Aviation Investigation Final Report

Location:	Woodland, Washington	**Accident Number:**	WPR16FA095
Date & Time:	April 21, 2016, 14:45 Local	**Registration:**	N97119
Aircraft:	MOONEY AIRCRAFT CORP. M20K	**Aircraft Damage:**	Substantial
Defining Event:	Miscellaneous/other	**Injuries:**	1 Fatal, 2 Serious
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot and two passengers boarded the airplane for a personal cross-country flight. After a normal engine run-up, the pilot began the takeoff roll on the 1,953-ft-long runway. According to the pilot, the airplane lifted off after a ground roll of about 1,250 ft, climbed to about 35 ft above ground level, but then stopped accelerating. The pilot then lowered the nose and discovered that the airplane was just above the ground and seconds from impacting a berm. However, video of the takeoff showed that the airplane became airborne after a ground roll of about 1,933-ft, about 20 ft from the end of the runway. Further, according to the witness who took the video, the airplane attained a maximum altitude of only about 4 ft before it touched down in the grass beyond the runway end. The airplane impacted the airport's perimeter fence located about 375 ft from the end of the runway and then collided with the 9-ft-tall berm.

A sound spectrum analysis of the video's audio channel showed that the propeller rpm was about 2,430 during takeoff, which was about 270 rpm below the expected maximum rpm of 2,700. Examination of the propeller governor showed that the unit was set to a maximum rpm of about 2,600, which was about 100 rpm below the manufacturer's specified setting. In addition, during engine test cell runs with a fixed-pitch club propeller, the maximum engine rpm was increased 100 rpm, from 2,640 to 2,740, by retiming the magnetos from an improper setting to the manufacturer's specified setting. Regardless, the propeller governor would have inhibited the engine from reaching rated power, thus it is likely that the propeller governor resulted in a takeoff rpm below maximum rpm.

The pilot reported that before departure, he calculated that the airplane's gross weight was about 2,864 pounds (lbs) and the takeoff ground roll would be about 1,250 ft. Postaccident calculations revealed that the airplane's gross weight was about 2,978 lbs, which exceeded the airplane's maximum gross weight by 78 lbs. The airplane's zero-wind ground roll at its maximum gross weight of 2,900 lbs was about 1,350 ft, and may have been longer due to the higher gross weight. Although the pilot's calculations indicated a safe takeoff was possible, the airplane did not perform as expected, likely due to the engine not achieving maximum rpm and the pilot's exceedance of the airplane's maximum gross weight. The

pilot should have been sensitive to the short runway length and closely monitored the airplane's performance. If the pilot had recognized promptly that the airplane was not performing as expected, given the distance from the runway end to the fence and the berm that the airplane impacted, adequate distance would likely have been available to safely abort the takeoff. Additionally, if the pilot had designated a go/no-go runway liftoff point, this would have helped him detect the performance deficiency. However, the pilot did not recognize that the airplane was not performing as expected until the airplane was near the runway end and the impact with the berm could not be avoided.

The pilot seated in the left front seat and the passenger seated in the right front seat were restrained with lap and shoulder belts and survived with compression fractures of the lumbar spine and extremity injuries, demonstrating that this accident was survivable for occupants who were properly restrained. The compression fractures sustained by the front seat occupants are typically caused by vertical loading from below while in a seated position; in this case, likely from the airplane striking the berm in a nose-high attitude.

