Aviation Investigation Final Report

Location:	Mobile, Alabama	**Accident Number:**	ATL03FA082
Date & Time:	April 24, 2003, 20:12 Local	**Registration:**	N705QD
Aircraft:	Socata TBM 700B	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Executive/Corporate		

Analysis

A review of communications between Mobile Downtown Control Tower, and the pilot revealed that while on approach the pilot reported having a problem. The Ground Controller reported that he had the airplane in sight and cleared the flight to land on runway 18. The pilot stated that he had a "run away engine", and elected to shut down the engine and continued the approach. The Controller then cleared the pilot again to runway 18. The pilot then stated that he did not think that he was going to "make it." The airplane collided with a utility pole and the ground and burst into flames short of the runway. The post-accident examination of the engine found that the fuel control unit arm to the fuel control unit interconnect rod end connection was separated from the rod end swivel ball assembly. The swivel ball assembly was found improperly attached to the inboard side of the arm, with the bolt head facing inboard, instead of outboard, and the washer and nut attached to the arm's outboard side instead of the inboard side. The rod separation would resulted in a loss of power lever control. The published emergency procedures for "Power Lever Control Lose," states; If minimum power obtained is excessive: 1) reduce airspeed by setting airplane in nose-up attitude at IAS < 178 KIAS. 2) "inert Sep" switch--On. 3) if ITT >800 C "Inert Sep"--Off. 4) Landing Gear Control--Down. 5) Flaps--Takeoff. 6) Establish a long final or an ILS approach respecting IAS < 178 KIAS. 7) When runway is assured: Condition Lever to --Cut Off. 8) Propeller Governor Lever to--Feather. 9) Flaps --Landing as required (at IAS <122 KIAS). 10) Land Normally without reverse. 11) Braking as required. The pilot stated to Mobile Downtown Control Tower, Ground Control that he had a "run away engine" and that he "had to shut down the engine". As a result of the pilot not following the published emergency procedures, the airplane was unable to reach the runway during the emergency.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The improper installation of the power control linkage on the engine fuel control unit by maintenance personnel which resulted in a loss of power lever control, and the pilot's failure to follow emergency procedures and his intentional engine shutdown which resulted in a forced

landing and subsequent inflight collision with a light pole.

Findings

Occurrence #1: LOSS OF ENGINE POWER
Phase of Operation: APPROACH

Findings
1. (C) MAINTENANCE,INSTALLATION - IMPROPER - OTHER MAINTENANCE PERSONNEL
2. (C) ENGINE SHUTDOWN - INTENTIONAL - PILOT IN COMMAND
3. (C) EMERGENCY PROCEDURE - NOT FOLLOWED - PILOT IN COMMAND

