Aviation Investigation Final Report

Location:	Kerrville, Texas	**Accident Number:**	WPR22FA229
Date & Time:	June 25, 2022, 18:23 Local	**Registration:**	N4267H
Aircraft:	Mooney M20J	**Aircraft Damage:**	Destroyed
Defining Event:	Sys/Comp malf/fail (non-power)	**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The airplane climbed to about 150 ft agl shortly after takeoff and then began a 180° turn back to the airport. After overflying the departure runway in the opposite direction, the airplane appeared to enter the left downwind traffic pattern to return for landing. As it turned from the downwind to base leg, it rolled left and into the ground. Both the pilot and passenger were fatally injured.

Witness accounts, along with evidence in the wreckage, indicated that the landing gear was extended during the return leg and at the time of impact. Also, a witness recalled that he heard a radio transmission from a pilot stating that he was having landing gear trouble and was coming back to the airport.

The pilot reported to his mechanic that on one prior occasion the landing gear had failed to retract completely, but he had resolved this by recycling its circuit breaker. The mechanic was not able to find anything wrong with the landing gear during inspection; however, it is likely that the pilot was returning to the airport after being unable to retract the landing gear.

Although the temperature at the time of the accident was high, the airplane was not heavily loaded, and should still have had adequate power to continue the climb to pattern altitude to allow the pilot to troubleshoot whatever problem he may have encountered. The airplane maintained altitude, albeit low, during the return leg, so a total loss of engine power could be ruled out, although a partial loss of power was possible.

Irrespective of the problems the pilot was encountering, he had successfully maneuvered the airplane back to the airport and had the opportunity to land on the opposite runway. Instead, he continued to fly in the traffic pattern at low altitude, and the airplane likely encountered an aerodynamic stall while maneuvering during the base leg.

The pilot's medical certificate had expired almost 19 years before the accident. According to the autopsy report, he had cardiomegaly, left ventricular hypertrophy, moderate atherosclerosis in one coronary artery, and severe atherosclerosis in his aorta. The airplane's flight path back to the airport, along with autopsy findings, do not suggest a sudden incapacitating cardiac event and the pilot initially survived the accident. Thus, the pilot's cardiovascular disease was likely not a factor.

The pilot's toxicology detected sub-therapeutic levels of the sedating antihistamine doxylamine in the blood. This medication can cause drowsiness and diminish performance.

The antidepressant amitriptyline and its active metabolite nortriptyline were detected but not quantified in the pilot's femoral blood, heart blood, and liver tissue. While these substances are associated with side effects such as drowsiness and dizziness, both were detected well below known therapeutic levels. Given their low concentrations and the circumstances of this accident, the effects from the pilot's use of amitriptyline were not likely a factor.

With the exception of a test flight flown by the airplane's maintenance facility a few days before the accident, this was the first time the airplane had been flown in the 6 months following its annual inspection. It was also likely the first time the pilot had flown during that period. Evidence suggests that the pilot had not received a flight review in almost 18 years. Without the benefit of recurrent training and review, the pilot would likely have had little opportunity to practice airplane procedures and performance capabilities under emergency situations.

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 aircraft control during a base leg turn in the airport traffic pattern, which resulted in an aerodynamic stall. Contributing to the accident was the pilot's lack of recent flight training experience.

Findings

Aircraft	Gear extension and retract sys - Inoperative
Aircraft	Directional control - Not attained/maintained
Personnel issues	Aircraft control - Pilot
Personnel issues	Recurrent instruct/training - Pilot
Personnel issues	Recent instruct/training recvd - Pilot

Factual Information

History of Flight

Takeoff	Sys/Comp malf/fail (non-power) (Defining event)
Initial climb	Landing gear not configured
Approach-VFR pattern crosswind	Loss of control in flight
Approach-VFR pattern crosswind	Collision with terr/obj (non-CFIT)

On June 25, 2022, about 1823 central daylight time, a Mooney M20J, N4267H, was destroyed when it was involved in an accident near Kerrville, Texas. The pilot and passenger were fatally injured. The airplane was operated as a Title 14 *Code of Federal Regulations (CFR)* Part 91 flight.

