



National Transportation Safety Board Aviation Accident Final Report

Location:	Paris, TN	Accident Number:	ATL06FA045
Date & Time:	02/08/2006, 1210 CST	Registration:	N629EK
Aircraft:	Swearingen SA-226-TC	Aircraft Damage:	Destroyed
Defining Event:		Injuries:	1 Fatal
Flight Conducted Under:	Part 135: Air Taxi & Commuter - Non-scheduled		

Analysis

While in cruise flight at 16,000 feet, the pilot requested from ATC and was cleared to make a 360-degree turn to the left. Shortly after this, the pilot requested a 360-degree turn to the right. The pilot then requested radar vectors to the closest airport and was given this. ATC asked the pilot if he had an emergency and the pilot reported he had an asymmetric fuel condition. The pilot then asked for a lower altitude and was cleared by ATC to 4,000 feet. About a minute later the pilot transmitted "Mayday" six times and shortly after this radar and radio contact with the flight was lost. Recorded radar data showed that at 1803:13 the accident airplane was proceeding on a southerly heading at 16,100 feet mean sea level (MSL). At 1803:53 the airplane turned left to a southeasterly heading. At 1804:13 the airplane turned right returning to its original southerly heading. At 1805:14 the accident airplane turned to the right on a southwesterly heading, and maintained that heading until 1809:04 at which time the airplane turned due west and was at an altitude of 15,400 feet. The last radar contact was at 1810:06 at an altitude of 13,800 feet. The airplane wreckage was located due north from this last recorded radar contact. Witnesses observed the airplane descend in a near vertical attitude, collide with the ground, and then explode. Components from all areas of the aircraft structure and flight control surfaces were located at the crash site along with components from both engines and propellers. Impact and post crash fire damage precluded the examination of the airplanes fuel system and components.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot's inflight loss of control following a reported fuel asymmetry condition for undetermined reasons.

Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: DESCENT

Findings

1. FLUID,FUEL - ASYMMETRICAL
 2. (C) REASON FOR OCCURRENCE UNDETERMINED
 3. AIRCRAFT CONTROL - NOT POSSIBLE - PILOT IN COMMAND
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Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings

4. TERRAIN CONDITION - GROUND

Factual Information

This factual report was modified on September 7, 2007.

HISTORY OF FLIGHT

On February 8, 2006, at 1210 central standard time, a Swearingen SA-226-TC, N629EK, registered to and operated by Tri-Coastal Airlines, Incorporated, as a Title 14 CFR Part 135 cargo flight, from Dayton, Ohio to Harlingen, Texas, collided with the ground in a nose down, near vertical attitude, near Paris, Tennessee. Visual meteorological conditions prevailed and an instrument flight rules flight plan was filed. The airline transport-rated pilot received fatal injuries and the airplane was destroyed. The flight originated from Dayton, the same day at 1048.

Recorded communications between air traffic controllers at the FAA, Memphis Air Route Traffic Control Center, and the pilot of N629EK show that while in cruise flight at 16,000 feet, the pilot requested and was cleared to make a 360-degree turn to the left. Shortly after this, the pilot requested a 360-degree turn to the right. The pilot then requested radar vectors to the closest airport. Controllers gave the pilot a vector to the closest airport and asked if he had an emergency. The pilot reported he had an asymmetric fuel condition. The pilot then asked for a lower altitude. Controllers cleared the flight to 4,000 feet. About a minute later the pilot transmitted "Mayday" six times and shortly after this radar and radio contact with the flight was lost.

Recorded radar data from the FAA Memphis Air Route Traffic Control Center showed that at 1803:13 the accident airplane was proceeding on a southerly heading at 16,100 feet mean sea level (MSL). At 1803:53 the airplane turned left to a southeasterly heading. At 1804:13 the airplane turned right returning to its original southerly heading. At 1805:14 the accident airplane turned to the right on a southwesterly heading, and maintained that heading until 1809:04 at which time the airplane turned due west and was at an altitude of 15,400 feet. The last radar contact was at 1810:06 at an altitude of 13,800 feet. The airplane wreckage was located due north from this last recorded radar contact.

