Aviation Investigation Final Report

Location:	ZEPHYRHILLS, Florida	**Accident Number:**	MIA00LA263
Date & Time:	September 16, 2000, 10:00 Local	**Registration:**	N7196L
Aircraft:	Grumman AA-5	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	1 Minor, 2 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The pilot noted the airplane was not climbing as expected and a decreased engine rpm. He checked the throttle and mixture controls then with obstructions ahead, intentionally stalled the airplane; a hard landing resulted. The mixture control arm was in the idle cutoff position and the mixture control cable was fractured aft of the mixture control arm. A bracket near the carburetor securing the mixture cable was displaced to the left 1.5 inches. The swivel assembly in the mixture control arm was installed upside down. Post accident, the engine was operated to 2,300 rpm. Both ends of the flame tube of the muffler were found separated following the engine run. One of the flame tube ends was impact damaged; portions of the fracture surfaces on both flame tube ends had a relatively shiny appearance. Wear and fatigue noted on the mixture control cable adjacent to the fracture area; bending overstress to the right on the remaining fracture surface. The mixture control cable had not been replaced since airplane manufacture in 1974. The airplane had accumulated 2,246 hours since then, 44 hours since the last annual inspection 11 months earlier, and 408 hours since an overhauled muffler was installed.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the intentional stall/mush by the pilot-in-command due to obstructions ahead resulting in a hard landing. Contributing to the accident was the partial loss of engine power due to fuel starvation caused by wear, fatigue, then overstress separation of the mixture control cable resulting in the mixture control arm moving to the idle cutoff position.

Findings

Occurrence #1: LOSS OF ENGINE POWER(PARTIAL) - MECH FAILURE/MALF
Phase of Operation: TAKEOFF - INITIAL CLIMB

Findings
1. (F) MIXTURE CONTROL,CABLE - WORN
2. (F) MIXTURE CONTROL,CABLE - FATIGUE
3. (F) MIXTURE CONTROL,CABLE - FAILURE,TOTAL
4. (F) MIXTURE CONTROL,CABLE - NOT CONNECTED
5. (F) FLUID,FUEL - STARVATION

Occurrence #2: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: MANEUVERING - TURN TO LANDING AREA (EMERGENCY)

Findings
6. (C) STALL/MUSH - INTENTIONAL - PILOT IN COMMAND

Factual Information

On September 16, 2000, about 1000 eastern daylight time, a Grumman AA-5, N7196L, registered to Positive Attitudes, Inc., experienced a loss of engine power shortly after takeoff from the Zephyrhills Municipal Airport, Zephyrhills, Florida. Visual meteorological conditions prevailed at the time and no flight plan was filed for the 14 CFR Part 91 personal flight. The airplane was substantially damaged and the private-rated pilot and one passenger were not injured. One passenger sustained minor injuries. The flight originated about 1 minute earlier from the Zephyrhills Municipal Airport.

The pilot stated that the aircraft preflight and engine run-up before departure were uneventful. The flight departed and during the initial climb at approximately 350 feet above ground level (agl), he noted that the airplane did not appear to be ascending as expected. He looked at the tachometer which was indicating between 1,900 and 2,000 rpm and, "...checked throttle and mixture which were both OK." He also scanned the gauges and switches on the instrument panel which were also indicating "OK." He advised his passengers of the situation and maneuvered the airplane for a landing in a field. He noted trees that were ahead and applied aft elevator control input to intentionally stall the airplane; it dropped and impacted the ground then slid approximately 60-70 feet before coming to rest upright. Both passengers reported that the airplane impacted the ground "real hard."

The accident site was located approximately 1 mile north of the airport. The airplane was recovered and according to the FAA certificated mechanic who recovered it, the carburetor bowl was drained and found to contain 2.5 ounces of fuel; no contaminants were noted. Some automotive fuel was present. The mechanic also indicated that he smelled fuel on the ground during recovery and that there was no fuel remaining in the fuel tanks when he recovered the airplane.

Examination of the airplane following recovery by an FAA airworthiness inspector revealed the mixture control cable was broken aft of the mixture control arm at the carburetor. An approximate 3-inch section of the cable remained secured to the mixture control arm which was found in the idle cutoff position. A bracket located in the engine compartment approximately 4.5 inches aft of the carburetor that secures the mixture control cable was noted to be displaced approximately 1.5 inches to the left; the cable housing remained secured to the bracket. The swivel assembly in the mixture control arm was installed upside down contrary to the illustrations in the maintenance manual and the illustrated parts catalog. The damaged propeller was removed from the airplane and a serviceable propeller was installed for the attempted engine run that was performed with FAA oversight. The engine was started and operated to 2,300 rpm. A check of each magneto during the engine run revealed that the left magneto had a broken "P" lead; the right magneto drop was noted to be "OK." Also during the engine run, a "tinny rattling noise" was heard. The engine was secured and a rattling sound

was heard when the muffler struck by hand. The muffler was removed and cut open which revealed that both end caps of the flame tube were separated and loose inside the muffler. Copies of the FAA inspector statements are an attachment to this report. The muffler and broken mixture control cable were retained for further examination by the NTSB Materials Laboratory located in Washington, D.C.

