Aviation Investigation Final Report

Location:	Fort Lauderdale, Florida	**Accident Number:**	MIA01LA210
Date & Time:	August 7, 2001, 15:52 Local	**Registration:**	N78933
Aircraft:	Mooney M20C	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	6 Minor
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The certified flight instructor flew into Fort Lauderdale to go to a pilot shop. After doing so, a limited preflight, and an engine run-up before takeoff were performed; no discrepancies noted. An intersection takeoff was performed and when no usable runway remained for landing, the landing gear was retracted. The left seat pilot turned off the auxiliary fuel pump and the engine experienced the initial loss of power. The CFI took control of the airplane and visually verified the positions of the magneto switch, master switch, and fuel pump. The fuel pump was turned on, and the throttle, mixture, and propeller controls were pushed forward; the manifold pressure indicated 17 or 18 inHg. The throttle was pumped, and the mixture control was leaned, with no effect. The CFI later reported that he felt, "minimal resistance", when pumping the throttle. He advised the tower of the loss of engine power and maneuvered the airplane gear-up for a forced landing on a roadway. He noted that the manifold pressure was indicating 15 inHg, and he reduced throttle before landing on the road later reporting, "Nothing changed." The airplane lightly contacted soft material on the roof of a car; no structural damage to the car was noted. A full stall landing was performed and while sliding on the ground, the right wingtip collided with the rear bumper of a bus; no structural damage to the bus was noted. Examination of the airplane revealed the throttle lever with attached throttle cable was separated from the carburetor; no evidence of safety wire was present in the hole of the securing screw of the throttle lever, on the lever, or on the throttle stop. Using the airplanes fuel system, the engine was started and operated; no discrepancies were noted. Airworthiness directive 72-06-05 Revision 2, with an effective date of July 3, 1986, indicates in part to safety wire the throttle arm and clamping screw to the throttle stop; it was signed off as being accomplished on January 10, 2000. The method of compliance was listed as, "[complied with] at [overhaul]." The carburetor was signed off as being overhauled on February 21, 2000. Calculations indicate that the propeller rpm at touchdown was 1,566.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The failure of the mechanic who installed the carburetor after overhaul to safety the throttle linkage at the carburetor per an Airworthiness Directive resulting in separation of the throttle linkage and subsequent partial loss of engine power. Contributing to the accident was the unsuitable terrain encountered by the pilot-in-command during the forced landing.

Findings

Occurrence #1: LOSS OF ENGINE POWER(PARTIAL) - NONMECHANICAL
Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings
1. (C) MAINTENANCE,INSTALLATION - IMPROPER - OTHER MAINTENANCE PERSONNEL
2. THROTTLE/POWER LEVER,LINKAGE - SEPARATION

Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: EMERGENCY DESCENT/LANDING

Findings
3. (F) UNSUITABLE TERRAIN OR TAKEOFF/LANDING/TAXI AREA
4. TERRAIN CONDITION - ROADWAY/HIGHWAY

Factual Information

On August 7, 2001, about 1552 eastern daylight time, a Mooney M20C, N78933, registered to a private individual, experienced a loss of engine power shortly after takeoff and minimally damaged a vehicle and a Broward County bus during a forced landing on a road. Visual meteorological conditions prevailed at the time and no flight plan was filed for the 14 CFR Part 91 instructional flight. The airplane was substantially damaged and the certified flight instructor/airplane owner (CFI) and private-rated student sustained minor injuries. The bus was not structurally damaged and the driver and five passengers were not injured; two passengers on the bus sustained minor injuries. The vehicle was not structurally damaged; the driver and one passenger sustained minor injuries. The flight originated about 3 minutes earlier from the Fort Lauderdale Executive Airport, Fort Lauderdale, Florida.

The CFI stated that he flew into the Fort Lauderdale Executive Airport for the purpose of going to a pilot shop and after going there, performed a limited preflight based on the uneventful flight and the short duration after landing. The airplane was taxied using only the engine-driven fuel pump, and an engine run-up was performed before takeoff with no discrepancies noted. An intersection takeoff was performed from runway 13 which provided for 3,000 plus feet of remaining runway. The pilot-rated left seat occupant performed the takeoff with 20 degrees of flaps extended and the boost pump on. When no usable runway remained for landing, the landing gear was retracted. The flight continued and at approximately 400 feet mean sea level, the left seat pilot turned off the boost pump; the engine, "...experienced the initial loss of power." The CFI took control of the airplane and visually verified the positions of the magneto switch, master switch, and fuel pump. The auxiliary fuel pump which was previously turned off was turned on, and the CFI pushed the throttle, mixture, and propeller controls forward; the throttle control was, "slightly retarded." He noted that the manifold pressure was indicating 17 or 18 inHg, and advised air traffic control of the loss of engine power. Unable to return to the departure airport, he maneuvered the airplane and attempting to restore engine power by pumping the throttle feeling, "...minimal resistance." He leaned the fuel/air ratio, with no effect. While flying near a highway, he noted that the manifold pressure was indicating 15 inHg. Unable to land on the highway due to congestion, he maneuvered the airplane for a forced landing on a roadway and pulled the throttle to idle, reporting later, "Nothing changed." While descending with the landing gear retracted, a portion of the airplane lightly contacted and damaged soft material on the roof of the car; no structural damage to the car was noted. He performed a full-stall landing and the airplane impacted the ground. While sliding on the ground, the right wingtip collided with the rear bumper of the bus; no structural damage to the bus was noted. The airplane came to rest upright approximately 523 feet from the initial touchdown point on the road. The airplane was recovered without removing any components.