The passenger seated in the left rear seat was likely restrained only by a lap belt and sustained fatal injuries to his brain and spinal cord. It could not be determined if the rear seat passenger's cervical spine injuries were primarily from hyperflexion or hyperextension. The head rests had been removed from all seats in the airplane, and the rear passenger received a significant posterior scalp laceration that was consistent with hyperextension of his neck over the low back of his seat. This hyperextension could have been prevented by the presence of a head rest at an appropriate height on his seat but would not have been prevented by his use of the available shoulder harness. The rear passenger's cervical spine injuries may also have been caused by hyperflexion of his neck over the pilot's seat back and could have been prevented by his use of the available shoulder harness and/or the presence of a head rest on the pilot's seat. Thus, it is likely that the appropriate use of head rests and shoulder restraints would have mitigated the severity of the rear seat passenger's injuries.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's delay in recognizing that the airplane was not performing as expected and aborting the takeoff, which resulted in collision with a berm beyond the end of the runway. Contributing to the accident were the pilot's exceedance of the airplane's gross weight and the underperformance of the engine due to governor setting and magneto timing deficiencies. Contributing to the severity of the rear passenger's injuries was his decision to forego use of his shoulder harness and/or the absence of head rests.

Findings

Personnel issues	Delayed action - Pilot
Aircraft	Powerplant parameters - Not attained/maintained
Personnel issues	Weight/balance calculations - Pilot
Aircraft	Climb capability - Attain/maintain not possible
Aircraft	Maximum weight - Capability exceeded
Aircraft	(general) - Incorrect service/maintenance
Aircraft	Magneto/distributor - Incorrect service/maintenance
Aircraft	Propeller governor - Incorrect service/maintenance
Personnel issues	Use of equip/system - Passenger
Aircraft	Passenger compartment equip - Not used/operated
Aircraft	Passenger compartment equip - Not installed/available

Factual Information

History of Flight

Takeoff	Miscellaneous/other (Defining event)
Takeoff	Powerplant sys/comp malf/fail
Takeoff-rejected takeoff	Collision with terr/obj (non-CFIT)

On April 21, 2016, about 1445 Pacific daylight time, a Mooney M20K, N97119, was substantially damaged when it impacted terrain during an aborted takeoff from Woodland State Airport (W27), Woodland, Washington. The rear seat passenger was fatally injured, and the commercial pilot and the front seat passenger received serious injuries. The airplane was registered to MC AIR, Inc., and was being operated by the pilot as a Title 14 *Code of Federal Regulations* Part 91 personal flight. Visual meteorological conditions prevailed, and an instrument flight rules flight plan was filed for the cross-country flight, which was destined for Renton Municipal Airport (RNT), Renton, Washington. The flight was originating at the time of the accident.

The pilot flew from RNT to W27 with the front seat passenger the day before the accident to meet the rear seat passenger and other friends for a fishing trip. The fishing trip concluded about 1400 on the day of the accident, and the pilot and his passengers were dropped off at W27 by a friend.

The pilot reported that he occupied the left front seat; the passengers occupied the right front seat and the left rear seat. Before departing from the 1,953-ft-long runway, the pilot computed a takeoff ground roll of about 1,250 ft and a distance to clear a 50-ft-obstacle of about 2,200 ft. He gave a preflight briefing to the passengers that included instructions on operation of the seat belts; the engine start and run-up were "normal". Before takeoff, the pilot set the flaps to 10°, called out "seat belts," and advanced the throttle to 2,700 rpm and a manifold pressure of 39 inches while holding the brakes. He released the brakes and started the takeoff roll. The airplane lifted off after a ground roll of about 1,250 ft and climbed to about 35 ft above ground level but "then no longer seemed to accelerate as expected." The pilot lowered the nose and found that the airplane was "just above the ground." He retarded the throttle and flared the airplane into a nose-high attitude to avoid a "head on" impact with a berm, which was located about 415 ft beyond the departure end of the runway.

During an interview, the front seat passenger stated that the pilot watched him fasten his seat belt but did not provide a safety briefing to the passengers. He reported that the rear seat occupant was on his cellphone during the takeoff, but could not recall if the pilot announced "seat belts" before the takeoff roll. When the airplane was about 350 ft from the berm, the pilot announced that they were not going to make it. The airplane's nose rose before the airplane impacted the berm.

