



# Aviation Investigation Final Report

<b>Location:</b>	Pittstown, New Jersey	<b>Accident Number:</b>	ERA16FA325
<b>Date &amp; Time:</b>	September 25, 2016, 12:30 Local	<b>Registration:</b>	N526AM
<b>Aircraft:</b>	Mooney M20J	<b>Aircraft Damage:</b>	Substantial
<b>Defining Event:</b>	Aerodynamic stall/spin	<b>Injuries:</b>	2 Fatal
<b>Flight Conducted Under:</b>	Part 91: General aviation - Personal		

## Analysis

The private pilot rented the airplane for a personal flight, flew to another airport, and picked up the passenger. The pilot and the passenger then flew to the airport where the accident occurred. During the first landing attempt, the airplane appeared to be traveling too fast on the final approach. During the touchdown, the airplane bounced, and the pilot aborted the landing, climbed out, and joined the traffic pattern. During the second landing attempt, the airplane was again fast on the approach, and it touched down about halfway down the runway on the nose wheel, then touched down on the main landing gear, bounced, and became airborne. The airplane bounced twice more, then touched down about 400 to 500 ft before the end of the runway and stayed on the runway surface. As the airplane approached the end of the pavement, witnesses heard the engine power increase as the pilot aborted the landing, and the airplane began to climb. According to some witnesses, the engine was not producing full power. As it approached a row of trees off the end of the runway, the airplane appeared to climb steeply, cleared the row of trees, and then abruptly banked steeply to the left, pitched nose down, and descended in a steep, nose-down attitude to ground impact.

Postaccident examination of the runway revealed propeller strike marks and a nosewheel tire mark about 1,747 ft from the threshold of the 2,900-ft-long runway, indicating that the pilot touched down past midfield in an improper nose-low attitude. Examination of the propeller revealed chordwise transfer marks and tip curling and polishing indicative of a propeller strike, which would have degraded the efficiency of the propeller and resulted in a loss of thrust during climb. The loss of control observed by the witnesses was consistent with the pilot attempting to climb even with the loss of thrust due to the damaged propeller, and exceeding the airplane's critical angle of attack, which resulted in an aerodynamic stall.

Security camera video recordings and wind information from a nearby airport indicated that a slight tailwind existed for landing on the chosen runway, which would have slightly increased the airplane's ground speed and ground roll during the landing. However, according to the airplane's pilot operating handbook, the landing ground roll under worse case conditions (maximum gross weight and an outside

air temperature of 40°C) would have been about 956 to 1,118 ft; therefore, the runway length was adequate for a safe landing if the proper touchdown point had been achieved.

Although the pilot had 36 hours of flight experience in the accident airplane make and model, his most recent flight in this make and model was 10 months before the accident. Further, his most recent flight before the accident flight was in an airplane of lesser performance equipped with fixed landing gear and a fixed pitch propeller, and was about 8 months before the accident. According to his logbook, he did not meet the Federal Aviation Administration recent experience requirements to act as a pilot in command of an airplane carrying passengers.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's improper landing touchdown attitude, which resulted in a propeller strike, and his inappropriate decision to abort the landing after the propeller had contacted the runway, which resulted in a loss of thrust and led to an aerodynamic stall during climb. Contributing to the accident was the pilot's lack of recent experience in the accident airplane make and model.

### Findings

<b>Aircraft</b>	Airspeed - Not attained/maintained
<b>Aircraft</b>	Descent/approach/glide path - Not attained/maintained
<b>Aircraft</b>	Landing flare - Not attained/maintained
<b>Aircraft</b>	(general) - Damaged/degraded
<b>Aircraft</b>	Angle of attack - Not attained/maintained
<b>Personnel issues</b>	Aircraft control - Pilot
<b>Personnel issues</b>	Decision making/judgment - Pilot
<b>Personnel issues</b>	Incorrect action performance - Pilot
<b>Personnel issues</b>	Recent experience w/ equipment - Pilot

# Factual Information

## History of Flight

<b>Landing-flare/touchdown</b>	Abnormal runway contact
<b>Landing-aborted after touchdown</b>	Attempted remediation/recovery
<b>Initial climb</b>	Aerodynamic stall/spin (Defining event)
<b>Uncontrolled descent</b>	Collision with terr/obj (non-CFIT)