According to witnesses, the airplane was heard and then seen descending at a high rate of speed in a near vertical attitude and then collided with the ground and exploded. They stated that the impact shook the ground and their homes, and when they got to the impact sight, they observed a large fireball and a hole in the ground with small fires burning around it. Witnesses stated that the airplane sounded like a "top fuel dragster running wide open" that lasted about 20-seconds. Witnesses stated that after the crash they telephoned local authorities to report the accident.

PERSONNEL INFORMATION

A review of information on file with the Federal Aviation Administration Airman's Certification Division, Oklahoma City, Oklahoma, revealed that the pilot was issued a commercial pilot certificate (Foreign Based) for Airplane Multiengine Land, Airplane Single Engine Land, and Instrument Airplane. Limitations listed on the certificate had the following: Issued on basis of and valid only when accompanied by Libya Pilot License Number 648, all limitations and restrictions on the Libya pilot license apply. This included; not valid for the carriage of persons or property for compensation or hire or for agricultural aircraft operation. Additionally, the pilot was issued an Airline Transport Pilot Certificate on March 3, 2005 for airplane

multiengine land, with a type rating in the SA-227.

A review of records on file with the FAA Aero Medical Records revealed the pilot held a first class medical certificate issued on July 22, 2005, with a restriction that it was not valid for any class after. The pilot reported on his application for the medical certificate that he had accumulated 5,237 total flight hours.

AIRCRAFT INFORMATION

The Swearingen SA226TC, Serial Number: TC-396, N629EK, was operated by TriCoastal Air Inc., Wilmington, Delaware, Certificate Number: E18A8091. A review of the airplane's maintenance records revealed that the airplane was maintained under an approved aircraft inspection program (AAIP). The last inspection was conducted on December 15, 2005. The airframe's total time was recorded as 15,883.0 hours. The left engine as of the date of the accident had accumulated 9,206.8 hours since new. The Right engine as of the date of the accident had accumulated 22,524.4 hours since new.

The left Engine P-54075C is on the Continuous Airworthiness Maintenance program. February 9, 2006: TSN 9206.8, TSCAM 3025.4, CSCAM 2537 Hot Section and Gearbox Inspection: March 1, 1999 CAM Inspection: May 1, 1995, TSN 22406.4, TSO 5600.3, CSO 6455, Worldwide Aircraft Services Engine Conversion and Overhaul: October 23, 1987, TSN 16,806.1, CSN Unknown, Garrett Turbine Engine Co. Engine Conversion and Overhaul: June 16, 1984, TSN 11,198.0, CSN Unknown, Garrett Turbine Engine Co.

The right Engine P-54275 is on the Continuous Airworthiness Maintenance program. February 9, 2006: TSN 22524.4, TSCAM 3069.5, CSCAM 3076 Hot Section and Gearbox Inspection: September 24, 2004, TSN 22,252.1, CSN 31,463, TSCAM 2797.2, CSCAM 2872, Turbine Standard Ltd. CAM Inspection: April 16, 1996 Engine Conversion and Overhaul: September 14, 1987, TSN 13,445.4, CSN 21,746, Turbine Standard Ltd. Engine Conversion and Overhaul: November 5, 1982, TSN 7098.2, CSN 12039, Garrett Turbine Engine Co.

WEIGHT AND BALANCE INFORMATION

The airplane's weight and balance data recorded for the accident flight showed the airplane's empty weight as 8,433.5 pounds, Captains weight as 190 pounds, Cargo Section two as 314 pounds, Zero fuel weight as 8,937 pounds, Fuel load as 3,200 pounds, Ramp weight as 12,137 pounds, and take off weight as 12,000 pounds. Take off Center of Gravity was 268. Fuel burn rate was 600 pounds per hour at 18,000 feet cruise.