The pilot's friend, who witnessed and recorded a video of the accident, was located at the north end of the airport near the berm that the airplane impacted. The video showed that as the airplane approached the departure end of runway 32, it entered a slight nose-high attitude, and the left main landing gear lifted from the runway surface when the airplane was about 20 ft from the end of the runway. The video

showed that the airplane reached an estimated maximum altitude of about 4 ft above the ground during the takeoff. In the video, after the airplane departed the asphalt runway, it maintained a nose-high attitude and then touched down in grass about 75 ft before it reached the airport perimeter fence, which was located about 375 ft beyond the runway end. During the time that the airplane was airborne, its estimated average groundspeed was about 65 knots. Sound spectrum analysis of the video indicated that the engine speed was constant about 2,430 rpm until the airplane impacted the fence and subsequently collided with the rising face of the berm.

PERSONNEL INFORMATION

The pilot, age 52, held a commercial pilot certificate with ratings for airplane single-engine land, airplane single-engine sea, airplane multi-engine land, and instrument airplane. He also held a flight instructor certificate with a single-engine airplane rating. The pilot's most recent Federal Aviation Administration (FAA) second-class medical certificate was issued on June 22, 2015 and included the restriction "must wear corrective lenses." According to the pilot's logbook, he had accumulated 2,915 hours of flight experience at the time of the accident, of which 46 hours were flown in the preceding 6 months. The pilot reported that he had accumulated about 100 hours of flight experience in the accident airplane make and model.

AIRCRAFT INFORMATION

According to FAA records, the airplane was manufactured in 1981 and registered to MC AIR on May 10, 2007. The airplane was powered by a turbocharged, direct-drive, air-cooled, 210-horsepower Continental TSIO-360-LB7 engine. A review of maintenance records revealed that the most recent 100 hour inspection was completed on September 30, 2015, at a hobbs time of 1,916 flight hours. At the time of the inspection, the engine had accrued 671 flight hours since major overhaul. The airplane had amassed 1,926 total flight hours at the time of the accident.

Takeoff Performance Information

The excerpts below from the airplane flight manual (AFM) show the procedures for a normal takeoff and an obstacle takeoff.

TAKEOFF (NORMAL)

1. Fuel boost pump – OFF
2. Alternate air – Push Closed
3. Parking brake – Push OFF
4. Engine oil temperature - 100° F minimum
5. Power – 40" MP and 2,700 rpm
6. Engine instruments – Check proper indications
7. Aircraft attitude – Lift nose wheel at 67 KIAS
8. Landing gear – Retract prior to 107 KIAS
9. Flaps – Retract in climb

TAKEOFF (OBSTACLE)

1. Fuel boost pumps – OFF

2. Alternate air – Push Closed
3. Parking brake – Push OFF
4. Engine oil temperature - 100° F minimum
5. Power – 40" MP and 2,700 rpm
6. Engine instruments – Check proper indications
7. Aircraft attitude – Lift nose wheel at 67 KIAS
8. Climb speed – 74 KIAS until clear of obstacle, then accelerate to 95 KIAS.
9. Landing gear – Retract in climb after clearing obstacle
10. Flaps – Retract after clearing obstacle

The AFM takeoff performance section includes charts for both ground roll and takeoff distance over a 50-ft obstacle. Both charts assume conditions that include 10° flaps, 40 inches manifold pressure, mixture full rich, and a paved level runway surface. These performance charts do not account for weights above the airplane's maximum gross weight of 2,900 pounds (lbs). Using the charts, the airplane's ground roll and takeoff distance over a 50-ft obstacle were calculated assuming an outside air temperature of 23°C and a gross weight of 2,900 lbs. As shown in Table 1, the airplane's zero-wind ground roll and takeoff distance over a 50-ft obstacle were about 1,350 ft and 2,300 ft, respectively. With a 4-knot headwind, the airplane's ground roll and takeoff distance over a 50-ft obstacle were about 1,200 ft and 2,200 ft, respectively. With a 6-knot tailwind, the airplane's ground roll and takeoff distance over a 50-ft obstacle were about 1,550 ft and 2,600 ft, respectively.