The pilot and passenger arrived at Kerrville Municipal Airport/Louis Schreiner Field (ERV) about 1700 on the day of the accident, having been flown inbound by a friend from Dublin Municipal Airport (9F0).

The airplane had undergone an annual inspection that was completed in December 2021. The accident pilot, who was the airplane's owner, was unable to pick up the airplane following the inspection, so it remained with the maintenance facility until the day of the accident. The accident flight was the first time the pilot had flown the airplane since the inspection.

Review of low-resolution airport security video showed the pilot arrive at the airplane about 1734 and perform what appeared to be a walk around and preflight inspection. Thirteen minutes later both the pilot and passenger had boarded, and an engine start was attempted. Over the next 10 minutes, the engine was seen to turn at least 12 times, but not start. The pilot then got out of the airplane and walked around the wings and reached over to both the left and right fuel caps. He then boarded the airplane again. Over the next two minutes multiple engine restarts were attempted, until 1802, the engine appeared to start, and the video ended.

There were no security cameras that recorded the airplane's takeoff, and no witnesses came forward to report they had observed the initial takeoff sequence. Runway 12 was active at the time of the accident, and there were no other airplanes in the traffic pattern or on the runway about the time of the accident.

Automatic dependent surveillance-broadcast (ADS-B) data provided by the FAA did not capture the takeoff sequence but indicated that about 1819 the airplane was on an east-northeast track, about 2 miles east of the departure end of runway 12 at an altitude of about 1,775 ft

mean sea level (msl), about 150 ft above ground level (agl). When combined with field wind conditions, the data revealed that the airplane was traveling at an airspeed of about 70 knots calibrated. Over the next two minutes, the airplane began a 180° left turn, while traveling about 80 knots. The airplane began to accelerate as it rolled out of the turn, reaching 96 knots as it approached runway 30. The last recorded target indicated the airplane was about 150 ft agl, 1,700 ft short of the runway 30 threshold, while tracking on the runway heading.

About this time, a witness, who was a retired professional pilot with an airline transport pilot rating was driving eastbound on a parallel highway, just south of the runway. He stated that he was passing about midfield when he saw a Mooney airplane approaching runway 30 with the landing gear extended at an altitude of about 150 ft agl. He knew the winds that day were favoring the southeast and wondered why the airplane was making what appeared to be a downwind landing on runway 30. He thought the pilot may have been practicing an instrument approach but noticed that the airplane appeared to be flying erratically in both the lateral and vertical axis. He stated that the propeller was turning and there was no fire, smoke, or other signs of distress. As the flight progressed, the airplane turned slightly right and became offset to the north of the runway centerline while maintaining altitude. He then lost sight of the airplane as he continued to travel along the highway.

Another witness traveling along the same highway observed a Mooney airplane flying over runway 30, but not climbing. He assumed it had just taken off and was concerned because the wind favored the opposite runway, and the weather was hot. He watched as the airplane continued traveling in a northwest direction, in a manner that he described as “mushing.” It was very close to the treetops when it appeared to make a turn to the left. The witness thought this was a left base turn for runway 12, but the bank angle became very steep, and the airplane disappeared behind trees (see Figure 1).

ADS-B data provided by a publicly available collection service (ADS-B Exchange) recorded position data during the return leg to the airport. The data appeared to match the witness observations and showed that the airplane flew directly over the takeoff runway at an altitude of about 100 ft agl before making a 10° turn to the right. The airplane continued at the same altitude for the next 1.25 miles before beginning a left turn almost 800 ft southeast of the accident site.