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

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

Findings
4. OBJECT - POLE

Factual Information

HISTORY OF FLIGHT On April 24, 2003 at 2012 central daylight time, a Socata TBM 700B, N705QD, registered to Fleet National Bank and operated by Quest Diagnostics, collided with a utility pole and the ground, and burst into flames one-half mile short of runway 18, at the Mobile Downtown Airport in Mobile, Alabama. The flight was being operated under the provisions of Title 14 CFR Part 91, and visual flight rules. Visual meteorological conditions prevailed and an instrument flight plan was filed. The Airline Transport Pilot received fatal injuries, the airplane sustained substantial damage and there was a post-crash fire. The flight originated from Lawrenceville, Georgia, at 1845 on April 24, 2003. A review of communications between Mobile Downtown Control Tower, Ground Control and N705QD, Lab Quest Eight Five Zero revealed that while on approach to Mobile Downtown Airport, Lab Quest contacted the Controller and informed him that he was having a problem. Ground Control informed the pilot that he was in sight and was cleared to land on runway 18, and could he be of assistance. The pilot responded that he had a "run away engine" or properly stated as a power lever control loss. Ground Control asked the pilot, if he could help. The pilot replied "no sir" that he had to shut down the engine and come in on runway 14. Ground Control informed the pilot that the first 2,600 feet of runway 14 was closed but that he was cleared to land on runway 14 or runway 18 his choice, and that the winds were at 150 degrees, at 13. The Controller then informed the pilot, that he was headed straight into runway 18 "now that's where you're going is that correct"?, the pilot responded yes sir. The pilot then stated that he did not think that he was going to make it and that they might want to roll the trucks. The airplane collided with a light pole 1800 feet short of runway 18 at 35 feet above the ground, separating five feet of the right wing. The airplane impacted the street inverted and came to rest engulfed in flames 477 feet from its initial contact with the light pole. Witnesses ran to the airplane and assisted the pilot after he emerged from the flames. The pilot was transported to the University of South Alabama Medical Center where he later succumbed to his injuries. PERSONNEL INFORMATION A review of information on file with the Federal Aviation Administration Airman's Certification Division, Oklahoma City, Oklahoma, revealed the pilot was issued an Airline Transport Pilot Certificate on December 17, 1998, with ratings for Airplane Multiengine Land, and a Commercial Pilot Certificate for airplane single engine land. A review of records on file with the FAA Aero Medical Records revealed the pilot held a first-class medical certificate issued on July 29, 2002 with no waivers or limitations. The pilot reported on his application for the medical certificate that he had accumulated 12,000 total flight hours. According to Quest Diagnostics, the pilot had accumulated 408 hours total time in the TBM 700B, including 177 hours in the last 90 days. AIRCRAFT INFORMATION A review of the airplane's maintenance records revealed that the airplane was on an FAA Approved Airworthiness Inspection Program (AAIP). The airplane's most recent inspection was a "C" Check which was accomplished on April 9, 2003. The airframes total time at the time of inspection was 1,183.7 hours, and the engines total time was 1,187.7 hours. On April 21, 2003 the fuel control on the engine was removed and replaced with an overhauled fuel control. The fuel control was rigged at high idle, low idle, reverse stop and max NG stop. A ground run was performed and an operational/leak check was done with no defects noted. According to the maintenance write-up, all work had been done in accordance with Pratt & Whitney’s maintenance manual Chapter 73-10-00, by Craig Air Center, Inc. METEOROLOGICAL INFORMATION The nearest weather reporting facility at the time of the accident was Mobile Downtown Airport in Mobile, Alabama. The 1953 surface weather observation was: 2,700 feet broken,