On September 25, 2016, about 1230 eastern daylight time, a Mooney M20J, N526AM, was substantially damaged when it impacted terrain during initial climb after a bailed landing at Sky Manor Airport (N40), Pittstown, New Jersey. The private pilot and the passenger were fatally injured. The airplane was privately owned and operated under the provisions of Title 14 Code of Federal Regulations (CFR) Part 91. Visual meteorological conditions prevailed, and no flight plan was filed for the personal flight, which departed Pennridge Airport (CKZ), Perkasio, Pennsylvania, about 1200.

The pilot had rented the airplane at the Trenton-Robbinsville Airport (N87), Robbinsville, New Jersey. According to security camera video, he boarded the airplane and departed from N87 at 1121. The pilot flew to CKZ, where he picked up the passenger. The pilot then flew to N40 with the passenger.

Numerous witnesses at N40 reported that the pilot attempted twice to land on runway 25. During the first landing attempt, the airplane appeared to be fast on the final approach. During the touchdown, the airplane bounced. The pilot then aborted the landing, climbed out, and joined the traffic pattern.

Review of video recordings obtained from a security camera at N40 revealed that, during the second landing attempt, about 1229, the airplane touched down more than halfway down the length of the runway. The video recording also revealed that the airplane's wing flaps were extended, and a flag visible in the camera frame indicated that a variable right-quartering tailwind existed. Witnesses reported that, during the second landing attempt, the airplane was again fast on the approach, and it touched down first on the nose wheel, then on the main landing gear, bounced, and became airborne. The airplane bounced twice more, touched down about 400 to 500 ft before the end of the runway and remained on the runway surface. Witnesses heard the engine power increase as the airplane approached the end of the pavement, and the airplane began to climb.

The witnesses described that the airplane appeared to climb slowly as it passed over a field that was surrounded by trees at the end of the runway, and some witnesses reported that the engine did not seem to be producing full power. As the airplane approached the row of trees at the far end of the field, it appeared to climb steeply. The airplane cleared the row of trees and then abruptly banked steeply to the left, pitched nose down, and descended in a steep, nose-down attitude out of view behind the trees.

According to a witness who lived near the accident site, the airplane was flying very low and slow compared to many other airplanes that he had observed departing from N40. The airplane rose slightly, pivoted nose down, and then rapidly lost altitude as it went out of view behind a barn. According to

another witness, he heard the airplane's engine running as it descended out of view. According to both witnesses, moments after losing sight of the airplane they heard the sound of impact.

### Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	59, Male
<b>Airplane Rating(s):</b>	Single-engine land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	3-point
<b>Instrument Rating(s):</b>	None	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 3 Without waivers/limitations	<b>Last FAA Medical Exam:</b>	February 10, 2016
<b>Occupational Pilot:</b>	No	<b>Last Flight Review or Equivalent:</b>	January 11, 2015
<b>Flight Time:</b>	(Estimated) 187.8 hours (Total, all aircraft), 35.7 hours (Total, this make and model)		

According to Federal Aviation Administration (FAA) records, the pilot held a private pilot certificate with an airplane single-engine land rating. His most recent FAA third-class medical certificate was issued on February 10, 2016. According to the pilot's logbook, he had accrued about 188 total hours of flight experience of which 36 hours were in the accident airplane make and model.

Review of the pilot's logbook revealed that his most recent flight before the accident flight was in a Piper PA-28-181, on January 14, 2016, about 8 months before the accident. Further review of the pilot's logbook revealed that the pilot's most recent flight in a Mooney M20J before the accident flight occurred on November 21, 2015, about 10 months before the accident.