A southeast-facing security camera located on the wall of a school, about 3/4 mile northwest of the approach end of runway 12, captured the last 2 seconds of the flight. The video showed that the airplane was flying southwest just above the tree line while in a left bank of about 45°. The airplane continued to roll left until the underside was completely visible as it descended into the trees and a fireball ensued.

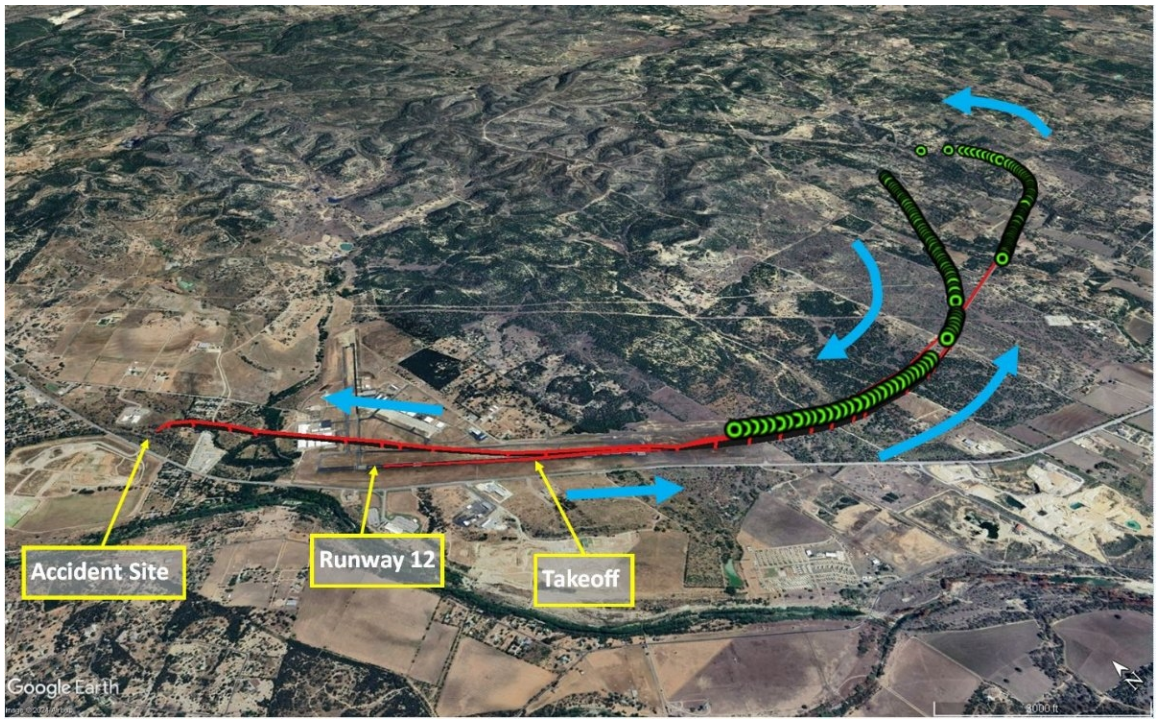

Figure 1 – Composite flight track. Green: FAA ADS-B. Red: ADS-B Exchange.

Pilot Information

Certificate:	Private	**Age:**	67,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Unknown
Other Aircraft Rating(s):	None	**Restraint Used:**	3-point
Instrument Rating(s):	None	**Second Pilot Present:**	
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 None	**Last FAA Medical Exam:**	November 19, 2001
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	August 11, 2004
Flight Time:	(Estimated) 800 hours (Total, all aircraft), 100 hours (Total, this make and model), 0 hours (Last 24 hours, all aircraft)		

The pilot's most recent FAA medical took place almost 21 years before the accident on November 19, 2001. There were no records indicating he was operating under the provisions of BasicMed.