Metallurgical examination of the mixture control cable revealed the fracture location of the wire was 0.14 inches forward of the end of the housing when the cable was straight and with the knob pushed in all of the way. The solid wire of the cable was worn adjacent to the fracture surface with the greatest wear on the wire located within approximately 0.34 inches aft and 0.09 inches forward of the fracture location. The worn surface was located at the outside radius of the bend (on the right side of the cable). Fatigue was noted emanating from multiple origins at the worn surface of the wire adjacent to the fracture surface. The area of the fatigue region was less than 10 percent of the total fracture surface area. The remaining fracture surface had dimpled fracture features consistent with overstress fracture. The fracture surfaces of the forward and aft pieces of the control cable were fit together which formed an angle of 129 degrees relative to each other with a bend radius of approximately 0.17 inches at the cable centerline. The direction of the deformation in the cable was such that the angle of the bend pointed to aircraft right. Examination of the muffler revealed the interior of the muffler had a generally corroded appearance, and the perforated inner cylinder wall thickness appeared thinner nearest the fracture locations where the end caps were located. Pieces were missing from the inner cylinder. Impact damage to the exterior of the muffler was noted and one of the separated end caps was deformed which was associated with the exterior crushing. Portions of the fracture surfaces on each end cap had a relatively shiny appearance consistent with little or no oxidation. A copy of the metallurgy report is an attachment to this report.

The airplane was manufactured in 1974, and had accumulated approximately 2,246 hours since then at the time of the accident. There was no record that the mixture control cable had been replaced since the airplane was manufactured. The muffler was replaced with an "overhauled" unit on August 11, 1993. The muffler had been in service for 408 hours at the time of the accident as determined by the tachometer. The airplane was inspected last on October 26, 1999, in accordance with an annual inspection and had accumulated approximately 44 hours since then at the time of the accident. Excerpts from the maintenance records are an attachment to this report.

The airplane minus the retained mixture control cable was released to Mr. Steven M. Homenda, insurance adjuster for Universal Loss Management, Inc., on September 20, 2000. The muffler was retained on November 15, 2000. The retained mixture control cable and muffler were released to Mr. Steven M. Homenda, on July 13, 2001.

Pilot Information

Certificate:	Private	**Age:**	45,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	July 7, 1999
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	
Flight Time:	93 hours (Total, all aircraft), 5 hours (Total, this make and model), 43 hours (Pilot In Command, all aircraft), 21 hours (Last 90 days, all aircraft), 6 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Grumman	**Registration:**	N7196L
Model/Series:	AA-5 AA-5	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal; Utility	**Serial Number:**	AA5-0496
Landing Gear Type:	Tricycle	**Seats:**	4
Date/Type of Last Inspection:	October 26, 1999 Annual	**Certified Max Gross Wt.:**	2200 lbs
Time Since Last Inspection:	44 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	2246 Hrs	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	O-320-E2G
Registered Owner:	POSITIVE ATTITUDES, INC.	**Rated Power:**	150 Horsepower
Operator:	ARTHUR L. SCHAER	**Operating Certificate(s) Held:**	None
Operator Does Business As:		**Operator Designator Code:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	LAL ,142 ft msl	**Distance from Accident Site:**	151 Nautical Miles
Observation Time:	09:50 Local	**Direction from Accident Site:**	17°
Lowest Cloud Condition:	Scattered / 7000 ft AGL	**Visibility**	12 miles
Lowest Ceiling:	Broken / 15000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	180°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	79°C / 73°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	(ZPH)	**Type of Flight Plan Filed:**	None
Destination:	LEESBURG , FL (LEE)	**Type of Clearance:**	None
Departure Time:	09:59 Local	**Type of Airspace:**	Class G

Airport Information

Airport:	ZEPHYRHILLS MUNICIPAL ZPH	**Runway Surface Type:**	Asphalt
Airport Elevation:	90 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	4	**IFR Approach:**	
Runway Length/Width:	5001 ft / 100 ft	**VFR Approach/Landing:**	

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 Minor, 1 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Minor, 2 None	**Latitude, Longitude:**	

Administrative Information

Investigator In Charge (IIC):	Monville, Timothy
Additional Participating Persons:	JAMES R BLAKE; TAMPA , FL GARY VIDAK; ORLANDO , FL
Original Publish Date:	October 9, 2001
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=50288