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Mooney	<b>Registration:</b>	N526AM
<b>Model/Series:</b>	M20J	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>	1980	<b>Amateur Built:</b>	
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	24-0916
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	4
<b>Date/Type of Last Inspection:</b>	August 13, 2016 100 hour	<b>Certified Max Gross Wt.:</b>	2899 lbs
<b>Time Since Last Inspection:</b>		<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	4690.3 Hrs as of last inspection	<b>Engine Manufacturer:</b>	Lycoming
<b>ELT:</b>	C126 installed, activated, did not aid in locating accident	<b>Engine Model/Series:</b>	IO-360-A3B6D
<b>Registered Owner:</b>	SKINNER ILISSA	<b>Rated Power:</b>	200 Horsepower
<b>Operator:</b>	Air Mods Flight Training Center, Inc.	<b>Operating Certificate(s) Held:</b>	None

The airplane was a 4-place, complex, single-engine monoplane. The airframe had a tubular steel cabin frame covered with non-structural aluminum skins, a semi-monocoque tail cone, and a full cantilever laminar-flow wing. It was equipped with a retractable, electrically-operated, tricycle-type landing gear with rubber shock discs, a steerable nose wheel, and hydraulic disc brakes. It was powered by an air-cooled, fuel-injected, 200 horsepower, horizontally-opposed, four-cylinder, Lycoming engine driving a 2-blade, variable-pitch, constant-speed McCauley propeller.

According to FAA and airplane maintenance records, the airplane was manufactured in 1980. The airplane's most recent 100-hour inspection was completed on August 13, 2016. At the time of the inspection, the airplane had accrued about 4,690.3 total hours of operation, and the engine had accrued about 100 hours of operation since major overhaul.

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual (VMC)	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	SMQ, 106 ft msl	<b>Distance from Accident Site:</b>	15 Nautical Miles
<b>Observation Time:</b>	12:53 Local	<b>Direction from Accident Site:</b>	90°
<b>Lowest Cloud Condition:</b>	Clear	<b>Visibility</b>	10 miles
<b>Lowest Ceiling:</b>	None	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	10 knots / None	<b>Turbulence Type Forecast/Actual:</b>	None / None
<b>Wind Direction:</b>	350°	<b>Turbulence Severity Forecast/Actual:</b>	N/A / N/A
<b>Altimeter Setting:</b>	30.17 inches Hg	<b>Temperature/Dew Point:</b>	21°C / -1°C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	PERKASIE, PA (CKZ )	<b>Type of Flight Plan Filed:</b>	None
<b>Destination:</b>	Pittstown, NJ (N40 )	<b>Type of Clearance:</b>	None
<b>Departure Time:</b>	12:00 Local	<b>Type of Airspace:</b>	Class G

At 1253, the recorded weather at Somerset Airport (SMQ), Somerville, New Jersey, located 15 nautical miles east of the accident site, included wind 350° at 10 knots, visibility 10 miles, sky clear, temperature 21°C, dew point -1°C, and an altimeter setting of 30.17 inches of mercury. Calculation of the crosswind component using the recorded weather at SMQ indicated that about a 2-knot tailwind would have been present on runway 25 at N40 about the time of the accident.

## Airport Information

<b>Airport:</b>	SKY MANOR N40	<b>Runway Surface Type:</b>	Asphalt
<b>Airport Elevation:</b>	560 ft msl	<b>Runway Surface Condition:</b>	Dry
<b>Runway Used:</b>	25	<b>IFR Approach:</b>	None
<b>Runway Length/Width:</b>	2900 ft / 50 ft	<b>VFR Approach/Landing:</b>	Go around; Traffic pattern

N40, located 2 miles southwest of Pittstown, New Jersey, was uncontrolled and had one runway in a 7/25 configuration. Runway 25 was asphalt, had a 0.3%-down gradient, and was in good condition. The runway was 2,900 ft long and 50 ft wide and was marked with non-precision markings in good condition.

Electrical transmission lines crossed the approach path for runway 25, about 99 ft above ground level, 2,070 ft from the beginning of the runway, and 210 ft left of centerline. The transmission lines were equipped with spherical high visibility markers and required an 18:1 slope to clear.

A 2-light precision approach path indicator (PAPI) that was installed on the left side of the runway displayed a 4.00° glidepath to provide pilots with guidance information to help acquire and maintain the correct approach slope to the runway. Postaccident examination of the PAPI revealed that it was operational and was aligned so that an airplane following its guidance would touch down within the first third of the runway.