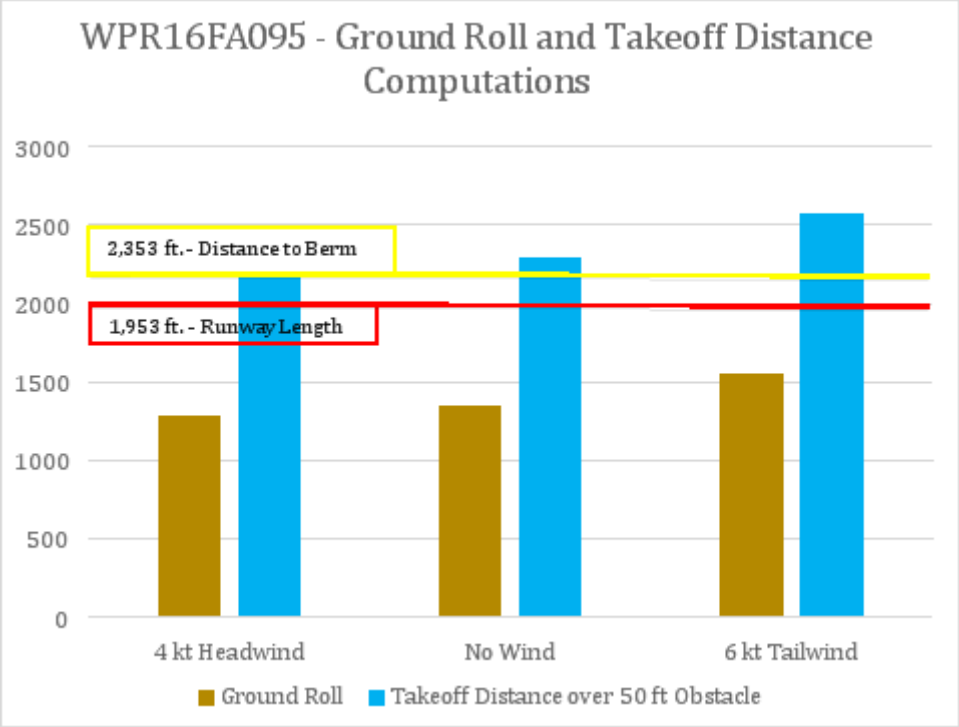

Table 1: Ground Roll and Takeoff Distance Chart

Weight and Balance

The AFM recovered from the airplane contained a weight and balance record dated May 23, 1994, that was marked as superseded on March 26, 2008, when avionics components were replaced. No weight and balance records with a more recent date than May 23, 1994, were found in the AFM. The airplane empty weight (EW) recorded on the May 23, 1994, weight and balance record was 1,945 lbs. Using the EW of 1,945 lbs, the pilot's weight of 206 lbs, the front seat passenger's weight of 284 lbs, the rear seat passenger's weight of 251 lbs, a fuel weight of 210 lbs, and a baggage weight of 83 lbs, the computed total weight was 2,978 lbs, which exceeded the maximum gross weight by 78 lbs. The occupant weights were derived from a combination of hospital reports and personal statements; the fuel weight was derived from the approximate fuel quantity drained from the airplane's wing tanks; and the baggage was weighed.

The pilot provided a weight and balance estimate for the flight, which he computed using a loading application on a portable electronic device. The pilot's inputs included an EW of 1,804 lbs, a combined weight of 530 lbs for the pilot and front seat passenger, a rear seat passenger weight of 200 lbs, a fuel weight of 210 lbs, and a baggage weight of 120 lbs. The pilot's computed total weight was 2,864 lbs. When asked where he obtained the EW of 1,804 lbs, the pilot replied that he retrieved this EW from the internet.