METEOROLOGICAL INFORMATION

The nearest weather reporting facility at the time of the accident was Paducah, Kentucky. The 1249 surface weather observation was: Broken clouds at 1,700, visibility 8 statute miles, temperature 2-degrees Celsius, dew point temperature 0-degrees Celsius, wind 220 at 8 knots, and altimeter 30.11. Visual meteorological conditions prevailed at the time of the accident. Additional information indicated that there was a low-pressure system and cold front moving through the area at the time of the accident. Radar mosaic indicated a large band of echoes extending over western Kentucky and Tennessee, with the accident site on the leading edge. Soundings indicated saturated conditions with favorable conditions for rime icing between 3,000 and 11,000 feet (20-degree range), at 16,000 feet winds were from the West at 52 knots, temperature was minus 25.7 degrees Celsius.

WRECKAGE AND IMPACT INFORMATION

Examination of the accident site found the airplane next to a pasture in a heavily wooded area. The airplane was observed imbedded in a crater, which was approximately 25 feet deep, 40 feet long, and 23 feet wide at GPS Coordinates; N36.13.755, W088.16.285. The debris field extended about 375 feet forward of the crater, and about 100 feet in all other directions. Small pieces of airplane skin were observed in the debris field surrounding the crater.

The aircraft impacted the ground in an 80-degree nose-down attitude on a heading of approximately 243-degrees magnetic. There were propeller blade strikes observed on one tree.

The only visible wreckage on initial examination was a section of the aft fuselage and pieces of the empennage. The crater was excavated to a depth of about 25 feet using a large tracked backhoe. Small fragments of wreckage and several pieces of the propeller blades were found up to about 300 feet from the main wreckage.

The entire airplane was severely fragmented by impact forces, however, portions of all flight controls, the tail section, both wing tips; both engines and both propellers were located and identified. The fuel crossflow valve was not located.

Very small fragments of the instrument panel, several small gears from inside instruments, and one altimeter were found. The altimeter was retrieved from the crater and the instrument panel fragments and instrument gears were along a path heading about 270 from the crater and a distance ranging from 30 to 50 feet from the crater. No portion of the center console or either side panel was found.

Several small sections of wing spar caps and webs were located and all displayed overload fractures. A small section of the aft spar carry through with a short piece of fuselage belt frame attached was found with the wing to fuselage fitting attached and displayed bending overload type failures of both, the spar and the belt frame. The largest portion of wing main spar found was a section of the upper spar cap on the main spar carry through (Center Section) about 3 feet long. It was retrieved at a depth of about 10 feet at the west end of the crater.

Three sections of the aileron push pull tubes were found in or near the crater and each displayed bending overload type failures. Several sections of control cables were examined and each displayed tension overload failures. All recovered pieces of control cable were excavated from the crater.

Segments of both flaps were found in the crater and one flap actuator was located. The flap segments displayed severe compression and fragmentation. The actuator was in the retracted position and held in position by wing structure.

Several very small pieces of wing leading edge were located and all displayed severe compression fore to aft and fragmentation.

Both ailerons were severely fragmented. Most fragments were retrieved from the crater and two small segments were in the wreckage scatter around the crater.

Both wing tips were severely fragmented and found outside the crater on either end and within about 10 feet of the crater.

Both flaps were severely compressed and fragmented and most fragments were retrieved from within the crater.

Due to the fragmentation of the entire airplane structure, it was not possible to confirm continuity of the flight control cables, engine controls or push pull tubes.

The pitch trim actuator housing was seen about six feet down in the crater and one jackscrew was about 8 feet down and about 5 feet west of the actuator housing. Both were removed from the crater with the backhoe.

The vertical stabilizer forward spar was observed intact but bent to the left and the tip was in contact with the upper surface of the left horizontal stabilizer. All the skin was missing but about 16 inches of the lower end of the rudder was still attached. The remainder of the rudder was not identified. Segments of both horizontal stabilizers were still in place but displayed severe compression and fragmentation.

One nose landing gear actuator was found in the crater with the attach fitting failed on the adjustable end and the bolt sheared on the fixed end. The actuator was in the retracted position. Both main landing gear struts and one drag brace were located in the crater, and three of the main landing gear actuators were recovered from the crater. All actuators were in the retracted position.

The second stage compressor and power section of one engine was recovered about 10 feet down at the westerly end of the crater and the other engine second stage compressor power section was recovered from the easterly end of the crater at a depth of about 8 feet.