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Fatal	<b>Aircraft Damage:</b>	Substantial
<b>Passenger Injuries:</b>	1 Fatal	<b>Aircraft Fire:</b>	None
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	2 Fatal	<b>Latitude, Longitude:</b>	40.559444,-74.990554

Examination of the runway revealed the presence of two fresh propeller strike marks and a tire transfer mark, which was perpendicular to and imprinted over one of the propeller strike marks. The strike marks were located 1,747 ft from the beginning of runway 25 and about 4 ft 11 inches to the right of the runway centerline.

Examination of the accident site revealed ground scars and wreckage distribution consistent with the airplane impacting a field in a nose-down attitude and coming to rest against the base of a tree. During the impact sequence, a small tree about 6 ft high was knocked down. Propeller strike marks were visible on about three of the small tree's branches. The leading edge of the right wing displayed crush and compression damage from the tip to about midspan; most of the sheet metal was crushed and accordioned back to the wing spar. The trailing edge of the right wing root also displayed compression damage. The outboard panel of the left wing displayed crush damage and was bent back about 30°.

The engine was separated from its mounting position and was found lying on the ground forward of the left side of the fuselage. The empennage was almost completely separated from the aft fuselage. The right horizontal stabilizer and elevator were wrinkled and displayed impact damage at their outboard ends; the vertical stabilizer and rudder displayed impact damage; and the rudder was partially separated from its mounting position. The landing gear was down, and the flaps were up. Both fuel caps were closed and locked. The fuel tanks were breached, and residual fuel was present in the bottom of the fuel tanks. The throttle control, propeller control, and mixture control were in the full forward positions. The cowl flaps were closed.

Examination of the 2-bladed propeller revealed that a portion of the propeller hub and one propeller blade remained attached to the engine crankshaft flange. The blade that remained attached to the hub exhibited "S" bending, twisting toward the blade face along the longitudinal axis, leading edge gouging, chord-wise scratching, and propeller tip curling of about 150° with an associated area of surface polishing near the curl. The separated blade exhibited chord-wise scratching and black-colored chordwise transfer marks near the propeller tip. The chordwise transfer marks and the tip curling and polishing were consistent with a propeller strike.

The engine remained partially attached to the firewall by fluid hoses and engine control cables. The exhaust tubing was partially crushed, and the muffler was crushed and separated from the engine.

Continuity of the crankshaft to the rear gears and to the valve train was confirmed. Compression and suction were confirmed on all four cylinders. The interiors of the cylinders were observed using a



lighted borescope, and no anomalies were noted.

The fuel injector servo was impact-fractured across the throttle bore and separated from the engine. Fuel hoses and control cables remained attached to the servo. The servo throttle control arm was observed in the full throttle position. The servo mixture control arm was observed in the full rich position. The brass plug in the fuel regulator section cover was secure. No damage was noted to the rubber diaphragms or other internal components. The fuel inlet screen was absent of debris.

The fuel flow divider remained attached to the engine, and the injector lines were secure. No damage was noted to the rubber diaphragm or other internal components. The fuel injector nozzles were unobstructed.

The engine-driven fuel pump was impact fractured and partially separated from the engine. No damage was noted to the rubber diaphragms or internal check valves. Liquid with an odor consistent with aviation gasoline was observed in the engine driven fuel pump, the fuel injector servo, and the fuel flow divider.

The dual magneto installation remained attached to the engine and was impact damaged. The distributor block cover and both distributor blocks were fractured. Sparks from the coil to the distributor carbon brush were observed when the magneto drive was rotated by hand. The ignition harness was impact damaged, and the spark plugs exhibited dark gray combustion deposits and worn normal condition.

The starter and alternator remained attached to the engine and appeared to be undamaged. The alternator belt was present but broken. The vacuum pump also remained attached to the engine; no damage was noted to the composite drive assembly, carbon rotor, or carbon vanes.

No metallic debris was noted in the oil suction screen or between the folds of the oil filter media. The oil cooler hoses were secure. The oil cooler was impact-damaged.

## **Medical and Pathological Information**

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The Hunterdon County Medical Examiner, Flemington, New Jersey, performed autopsies on the pilot and passenger. The cause of death of both occupants was blunt force trauma to the body.

The FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, conducted toxicological testing on specimens from the pilot. The toxicology results were negative for ethanol and drugs of abuse.

## **Additional Information**

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## Recent Flight Experience

According to 14 *CFR* 61.57 (Recent flight experience: Pilot in command), no person may act as a pilot in command of an aircraft carrying passengers unless that person has made at least three takeoffs and three landings within the preceding 90 days and acted as the sole manipulator of the flight controls. Further, the required takeoffs and landings must be performed in an aircraft of the same category, class, and type (if a type rating was required).

## Propeller Ground Clearance

According to 14 *CFR* 23.925 (Propeller clearance), unless smaller clearances are substantiated, with the airplane at the most adverse combination of weight and center of gravity, and with the propeller in the most adverse pitch position, a propeller clearance of at least 7 inches between each propeller and the ground with the landing gear statically deflected and in the level, normal takeoff, or taxiing attitude (whichever is most critical) must be provided. In addition, for each airplane with conventional landing gear struts using fluid or mechanical means for absorbing landing shocks, there must be positive clearance between the propeller and the ground in the level takeoff attitude with the critical tire completely deflated and the corresponding landing gear strut bottomed.

Review of engineering data for the M20J indicated that the propeller clearance exceeded the requirements of 14 *CFR* 23.925 under all conditions and that the most critical load condition for the airplane was at forward gross weight in either the level, level takeoff, normal takeoff, or taxiing attitude.

Review of the dimensional data in the three-view drawing of the airplane contained in the Mooney M20J Airplane Flight Manual and Pilot's Operating Handbook (AFM/POH) indicated that when the airplane was on the ground in a level takeoff attitude, propeller clearance from the ground was 9.5 inches. Further review of the data indicated that propeller clearance could be significantly reduced if the airplane was in a nose-down attitude during landing and touched down on the nose landing gear first, rather than touching down with the main landing gear first.

## Go Around and Landing Information

According to the M20J AFM/POH, during a go-around (balked landing), the power should be increased to full throttle, and an airspeed of 75 mph (65 knots) indicated air speed (IAS) should be established initially. After the climb is established, the wing flaps should be retracted while accelerating to 84 mph (73 knots) IAS, and then the landing gear should be retracted. During landing, the airspeed on final approach should be 81 mph (71 knots) IAS with full flaps. Touchdown should be on the main wheels first, and then during the landing roll, the nose wheel should be gently lowered.

Review of the Mooney M20J Normal Landing Distances Chart contained in the POH revealed that when loaded its maximum gross weight, with an outside air temperature at 40°C (104°F) which would have been about 19°C higher than the temperature around the time of the accident, during landing, the airplane would have had a ground roll of 956 feet to 1,118 feet. Total landing distance over a 50-foot obstacle would have been 2,129 feet to 2,269 feet.

According to the Airplane Flying Handbook (FAA-H-8083-3B), a normal approach and landing

involves selecting a landing point that is normally beyond the runway's approach threshold but within the first third of the runway. Regarding touchdowns, the handbook states, in part:

*Some pilots try to force or fly the airplane onto the ground without establishing the proper landing attitude. The airplane should never be flown on the runway with excessive speed. A common technique to making a smooth touchdown is to actually focus on holding the wheels of the aircraft a few inches off the ground as long as possible using the elevators while the power is smoothly reduced to idle. In most cases, when the wheels are within 2 or 3 feet of the ground, the airplane is still settling too fast for a gentle touchdown; therefore, the descent must be retarded by increasing back-elevator pressure. Since the airplane is already close to its stalling speed and is settling, this added back-elevator pressure only slows the settling instead of stopping it. At the same time, it results in the airplane touching the ground in the proper landing attitude and the main wheels touching down first so that little or no weight is on the nose wheel.*

## Administrative Information

<b>Investigator In Charge (IIC):</b>	Gunther, Todd
<b>Additional Participating Persons:</b>	Thomas Savickas; FAA / FSDO; Allentown, PA Michael Childers; Lycoming Engines; Williamsport, PA
<b>Original Publish Date:</b>	March 18, 2019
<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.ntsb.gov/Docket?ProjectID=94073">https://data.ntsb.gov/Docket?ProjectID=94073</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](#).