 1997, at a tachometer time of 1,146 hours and an engine total time of 5,745.5 hours.

Using the reported weights of the pilot and three passengers, approximately 30 pounds for items within the airplane, 28 gallons of fuel, and the airplane, the IIC calculated the weight of the airplane to be about 2,139 pounds at the time of the accident and within center of gravity limits.

Review of the Pilot's Operating Handbook for the accident airplane revealed that there are no published performance charts for takeoff from a turf runway.

#### METEOROLOGICAL INFORMATION

A review of recorded weather data from the Mahlon Sweet Field Airport, Eugene, Oregon, automated weather observation station, located 8.6 miles northeast of the accident site, revealed at 1454 conditions were wind from 260-degrees at 14 knots, visibility 10 statute miles, few clouds at 4,000 feet, scattered clouds at 7,000 feet, broken clouds at 22,000 feet, temperature 16-degrees Celsius, dew point 8 degrees Celsius, and an altimeter setting of 29.86 inches of mercury, remarks Cumulonimbus Clouds in the distance north west of the airport, showers to the west of the airport.

According to the Federal Aviation Administration Special Airworthiness Information Bulletin, entitled Carburetor Icing Prevention, the temperature and dew point were conducive to the formation of serious icing at glide power.

#### AIRPORT INFORMATION

The Crow-Mag Airport (33OR) is a private airport that features a single 3,200-foot long turf runway (15/33). The reported airport elevation is 450 feet mean sea level (msl). During a telephone conversation, the owner of the airport reported that he mows the runway surface to about 3 inches in height and that it was last mowed two days prior to the accident. In addition, the owner of the airport reported that there had been multiple rain showers within the vicinity of the airport prior to the accident flight and that the grass runway was damp.

#### WRECKAGE AND IMPACT INFORMATION

Examination of the accident site revealed that wreckage debris and broken tree limbs were scattered about 80 feet along an approximate 174-degree magnetic heading from a cluster of scraped and broken trees. The right wing was lodged in one of the damaged trees at the beginning of the debris path, about 70 to 75 feet above ground level. The right horizontal and right elevator was located about 20 feet from the first identified point of contact (FPIC). The left horizontal, left elevator, vertical stabilizer, and rudder were located about 40 feet beyond the FPIC. The main wreckage came to rest inverted about 80-feet from the FPIC, oriented on a heading of about 235-degrees magnetic.

Examination of the left wing revealed that the aileron remained attached to the wing via all respective mounts. The leading edge was crushed aft about 1 foot inboard of the lift strut wing attach point, consistent with an impact with a circular object (tree trunk). The left wing fuel pickup fuel line was

compromised. The fuel tank cap and seal were intact and undamaged. No fuel was found within the left wing fuel tank, however, a blue stain was observed on the top portion of the left wing about mid span.

The right wing was separated from the fuselage via all its mounts. The leading edge exhibited a large circular impression about 2 feet outboard of the wing root, and extended aft to the main spar. The right wing fuel tank was dislodged from the wing structure and was located within the wreckage debris path. The fuel tank cap and seal were intact and undamaged. About 2 gallons of fuel was removed from the fuel tank and multiple holes were observed in the fuel tank.

The fuselage came to rest inverted. The fuselage structure surrounding the cabin area was compressed. The left and right horizontal stabilizers, left and right elevators, rudder, and vertical stabilizer were separated from the fuselage. The right elevator remained attached to the right horizontal stabilizer via its outboard two mounts. The leading edge of the right horizontal stabilizer was crushed aft near the inboard portion of the stabilizer. The left horizontal stabilizer exhibited a circular leading edge impression about 14 inches from the inboard root, and extended aft to the spar. The elevator remained attached to the left horizontal stabilizer via its two outboard mounts. The vertical stabilizer was intact. The lower portion of the rudder was displaced right and exhibited bending and buckling.