Multiple flight instructors from the pilot's base in the Dublin and Stephensville area of Texas were contacted. None stated that they had provided the pilot any recent flight training. One

instructor recounted that he had given the pilot initial training in 2001 through to his first solo flight. He reported that the pilot was stubborn and often refused to use his checklist. The instructor was made aware that shortly after receiving his solo endorsement the pilot was flying passengers while still a student. When he approached the pilot to discuss, the pilot stated that he no longer wanted to use him as an instructor. The pilot reportedly found another instructor to complete his training.

Burnt remnants of the pilot's logbooks were found in the wreckage. Thermal damage prevented an accurate assessment of total flight time; however, the endorsement pages were largely intact. The last endorsement was dated August 11, 2004, and was for a 14 *CFR* 61.56 flight review.

A friend, who was also a pilot and had flown with him, stated that he was generally procedure-oriented, and on occasion was overcome by operational tasks and could sometimes "get behind" the airplane.

The passenger was a recent acquaintance of the pilot and did not hold a pilot certificate.

Aircraft and Owner/Operator Information

Aircraft Make:	Mooney	**Registration:**	N4267H
Model/Series:	M20J	**Aircraft Category:**	Airplane
Year of Manufacture:	1978	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	24-0690
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	December 7, 2021 Annual	**Certified Max Gross Wt.:**	2740 lbs
Time Since Last Inspection:	0.5 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	1908.2 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	Installed	**Engine Model/Series:**	IO-360-A36BD
Registered Owner:	On file	**Rated Power:**	200 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Because the airplane sat unused for so long since inspection, in advance of the arrival of the pilot the maintenance facility flew a test flight on June 23. During that flight, it was found that the directional gyro was inoperative. The gyro was replaced the following day and another test

flight was flown. The test pilot stated that beyond the problems with the directional gyro, the test flights were uneventful and the engine started without issue.

According to the owner of the maintenance facility, during the period when the airplane was not flown it sat on the ramp outside and was brought into the hangar during heavy storms.

When the pilot originally brought the airplane in for the annual inspection, he stated that the engine could be hard to start. However, according to the maintenance facility owner, no anomalies were found, and the engine started normally if the engine start checklist was followed.

The pilot also reported to him that on one occasion the landing gear circuit breaker popped after takeoff while the landing gear was being retracted, causing it to remain partially extended. The pilot cycled the circuit breaker and the landing gear retraction cycle completed normally. The maintenance facility owner tried to duplicate the discrepancy during the annual inspection by cycling the landing gear multiple times but he was not able to get the circuit breaker to pop and the gear cycled normally. He examined the landing gear system but was not able to find any anomalies.

An employee at a local fixed base operator on the airport recalled that about the time of the accident he heard a radio transmission from a pilot stating that he was having landing gear trouble and was coming back to the airport.

Fuel

The day before the accident the airplane was serviced by the maintenance facility with 25.1 gallons of 100 low-lead aviation fuel to the fuel level indicators, or “tabs,” which would have indicated that each tank contained 25 gallons of fuel (32 gallons capacity).

The fueling facility tested the fuel batch immediately following the accident and the results were nominal. Three other airplanes were serviced from the same fuel truck on the day of the accident. None of those pilots reported problems and a review of commercially available flight tracking software confirmed that those aircraft had reached their destinations.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KERV,1617 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	18:15 Local	**Direction from Accident Site:**	108°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	190°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.95 inches Hg	**Temperature/Dew Point:**	36°C / 11°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Kerrville, TX	**Type of Flight Plan Filed:**	None
Destination:	Stephenville, TX (SEP)	**Type of Clearance:**	None
Departure Time:		**Type of Airspace:**	Class E

At the time of the accident wind speed was 10 knots from 190° and the density altitude was about 4,480 ft.

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	None
Ground Injuries:		**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	29.987047,-99.097337

The airplane came to rest at an elevation of about 1,600 ft on the slope of a hill about 4,200 ft beyond the runway 12 threshold and 20° offset from the runway centerline (see Figure 2). The first identified point of impact was a cleanly cut swath of tree branches and limbs at an angle of 60° relative to the horizon (Figure 3). The airplane was located about 30 ft southwest of the swath at the base of a felled 50-ft tall oak tree. The tree exhibited impact damage along its north face.