METEOROLOGICAL INFORMATION

The 1440 recorded weather at Paradise Point State Park, Ridgefield, Washington, located about 2.5 nautical miles (nm) southeast of W27, included wind from 290° at 2 to 4 knots, temperature 23°C, dewpoint 7°C, and an altimeter setting of 29.67 inches of mercury.

The 1459 recorded weather at St. Helens, Oregon, located about 4 nm southwest of W27 included wind from 131° at 1 to 6 knots, temperature 24°C, dewpoint 12°C, and an altimeter setting of 29.65 inches of mercury.

The 1453 recorded weather observation at Scappoose Industrial Airpark (SPB), Scappoose, Oregon, located about 9 nm southwest of W27, included wind from 070° at 4 knots, visibility 10 statute miles, clear skies, temperature 22°C, dew point 08°C, and an altimeter setting of 29.71 inches of mercury.

The resolution of the video frames from the recording made by the friend was sufficiently high for making wind-related observations. A windsock was located about 330 ft left of and before the end of the paved runway; it was about 730 ft from the camera. In addition to the windsock, the video also recorded trees and bushes on both sides of the runway. The video showed that the shape of the windsock corresponded to low wind speed, and did not show any visible motion of branches and leaves consistent with calm wind at the time of takeoff.

AIRPORT INFORMATION

W27 was located at an elevation of 29 ft above mean sea level and had one asphalt runway in a 14/32 configuration. The north end of the airport was bordered by a perimeter fence that was situated about 375 ft beyond the departure end of runway 32. A 9-ft-tall berm adjacent to a wastewater treatment facility was perpendicular to and about 415 ft beyond the departure end of runway 32.

WRECKAGE AND IMPACT INFORMATION

The airplane came to rest upright and relatively intact on the rising face of the berm on a magnetic heading of 320°. The initial impact point was indicated by a crater on the berm that measured about 8 ft long and contained both main landing gear. The airplane was located about 5 ft beyond the crater. Several plexiglass window fragments were scattered about 20 ft beyond the airplane. Both propeller blades displayed chordwise striations that originated at the leading edges. One propeller blade exhibited a slight aft bend and was tangled in a portion of the airport perimeter fence. The other propeller blade did not display any bending.

All major structures of the airplane were accounted for at the accident site. The nose landing gear was located in the debris path about 8 ft beyond the main wreckage. Both wings remained attached to the fuselage and displayed depressions in the leadings edges about midspan along with wingtip damage.

The wing tanks were not breached. More than 20 total gallons of fuel were drained from the wing tanks and a fuel line. The fuel selector moved normally between each detent, and no obstructions were noted in the valve. Some residual fuel was found in the lines of the gascolator. A SAR-GEL water finding paste test confirmed that the fuel was not contaminated by water. The gascolator screen displayed some debris, but it was not obstructed. The electric fuel boost pump functioned normally when tested using an external 12-volt battery.

The rudder, elevator, and aileron control tubes and links were continuous from their respective control surfaces to the cockpit. The stabilizer jackscrew displayed 6 threads, consistent with a takeoff position. The flap jackscrew remained attached and measured 1.75 inches, consistent with a 10° normal takeoff flap setting. The flap indicator in the cockpit showed the flaps were in a takeoff position.

MEDICAL AND PATHOLOGICAL INFORMATION

The Cowlitz County Coroner's Office, Longview, Washington, performed an autopsy on the rear seat passenger. The cause of death was listed as "blunt head and neck injuries." The rear seat passenger's injuries included a laceration to the left posterior scalp with multiple intersecting linear lacerations associated with a hemorrhage into the scalp. He sustained further injuries including fractures of cervical vertebrae C1, C2, C4, and C5, hemorrhage of the cervical paraspinal muscles, and facial contusions of the left cheek and right medial eyebrow.

According to the pilot's medical records, his injuries included a burst fracture of lumbar vertebra L3 with 50% loss of height, a displaced fracture of the right radial styloid, a laceration of his right hand, and abrasions to his left shoulder and right chest. His injuries were classified as serious due to the lumbar fracture. According to the front seat passenger's medical records, his injuries included a compression fracture of lumbar vertebra L1 with 20% loss of height, a puncture laceration of his right forearm, and abrasions to both knees. His injuries were also classified as serious due to the lumbar fracture.