Examination of the airplane revealed the throttle lever with attached throttle cable was

separated from the carburetor; no evidence of safety wire was present in the hole of the securing screw of the throttle lever, on the lever, or on the throttle stop. Both propeller blades were damaged. A sufficient quantity of fuel were found in both fuel tanks; no contaminants were noted. No repairs were performed to the engine which remained installed on the airframe. Using the airplanes fuel system, the engine was started and operated to 2,000 rpm using only the engine-driven fuel pump; safety concerns pertaining to the damaged propeller blades precluded operating the engine at a higher rpm. Both propeller blades were cut to approximately the same length, removing the damaged portion of the blades. The engine was started and operated to maximum red line indication using only the engine-driven fuel pump.

Airworthiness directive (AD), 72-06-05 Revision 2, with an effective date of July 3, 1986, indicates in part that for the model of carburetor installed, to torque the throttle arm clamping screw to 20 to 28 inch pounds and to safety the clamping screw to the throttle arm and throttle stop as depicted in the illustrations. A copy of the AD is an attachment to this report.

An AD list included with the maintenance records indicates that AD 72-06-05 Revision 2 was signed off as being accomplished on January 10, 2000. The method of compliance was listed as, "[complied with] at [overhaul]." Review of the maintenance records revealed that the carburetor was signed off as being overhauled on February 21, 2000. Copies of the AD list and maintenance entry are an attachment to this report.

Calculations performed using an NTSB program determined the propeller rpm at touchdown was 1,566. The calculations are based on the distance between the first and second ground scars on the road made by the propeller (21.5 inches), a two-bladed propeller installed, and stall speed at touchdown. A copy of the document prepared is an attachment to this report.

The airplane minus the retained carburetor was released to David E. Gourgues, liability specialist for LAD (Aviation) USA, on October 11, 2001. The retained carburetor was also released to David E. Gourgues, on October 12, 2001.

Pilot Information

Certificate:	Commercial; Flight instructor	**Age:**	58,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane single-engine; Instrument airplane	**Toxicology Performed:**	No
Medical Certification:	Class 3 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	September 25, 2000
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	August 3, 1999
Flight Time:	2312 hours (Total, all aircraft), 95 hours (Total, this make and model), 2258 hours (Pilot In Command, all aircraft), 77 hours (Last 90 days, all aircraft), 13 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

Student pilot Information

Certificate:	Commercial; Private	**Age:**	43,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	Helicopter	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 2 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	September 21, 2000
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	July 28, 2000
Flight Time:	543 hours (Total, all aircraft), 64 hours (Total, this make and model), 445 hours (Pilot In Command, all aircraft), 30 hours (Last 90 days, all aircraft), 11 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Mooney	**Registration:**	N78933
Model/Series:	M20C	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	1967
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	April 9, 2001 Annual	**Certified Max Gross Wt.:**	2575 lbs
Time Since Last Inspection:	37 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	2856 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	O-360-A1D
Registered Owner:	Richard W. Sheppard	**Rated Power:**	180 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	KFXE,14 ft msl	**Distance from Accident Site:**	
Observation Time:	15:50 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Scattered / 3000 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	Broken / 10000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	10 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	70°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.13 inches Hg	**Temperature/Dew Point:**	31°C / 22°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Fort Lauderdale, FL (KFXE)	**Type of Flight Plan Filed:**	None
Destination:	West Palm Beach, FL (F45)	**Type of Clearance:**	None
Departure Time:	15:49 Local	**Type of Airspace:**	Class D

Wreckage and Impact Information

Crew Injuries:	2 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	4 Minor	**Aircraft Explosion:**	None
Total Injuries:	6 Minor	**Latitude, Longitude:**	26.190538,-80.169105(est)

Administrative Information

Investigator In Charge (IIC):	Monville, Timothy
Additional Participating Persons:	Lloyd A Morgan; FAA Flight Standards District Office; Fort Lauderdale, FL Edward Rogalski; Textron Lycoming; Belleview, FL
Original Publish Date:	April 25, 2002
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=52993