The first-stage compressors and gearboxes from both engines were not recovered. Only small fragments of the engines gearboxes were recovered. Neither engine data plate, which was mounted on the gearbox, was recovered. The main shaft of engine "B" was cut near the aft curvic coupler to allow disassembly of the turbine section of the engine and the examination of turbine component serial numbers. The serial number information was cross referenced with maintenance records to determine identity of the left and right engines. The left engine, which was labeled as engine "A" on-scene, was a TPE331-10UA-511G, serial number P-54075C. Disassembly of the turbine section of the left engine was not attempted.

The damage to both left and right engines was similar. The forward curvic teeth of the second-stage compressor impeller were smeared on both engines. All second-stage compressor impeller blades were bent opposite the direction of rotation on both left and right engines. There was metal spray on the turbine blades and vanes of both engines. These observations were consistent with engines that were operating at the time of impact with the ground.

Five of the six propeller blades were scattered around the crater at varying distances ranging from about 20 feet to over 300 feet from the center of the crater. The sixth blade was still attached to the propeller hub at the westerly end of the crater. The second propeller hub with the engine propeller shaft attached was recovered from the opposite end of the crater buried about eight feet.

Engine P-54075C, Left Engine, Labeled as Engine "A" On-Scene

The engine, aft of the second-stage compressor impeller, was recovered at the accident site. The gearbox and first-stage compressor of the engine was not identified at the accident site, with the exception of the components listed in the Miscellaneous Engine Components section of this report. The forward curvic teeth of the second-stage compressor were smeared. The blades of the second-stage compressor impeller blades were bent opposite the direction of rotation. There were metal spray deposits on the suction side of the blades of the third-stage

turbine rotor.

Engine P-54275C, Right Engine, Labeled as Engine "B" On-Scene

The engine, aft of the second-stage compressor impeller, was recovered at the accident site. The gearbox and first-stage compressor of the engine was not identified at the accident site, with the exception of the components listed in the Miscellaneous Engine Components section of this report.

The forward curvic teeth of the second-stage compressor were smeared..

The blades of the second-stage compressor impeller were bent opposite the direction of rotation.

Approximately half of the third-stage turbine rotor blades were separated immediately above the blade platforms.

There were metal spray deposits on the suction side of the third-stage turbine rotor blades.

There were metal spray deposits on the suction side of the third-stage turbine stator vanes.

There was rotational scoring through 360 degrees on the aft blade platforms of the third-stage turbine rotor, with corresponding rotational scoring through 360 degrees on the forward inner face of the turbine bearing support housing.

Miscellaneous Engine Components

Miscellaneous loose engine components recovered included:

Fuel filter and canister.

Oil filter and canister.

Gearbox section with the oil bypass indicator in the extended position.

Gearbox section with the feather valve.

Nose cone section with the metal chip detector.

Five miscellaneous housing pieces.

Left Propeller

Maintenance records indicate that the left propeller was a Hartzell three-bladed full propeller assembly: Propeller model HC-B3TN-5G, hub serial number BVA6560, blade model T10282NB, blade serial numbers H53932, H53924, H53925.

Three propeller blades and the hub of the left propeller were recovered and identified at the accident site.

There was S-bending along the length of the blades.

The leading edge of the propeller blades had battering damage.

Right Propeller

Maintenance records indicate that the right propeller was a Hartzell three-bladed full propeller assembly: Propeller model HC-B3TN-5G, hub serial number BVA7091, blade model T10282NB, blade serial numbers H76478, H76480, H76488.

Three propeller blades and the hub of the right propeller were recovered and identified at the accident site.

There was S-bending along the length of the blades.

The leading edge of the propeller blades had battering damage.

The engine propeller shaft remained attached to the right propeller hub.

Miscellaneous Propeller Components

Miscellaneous loose propeller components recovered included:

One propeller dome.

Four blade pieces.

There were no mechanical problems reported by the pilot or discovered during the post-accident examination of the airplane.