Examination of the cockpit controls revealed that the throttle was in the idle position and was bent downwards. The mixture was in the full forward or full rich position. The primer was in and locked, and the carburetor heat was pulled out about half way. The magneto key switch was in the "both" position. The fuel selector valve was in the "both" position. The flap handle was found in the stowed position, consistent with the flaps up position.

Flight control continuity was established throughout to all primary flight control surfaces from the cockpit controls. Several separations of the control cables were observed and were splayed, consistent with overload.

The engine remained attached to the fuselage via one of the four engine mounts. The carburetor was partially separated from its mount. The rest of the engine accessories remained attached to the engine via their respective mounts. All of the top sparkplug leads were bent and damaged, consistent with impact damage. The top spark plugs were removed and exhibited dark gray, almost black in color deposits within the electrode area and displayed normal wear signatures when compared to the Champion Check-A-Plug comparison chart. The carburetor fuel screen was removed from the carburetor and was free of debris.

In order to facilitate an engine run, the carburetor mount flange was repaired using JB Weld, Duct Tape, and Plumbers Putty. The carburetor was reinstalled on the engine and secured. Battery power was applied to the airplane and it was determined that the starter was inoperative. A new starter was installed on the engine. An external fuel source was connected directly to the carburetor fuel inlet port. Battery power was applied and the engine was started using the airframes starter button. The engine ran throughout various power settings to about 1,700 rpm with no anomalies noted. The power was not advanced higher than 1,700 rpm due to the damaged engine mounts. A magneto check was conducted at 1,200 rpm with no anomalies noted. The engine was shut down normally by moving the mixture control to the idle cutoff position.

A postaccident examination of the airframe and engine revealed no evidence of mechanical malfunctions or failures that would have precluded normal operation.

## MEDICAL AND PATHOLOGICAL INFORMATION

The Lane County Coroner conducted an autopsy on the pilot on June 25, 2012. The medical examiner determined that the cause of death was "... blunt force chest trauma..."

The FAA's Civil Aeromedical Institute (CAMI) in Oklahoma City, Oklahoma, performed toxicology tests on the pilot. According to CAMI's report, carbon monoxide, cyanide, volatiles, and drugs were tested, and had positive results for 0.1831 (ug/ml, ug/g) Tetrahydrocannabinol (Marihuana) detected in Lung, Tetrahydrocannabinol (Marihuana) NOT detected in Blood (Aortic), 0.0068 (ug/ml, ug/g) Tetrahydrocannabinol Carboxylic Acid (Marihuana) detected in Blood (Aortic), and 0.0058 (ug/ml, ug/g) Tetrahydrocannabinol Carboxylic Acid (Marihuana) detected in Lung.

According to the NTSB staff Medical Officer, marijuana is a psychoactive drug with therapeutic levels as low as 0.001 ug/ml. Marijuana has mood altering effects causing euphoria and relaxation. The ability to concentrate and maintain attention is decreased during marijuana use, and impairment of hand-eye coordination is dose-related over a wide range of dosages. Impairment in retention time and tracking, subjective sleepiness, distortion of time and distance, vigilance, and loss of coordination in divided attention tasks have all been reported. Users may be able to "pull themselves together" to concentrate on simple tasks for brief periods of time. Significant performance impairments are usually observed for at least 1 to 2 hours following marijuana use, and residual effects have been reported up to 24 hours.

## TESTS AND RESEARCH

An iPhone was located within the wreckage. The iPhone was subsequently shipped to the NTSB Recorders Laboratory for further examination. A recorder specialist reported that the iPhone contained a 23-second video recording taken at 1512 from inside the accident airplane. Review of the video revealed that it began as the airplane initiated takeoff roll on the grass runway. The first 7 seconds of the video showed the take-off roll from a forward facing and slightly right quartering perspective from the right forward seat with the field of view varying slightly. From about 7 to 10 seconds, the recording captured the instrument panel, runway, and area to the right of the runway. A red roofed building was observed passing off the right side. Between about 13 and 14 seconds, the red roofed building passed out of the field of view from the camera, and only the tops of the pine trees and a partly cloudy sky were visible. A sound was heard about 15 seconds into the recording, and continued to the end of the recording. The sound was a mechanical chattering sound, similar to a stall warning horn.