visibility 10 statute miles, temperature 73-degrees Fahrenheit, dew point temperature 66-degrees Fahrenheit, wind 150-degrees at 12 knots, and altimeter 29.81. Visual meteorological conditions prevailed at the time of the accident. WRECKAGE AND IMPACT INFORMATION Examination of the airplane found that it had come to rest inverted about 1,000 feet short of the runway on an access road near an industrial parking area. The airframe from the cockpit seats including the instrument panel aft, had been fire damaged. The left horizontal stabilizer, right elevator and vertical stabilizer with rudder were identifiable in an ash outline, and found at the approximate airplane position they would be normally. Control continuity was not established due to the fire damage. All of the cockpit instruments were in their proper location but badly burned and unreadable. The landing gear was found in the retracted position. The right wing outboard five feet and about 7 feet of the right flap and aileron had separated on initial impact with the light pole. The remainder of the right wing remained with the wreckage and was damaged in the post crash fire aft of the main wing spar. The left wing remained with the fuselage, however the sections of the wing outboard of the fuel tank were fire damaged. Examination of the engine found it intact in the airframe nacelle, and no fire damage was present. The cowling and inlet shrouding displayed severe deformation with deep gouges and scrape marks running longitudinally along the surface of the upper cowling. The accessory gearbox housing was intact. The fuel control unit and high pressure fuel pump were intact. The fuel-control manual over-ride lever was found in the maximum flow position. The input clevis fitting was fractured. The fuel control unit condition lever linkage was found intact. The fuel control unit arm to fuel control unit interconnect rod end connection was found separated from the rod end swivel ball assembly. The swivel ball assembly was found attached to the inboard side of the arm, with the bolt head facing inboard, and the washer and nut attached to the arm's outboard side. The rod end bronze bearing surface displayed heavy wear and material smearing. The remainder of the power control and reversing linkage connections were intact and were found to be assembled in their correct sequence and orientation. Examination of the 1st and 2nd stage power turbine sections found circumferential scoring of varying degrees around their shrouds, power turbine blades and blade tips. Examination of 1st and 2nd stage gearing in the reduction gearbox found no indications of operational distress. The fuel control, high pressure fuel pump, propeller governor, and over speed governor were removed and forwarded to Pratt & Whitney Canada for further examination. MEDICAL AND PATHOLOGICAL INFORMATION The Alabama Department of Forensic Sciences, Mobile, Alabama, conducted a postmortem examination of the pilot on April 25, 2003. The reported cause of death was 100 percent body surface area burns, smoke inhalation, and thermal inhalation injuries. The Forensic Toxicology Research Section, Federal Aviation Administration, Oklahoma City, Oklahoma performed postmortem toxicology of specimens from the pilot. No carbon monoxide or cyanide were detected in the blood, no ethanol was detected in vitreous. Etomidate and 0.702 (ug/ml, ug/g) Morphine were detected in the blood, etomidate and 1.95 (ug/ml, ug/g) morphine was detected in the urine, and were administered at the University of South Alabama Emergency room. TESTS AND RESEARCH Examination and testing of the Fuel Control, revealed that the start and acceleration checks, verified at various P3 pneumatic pressure and speeds from low to high regimes, to be within acceptance requirements. Maximum flow checks identified an output flow of 660 pph, which is with the calibration requirements of 640 - 660 pph. Maximum relief valve pressure setting was observed to be 1180 psid, which was slightly below the minimum calibration setting of 1200 psid. No leakage was observed from the overboard drain. Shutdown verification identified positive fuel cutoff when the shutdown valve was actuated. Additionally, manual override lever checks identified an output flow of 572 pph when the lever was actuated to its maximum stop. This was above the calibration requirements of 407 to 430 pph. The manual override lever maximum stop position was observed to be set at 60 degrees, which was within the calibration setting of 55.2 to 61.2 degrees. Examination of the

Fuel Pump, found the drive coupling intact. Pump capacity at a low pad speed of 810 rpm identified an output flow of 225pph, which was above the minimum overhaul acceptance limit of 214 pph. At a high pad speed of 6350 rpm, the output flow was observed to be 1724 pph, which was above the minimum overhaul acceptance limit of 1698 pph. Bypass valve checks were within acceptance requirements. Following the above tests, the unit was removed from the test stand in order to perform a visual inspection of the outlet filter. The filter was observed to be clean. The unit was considered to be reacting well to the test inputs. Examination of the propeller governor found that it had severe impact damage. The speed setting lever, shaft, and stops were missing as observed. The cover was fractured and severed from the main body assembly exposing the internal housing cavity and internal details. The reset post was bent and the drive was fractured adjacent to the drive splins. Disassembly of the governor base found the plunger assembly seized in the drive gear. The gears were found in satisfactory condition. Swipe marks from the gears were found on the base, and on the housing gear walls. The flyweights were removed and found to be moving freely on their pivots. The cavity of the governor body assembly was found in satisfactory condition. Examination of the over speed governor found it in a testable condition. Functional tests found a maximum over speed setting of 4047 rpm, which was within the calibration range of 4037 to 4057 rpm. The reset solenoid was then activated which revealed a reset over speed setting of 3525 rpm, or 5 rpm below the minimum reset calibration setting of 3530 rpm. No external leakage was noted during the functional tests. ADDITIONAL INFORMATION The wreckage of N705QD, the aircraft logbooks and the components retained for further testing were released to U.S. Aviation Underwriters, on August 31, 2004. The pilot stated to Mobile Downtown Control Tower, Ground Control that he had a "run away engine" and that he "had to shut down the engine". Examination of the engine found that the fuel control unit arm to fuel control unit interconnect rod end connection was separated from the rod end swivel ball. The swivel ball was found improperly attached to the inboard side of the arm, with the bolt head facing inboard, and the washer and nut attached to the arm's outboard side. According to the Pratt & Whitney Canada Maintenance Manual Ref. 76-10-00 Figure 1, Propeller Reversing Interconnect Linkage Installation, Rear. In the TBM Pilot's Information Manual, Section 3, Emergency Procedures, 3.3 Engine Failures; Engine Regulation Discrepancy, Power Loss, Power Lever Control Lose, states in part: If minimum power obtained is excessive: 1) reduce airspeed by setting airplane in nose-up attitude at IAS < 178 KIAS. 2) "inert Sep" switch--On. 3) if ITT >800 C "Inert Sep"--Off. 4) Landing Gear Control--Down. 5) Flaps--Takeoff. 6) Establish a long final or an ILS approach respecting IAS < 178 KIAS. 7) When runway is assured: Condition Lever to --Cut Off. 8) Propeller Governor Lever to--Feather. 9) Flaps --Landing as required (at IAS <122 KIAS). 10) Land Normally without reverse. 11) Braking as required.

