Aviation Investigation Final Report

Location:	DAYTONA BEACH, Florida	**Accident Number:**	ATL97LA028
Date & Time:	December 26, 1996, 12:49 Local	**Registration:**	N737JC
Aircraft:	Mooney M20F	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	2 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

Because the flight was taking longer than expected, the pilot elected to divert for fuel. While being vectored for an approach, the engine quit. During the ensuing forced landing, the airplane collided with trees and the ground. There was no evidence of a loss of fuel during the flight nor at the accident site, and the engine was operated following the accident. However, testing of the fuel injector servo revealed that its flow exceeded the maximum limit. The pilot stated he was using 11 gallons per hour for fuel usage planning. Using the power setting and altitude the pilot reported he used during the flight, the engine manufacturers operating manual indicated that the fuel usage would be between 11.3 and 13 gallons per hour (gph), depending on the mixture setting. Based on the elapsed time of the flight, the usable fuel supply in the airplane, and the excessive fuel servo flow, at 11.3 gph, about six gallons of fuel would have remained in the airplane. At 13 gph, more fuel than the usable capacity would have been needed. The fuel usage, therefore, exceeded the pilot's planned usage, discounting the servo's excessive flow rate.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's inadequate in-flight fuel consumption calculations, and the excessive flow of the fuel injector servo, that combined to result in fuel exhaustion.

Findings

Occurrence #1: LOSS OF ENGINE POWER(TOTAL) - NONMECHANICAL
Phase of Operation: DESCENT

Findings
1. (C) FUEL CONSUMPTION CALCULATIONS - INADEQUATE - PILOT IN COMMAND
2. (C) FUEL SYSTEM,INJECTOR - EXCESSIVE FLOW/OUTPUT
3. (C) FLUID,FUEL - EXHAUSTION

Occurrence #2: FORCED LANDING
Phase of Operation: EMERGENCY DESCENT/LANDING

Occurrence #3: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: EMERGENCY DESCENT/LANDING

Findings
4. OBJECT - TREE(S)

Factual Information

On December 26, 1996, about 1248 eastern standard time, a Mooney M20F, N737JC, collided with trees and the ground about two miles from the approach end of runway 7L at Daytona Beach, Florida. The airplane was operated by the pilot under the provisions of Title 14 CFR Part 91, and visual flight rules. An instrument flight plan had been filed for the personal flight. There were no injuries to the private pilot, who was instrument rated, nor the passenger, and the airplane was substantially damaged. Origination of the flight was Elizabeth City, North Carolina, about 0822, on the same day.

According to air traffic personnel, the flight was originally destined for Melbourne, Florida. While the flight was in contact with Jacksonville Air Route Traffic Control Center, the destination was changed to Daytona Beach, Florida. The pilot reported critical fuel when about seven miles from Daytona Beach International Airport. Subsequently, about two miles from the airport, the pilot reported that the airplane would not reach the runway.

The FAA inspector who visited the accident site reported no evidence of siphoned fuel, no evidence of fuel on the ground, and no a fuel odor.

From the departure time until the pilot reported a loss of engine power, 4.5 hours elapsed. According to a record of telephone conversation between the FAA inspector and the airplane fueler, the fuel tanks were filled to their capacity of 64 usable gallons. The pilot reported that he used 11 gallons per hour to calculate the fuel usage, which was consistent with the owners manual for the 1967 airplane. At 11 gallons per hour and 4.5 hours elapsed flight time the total fuel usage would be 49.5 gallons. Fuel used for taxi, run-up, and takeoff was not listed in the owner's manual.

A post accident flow test of the fuel servo unit revealed in the servo exceeding the upper flow limit by 1 2/3 gallons per hour (see attached report) or 7.47 gallons for the 4.5 hour flight. Using the Lycoming Operator's Manual, the fuel flow at the pilot's described flight conditions of 4,000 feet mean sea level, 23 inches manifold pressure, and 2500 rpm, was 11.3 gallons per hour at best economy mixture setting, and 13.0 gallons per hour at best power mixture setting. Based on these figures the fuel expected to be used during the 4.5 hour flight would be as follows:

best economy: 4.5 hours X 11.3 gallons/hour = 50.85 + 7.47 gallons = 58.32 gallons best power:4.5 hours X 13 gallons /hour = 58.5 + 7.47 gallons = 65.97. Normally expected fuel for start, taxi, and run up is two to four gallons.

Pilot Information

Certificate:	Private	**Age:**	64,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	April 16, 1996
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	1780 hours (Total, all aircraft), 24 hours (Total, this make and model), 1687 hours (Pilot In Command, all aircraft), 24 hours (Last 90 days, all aircraft), 13 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Mooney	**Registration:**	N737JC
Model/Series:	M20F M20F	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	670376
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	September 12, 1996 Annual	**Certified Max Gross Wt.:**	2740 lbs
Time Since Last Inspection:	24 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	6552 Hrs	**Engine Manufacturer:**	Lycoming
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	IO-360-A1A
Registered Owner:	TWIN AIR TRANSPORT CORPORATION	**Rated Power:**	200 Horsepower
Operator:	THEODORE R. COLEMAN	**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:	DAB ,35 ft msl	**Distance from Accident Site:**	3 Nautical Miles
Observation Time:	12:53 Local	**Direction from Accident Site:**	70°
Lowest Cloud Condition:	Scattered / 2300 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	5 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	0°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30 inches Hg	**Temperature/Dew Point:**	24°C / 19°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	ELIZABETH CITY , NC (ECG)	**Type of Flight Plan Filed:**	IFR
Destination:	(DAB)	**Type of Clearance:**	IFR
Departure Time:	08:22 Local	**Type of Airspace:**	Class C

Airport Information

Airport:		**Runway Surface Type:**	
Airport Elevation:		**Runway Surface Condition:**	
Runway Used:	0	**IFR Approach:**	Localizer only
Runway Length/Width:		**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 None	**Latitude, Longitude:**	29.189174,-81.050682(est)

Administrative Information

Investigator In Charge (IIC):	Hicks, Preston
Additional Participating Persons:	J S STRICKLAND; ORLANDO , FL JOHN MURPHY; ORLANDO , FL
Original Publish Date:	September 5, 1997
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=3814

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