TESTS AND RESEARCH

Engine Examination

The engine was shipped to the manufacturer's facility in Mobile, Alabama, for an examination and test run under the supervision of the National Transportation Safety Board (NTSB) investigator-in-charge (IIC). The engine was mounted in a test cell; various thermocouples, pressure lines, and test pads were installed on the engine; and a test club propeller for the engine model was fitted to the propeller flange.

According to the manufacturer, the design maximum-rated-power parameters included 2,700 rpm, 40 inches manifold pressure, and unmetered fuel pressure between 34 and 38 pounds per square inch (psi).

During initial tests, the engine was sluggish to start and ran slightly rough at idle. The engine subsequently reached 2,640 rpm, 39 inches manifold pressure, and an unmetered fuel pressure of 27 psi when tested without any adjustments. The magnetos were then re-timed from 12.5° before top dead center (BTDC) and 11.5° BTDC for the left and right magnetos, respectively, to 20° BTDC, in accordance with the engine manufacturer's specification. After this adjustment, the engine reached 2,765 rpm, 40 inches manifold pressure, and an unmetered fuel pressure of 26 psi. Further tests were completed by enrichening the fuel/air mixture through a manual adjustment of the aneroid at the fuel pump until the unmetered fuel flow reached 34 psi, consistent with the manufacturer's prescribed range. The engine ran more smoothly as the fuel/air mixture was adjusted, and the roughness ceased after the final adjustment was made.

Propeller Examination

A propeller examination was performed at the propeller manufacturer's facility with oversight from the NTSB IIC. The propeller exhibited damage consistent with sudden stoppage associated with impact forces. Both propeller blades displayed leading edge impact damage, leading edge polishing, and chordwise gouges and paint scratches. Continuity of the pitch change system was confirmed from the piston to both blade shanks. The assembly contained two actuating links that are loaded in compression during normal operation and connect the hydraulic piston and yoke assembly to the pin on the base of each propeller blade. A single actuating link had failed in tensile overload related to gross deflection of the blade and pitch change mechanism during the accident sequence.

Propeller Governor Examination

The propeller governor was examined at the governor manufacturer's facility with oversight from an FAA inspector. The unit did not display any abnormalities or visual damage when it was removed from the shipping container, and manual rotation of the drive gear was smooth with no binding. Internal examination of the unit, by removing the top cover and head assembly, did not reveal any indications of noticeable wear. A functional test of the unit recorded the following parameters: pressure relief, pump capacity, internal leakage, maximum rpm, control arm setting, minimum rpm, and control arm travel. The unit met the required test value for each parameter, except for maximum rpm. According to the manufacturer, the propeller governor's maximum governed speed should be 2,700 rpm. When the unit was placed on a test bench, it governed to a maximum speed of 2,590 rpm.

SURVIVAL FACTORS

The airplane had four seating positions: two front seats and an aft seat cushion (placed directly on the airplane structure) with two seat positions. The head rests had been removed from all seats. A representative of Mooney Corporation reported that the accident airplane would have been produced with head rests. All four seat positions were equipped with three-point restraint systems consisting of a lift latch buckle lap belt and a single fixed length (adjustable) shoulder harness affixed to the airplane's sidewall outboard of each seat position. The shoulder harness terminated with a metal fitting that was to be hooked to a standoff button on the insert tab portion of the lap belt during use. The pilot and the front seat passenger reported that they were wearing their lap belts and shoulder harnesses. The witness who

recorded the accident reported that when he responded to the airplane immediately after the impact, the rear seat occupant's lap belt was fastened, but not his shoulder harness. An investigator from the Cowlitz County Coroner's Office responded to the scene about 1 hour after the accident and reported seeing the rear passenger in the same orientation as shown in the photograph; the passenger's upper torso was bent at the waist with his head contacting the pilot's seatback. The investigator noted that the "decedent was unrestrained at the time of… initial observation" and that he was "advised by first responders, that the decedent's seatbelt had been unsecured by medics for emergency medical assessment."