Pilot Information

Certificate:	Airline transport; Commercial	**Age:**	44,Male
Airplane Rating(s):	Single-engine land; Multi-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:**	Yes
Medical Certification:	Class 1 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	July 29, 2002
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	October 2, 2002
Flight Time:	10000 hours (Total, all aircraft), 408 hours (Total, this make and model), 177 hours (Last 90 days, all aircraft), 49 hours (Last 30 days, all aircraft), 3 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Socata	**Registration:**	N705QD
Model/Series:	TBM 700B	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	231
Landing Gear Type:	Retractable - Tricycle	**Seats:**	2
Date/Type of Last Inspection:	April 9, 2003 Continuous airworthiness	**Certified Max Gross Wt.:**	6579 lbs
Time Since Last Inspection:	40 Hrs	**Engines:**	1 Turbo prop
Airframe Total Time:	1222 Hrs at time of accident	**Engine Manufacturer:**	Pratt & Whitney Canada
ELT:	Installed, not activated	**Engine Model/Series:**	PT6A-64
Registered Owner:	Fleet National Bank	**Rated Power:**	700 Horsepower
Operator:	Quest Diagnostics	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Dusk
Observation Facility, Elevation:	BFM,26 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	19:53 Local	**Direction from Accident Site:**	360°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	Broken / 2700 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	12 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	150°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.8 inches Hg	**Temperature/Dew Point:**	23°C / 19°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Lawrenceville, GA (LZU)	**Type of Flight Plan Filed:**	IFR
Destination:	Mobile, AL (BFM)	**Type of Clearance:**	IFR
Departure Time:	18:45 Local	**Type of Airspace:**	Class C

Airport Information

Airport:	Mobile Downtown Airport BFM	**Runway Surface Type:**	Asphalt
Airport Elevation:	26 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	18	**IFR Approach:**	None
Runway Length/Width:	8603 ft / 150 ft	**VFR Approach/Landing:**	Forced landing;Straight-in

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Fatal	**Latitude, Longitude:**	30.635278,-88.06639

Administrative Information

Investigator In Charge (IIC):	Wilson, Ralph
Additional Participating Persons:	Warren Green; FAA Alabama FSDO; Vestavia Hills, AL Thomas A Berthe; Pratt & Whitney Canada; South Burlington, VT Howard Busch; Quest Diagnostics Flight Operations; Reading, PA Wayne Miller; Socata Aircraft; Pembroke, FL
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Note:	
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