Figure 2 – Wreckage location and runway threshold.

Figure 3 – Facing north, a 60° swath of cut tree limbs and branches, with the main wreckage in the foreground.

The cabin skins were consumed by fire with only crushed and bent steel frame members remaining. The instrument panel, flight instruments, control switches, and circuit breakers were consumed by fire, such that their operation and position at the time of the accident could not be determined.

Most of the wings and the tail section were thermally consumed; however, sections of all major airframe components and primary flight controls were found within the immediate wreckage site, and no mechanical anomalies were noted to the remnants.

The landing gear actuator was located and its jackscrew appeared to be fully retracted, consistent with the landing gear being extended at impact. Thermal damage prevented an assessment of the landing gear extension and retraction system's functionality. The pitch trim jackscrew in the tail section and the position of the elevator cabin trim assembly matched dimensions that indicated the takeoff trim position was selected. The flap actuator jackscrew extension dimension matched the flaps up position.

Remnants of the left pilot seat frame and rail indicated the seat was locked about 3 inches short of the full forward position. All seatbelts sustained thermal damage, destroying their webbing. Both front seat belt latches were located and were in the locked position with their shoulder strap buckles still attached.

Examination of the airframe did not reveal any evidence of a bird strike. The entire runway surface along with the overrun area beyond the runway 30 threshold and up to the airport perimeter were inspected the day after the accident and no bird remnants were found.

The engine sustained extensive thermal damage and remained partially attached to the firewall. There was no evidence of catastrophic internal failure within the case or cylinder bores. All valves were intact and exhibited concentric discoloration and deposits to their heads and all piston crowns were coated in light grey deposits. Removal of the rocker covers revealed that all springs and rocker arms were intact, and the pushrod shroud tubes were straight. The camshaft lobe tips were well defined, with no evidence of wear or deformation. The tappet heads were clean with no obvious evidence of galling or surface damage.

The propeller remained attached at the hub which was still connected to the engine crankshaft. Both blades sustained thermal damage, melting their outboard sections midspan and 12 inches inboard from the tip respectively.

The dual magneto, engine-driven fuel pump, propeller governor, fuel flow divider, and fuel servo had varying levels of thermal damage that prevented an accurate assessment of their operational status at the time of the accident. All fuel and oil lines were damaged by the fire, but all remaining line fittings were still tight at their respective attachment points.

The turbocharger assembly remained partially attached to the engine. The exhaust pipes remained attached to each cylinder and were continuous to the turbocharger manifold; each

slip joint was intact. The turbocharger exhaust inlet, outlet, and center V-band clamps were intact. The case sustained thermal damage that caused it to sag against the turbine and compressor blade assemblies, both of which remained intact.

Medical and Pathological Information

According to the autopsy report, the pilot's cause of death was blunt trauma, thermal injuries, and inhalation of products of combustion. The medical examiner reported the pilot had soot in his upper and lower airways. He also had an enlarged heart, left ventricular hypertrophy, moderate atherosclerosis of the left anterior descending coronary artery, and severe complex atherosclerotic aortic plaques.

Toxicology testing detected doxylamine at 31 nanograms per milliliter (ng/mL) in femoral blood, 115 ng/mL in heart blood, and in his liver tissue. Amitriptyline and nortriptyline were detected but not quantified in his femoral blood, heart blood, and liver tissue. The non-sedating cough suppressant dextromethorphan and its metabolite dextrorphan were detected in his heart blood and liver tissue.

Administrative Information

Investigator In Charge (IIC):	Simpson, Eliott
Additional Participating Persons:	Robert Thomason; FAA FSDO; San Antonio, TX David Harsanyi; Lycoming Engines
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Last Revision Date:	
Investigation Class:	Class 3
Note:	
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