Postaccident photographs showed that the rear left seat shoulder harness was attached to the airframe, undamaged, and not attached to the lap belt insert tab standoff button. A postaccident photograph showed that the outboard insert tab portion of the left rear seat's lap belt was affixed to its floor attachment point and was undamaged. None of the webbings showed any noticeable damage, fraying or warping in the photographs.

Seat belt testing was performed by representatives of the FAA. Both rear lap belt buckles were affixed to a central floor attachment fitting and functioned normally when insert tabs were fastened. Both buckles released the insert tabs when the lift latches were lifted.

ADDITIONAL INFORMATION

The "Rejected Takeoff" section of the FAA Airplane Flying Handbook states:

Prior to takeoff, the pilot should have in mind a point along the runway at which the airplane should be airborne. If that point is reached and the airplane is not airborne, immediate action should be taken to discontinue the takeoff. Properly planned and executed, chances are excellent the airplane can be stopped on the remaining runway without using extraordinary measures, such as excessive braking that may result in loss of directional control, airplane damage, and/or personal injury. In the event a takeoff is rejected, the power should be reduced to idle and maximum braking applied while maintaining directional control.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	52,Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	3-point
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane single-engine	**Toxicology Performed:**	No
Medical Certification:	Class 2 With waivers/limitations	**Last FAA Medical Exam:**	June 22, 2015
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	2915 hours (Total, all aircraft), 100 hours (Total, this make and model), 23 hours (Last 90 days, all aircraft), 5 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Passenger Information

Certificate:		**Age:**	Male
Airplane Rating(s):		**Seat Occupied:**	Right
Other Aircraft Rating(s):		**Restraint Used:**	3-point
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:			

Passenger Information

Certificate:		**Age:**	Male
Airplane Rating(s):		**Seat Occupied:**	Right
Other Aircraft Rating(s):		**Restraint Used:**	Lap only
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:	MOONEY AIRCRAFT CORP.	**Registration:**	N97119
Model/Series:	M20K NO SERIES	**Aircraft Category:**	Airplane
Year of Manufacture:	1981	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	25-0503
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	September 30, 2015 100 hour	**Certified Max Gross Wt.:**	2900 lbs
Time Since Last Inspection:	11 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	1926 Hrs at time of accident	**Engine Manufacturer:**	Continental Motors, Inc.
ELT:	C91 installed, activated, did not aid in locating accident	**Engine Model/Series:**	TSIO-360-LB
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:	200 ft msl	**Distance from Accident Site:**	3 Nautical Miles
Observation Time:	14:40 Local	**Direction from Accident Site:**	160°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.67 inches Hg	**Temperature/Dew Point:**	23°C / 7°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	WOODLAND, WA (W27)	**Type of Flight Plan Filed:**	IFR
Destination:	RENTON, WA (RNT)	**Type of Clearance:**	None
Departure Time:	14:45 Local	**Type of Airspace:**	

Airport Information

Airport:	WOODLAND STATE W27	**Runway Surface Type:**	Asphalt
Airport Elevation:	29 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	32	**IFR Approach:**	None
Runway Length/Width:	1953 ft / 25 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Serious	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Fatal, 1 Serious	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal, 2 Serious	**Latitude, Longitude:**	45.901668,-122.73722

Administrative Information

Investigator In Charge (IIC):	Stein, Stephen
Additional Participating Persons:	Dee Rice; FEDERAL AVIATION ADMINISTRATION; Portland, OR Mike Council; Continental Motors, Inc.; Mobile, AL Robert Collier; Mooney International Corporation; Kerrville, TX
Original Publish Date:	February 19, 2019
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=93051