Throughout the video, the engine sound was consistent and did not increase or decrease. The video recording showed some instruments throughout the recording. The tachometer was visible between a recording time of 10 to 14 seconds, and displayed a revolutions per minute (RPM) indication of 2,300 and a tachometer time of 1,576.87 hours. The oil pressure gauge was visible between a recording time of 8 to 13 seconds, and indicated about 50 the entire time.

For further information, see the On Board Image Recorder report within the public docket for this accident.

## Pilot Information

<b>Certificate:</b>	Commercial	<b>Age:</b>	41
<b>Airplane Rating(s):</b>	Single-engine land; Single-engine sea	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	Glider; Helicopter	<b>Restraint Used:</b>	
<b>Instrument Rating(s):</b>	Airplane; Helicopter	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 2 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	August 23, 2011
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	
<b>Flight Time:</b>	1600 hours (Total, all aircraft), 999 hours (Total, this make and model)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Cessna	<b>Registration:</b>	N5781A
<b>Model/Series:</b>	172	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	28381
<b>Landing Gear Type:</b>	Tricycle	<b>Seats:</b>	4
<b>Date/Type of Last Inspection:</b>	August 1, 2011 Annual	<b>Certified Max Gross Wt.:</b>	2200 lbs
<b>Time Since Last Inspection:</b>	15 Hrs	<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	6162 Hrs as of last inspection	<b>Engine Manufacturer:</b>	CONT MOTOR
<b>ELT:</b>	Installed, activated, did not aid in locating accident	<b>Engine Model/Series:</b>	O-300-A
<b>Registered Owner:</b>	On file	<b>Rated Power:</b>	145 Horsepower
<b>Operator:</b>	On file	<b>Operating Certificate(s) Held:</b>	None

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	EUG,374 ft msl	<b>Distance from Accident Site:</b>	8 Nautical Miles
<b>Observation Time:</b>	14:54 Local	<b>Direction from Accident Site:</b>	65°
<b>Lowest Cloud Condition:</b>	Few / 4000 ft AGL	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	Broken / 22000 ft AGL	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	14 knots / None	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	260°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	29.86 inches Hg	<b>Temperature/Dew Point:</b>	16°C / 8°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Veneta, OR (33OR)	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	Veneta, OR (33OR)	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>	15:13 Local	<b>Type of Airspace:</b>	

## Airport Information

<b>Airport:</b>	CRO-MAG 33OR	<b>Runway Surface Type:</b>	
<b>Airport Elevation:</b>	450 ft msl	<b>Runway Surface Condition:</b>	
<b>Runway Used:</b>		<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>		<b>VFR Approach/Landing:</b>	None

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Fatal	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>	3 Fatal	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	4 Fatal	<b>Latitude, Longitude:</b>	44.061668,-123.39389(est)



## Administrative Information

<b>Investigator In Charge (IIC):</b>	Cawthra, Joshua
<b>Additional Participating Persons:</b>	Jarvis Cochran; Federal Aviation Administration; Portland, OR Ricardo Asensio; Cessna Aircraft Company; Wichita, KS Chris Lang; Continental Motors Inc.; Mobile, AL
<b>Original Publish Date:</b>	December 2, 2013
<b>Last Revision Date:</b>	
<b>Investigation Class:</b>	<a href="#">Class</a>
<b>Note:</b>	The NTSB traveled to the scene of this accident.
<b>Investigation Docket:</b>	<a href="https://data.nts.gov/Docket?ProjectID=84060">https://data.nts.gov/Docket?ProjectID=84060</a>

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).