MEDICAL AND PATHOLOGICAL INFORMATION

The Office of the medical examiner, Tennessee Department of health and environment, conducted a postmortem examination of the pilot, on February 8, 2006. The reported cause of death was "multiple blunt force injuries." The Forensic Toxicology Research Section, Federal Aviation Administration, Oklahoma City, Oklahoma performed postmortem toxicology of specimens from the pilot. The results were negative for ethanol and various other drugs. The tests for carbon monoxide, and cyanide were not performed.

ORGANIZATIONAL AND MANAGEMENT INFORMATION

The Swearingen SA226TC, Serial Number: TC-396, N629EK, was operated by TriCoastal Air Inc., Wilmington, Delaware, Certificate Number: E18A8091. The operator was authorized to conduct on demand operations in common carriage pursuant to Title 13 Code of Federal Regulations (CFR) Section 119.21 (a)(5) On demand and provide at all times, the certificate holder has appropriate written economic authority issued by the Department of Transportation. Additionally, the certificate holder was authorized to conduct flight under 14 CFR Part 91 for crewmember training, maintenance tests, ferrying, re-positioning, and the carriage of company officials using the applicable authorizations in these operations specifications, without obtaining a Letter of Authorization, provided the flights are not conducted for compensation or hire and no charge of any kind is made for the conduct of the flights. The certificate holder is also authorized to conduct operations under the provisions of Title 14 CFR Part 135 using airplane Make/Model/Series SA-226-TC, 14 CFR 119.21 (a) 95) On demand, with on demand operational use of aircraft, all cargo operation configuration, Minimum Equipment List class/category operation, En-Route IFR/VFR, and Day/Night condition of flight.

ADDITIONAL INFORMATION

According to the Swearingen Metro SA226-TC Aircraft Flight Manual (AFM) Section II-23, Subheading Fuel System it states in part that "fuel system includes left and right integral wing fuel tanks with a total usable capacity of 648 U.S. gallons. A crossflow valve provides for fuel balancing between tanks as required. An amber annunciator light illuminates when the fuel crossflow switch is placed in the open position but does not necessarily indicate the position of the crossflow valve."

The aircraft was released to the owner's representative on July 23, 2007, at Atlanta Air Recovery in Griffin, Georgia.

Pilot Information

Certificate:	Airline Transport; Commercial	Age:	45, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 1 Without Waivers/Limitations	Last FAA Medical Exam:	07/01/2005
Occupational Pilot:		Last Flight Review or Equivalent:	01/01/2006
Flight Time:	5237 hours (Total, all aircraft), 164 hours (Total, this make and model), 345 hours (Pilot In Command, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Swearingen	Registration:	N629EK
Model/Series:	SA-226-TC	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal; Transport	Serial Number:	TC-396
Landing Gear Type:	Retractable - Tricycle	Seats:	2
Date/Type of Last Inspection:	12/01/2005, AAIP	Certified Max Gross Wt.:	12500 lbs
Time Since Last Inspection:		Engines:	2 Turbo Prop
Airframe Total Time:	15883 Hours at time of accident	Engine Manufacturer:	Honeywell
ELT:	Installed, not activated	Engine Model/Series:	TPE331-10UA
Registered Owner:	Tri-Coastal Airlines, Inc.	Rated Power:	940 hp
Operator:	Tri-Coastal Airlines, Inc.	Operating Certificate(s) Held:	On-demand Air Taxi (135)
Operator Does Business As:		Operator Designator Code:	E18A

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	Condition of Light:	Day
Observation Facility, Elevation:	PHT, 580 ft msl	Distance from Accident Site:	10 Nautical Miles
Observation Time:	1249 CST	Direction from Accident Site:	180°
Lowest Cloud Condition:		Visibility	8 Miles
Lowest Ceiling:	Broken / 1700 ft agl	Visibility (RVR):	
Wind Speed/Gusts:	8 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	220°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30.11 inches Hg	Temperature/Dew Point:	2° C / 0° C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Dayton, OH (KDAY)	Type of Flight Plan Filed:	IFR
Destination:	Harlingen, TX (KHRL)	Type of Clearance:	IFR
Departure Time:	1048 CST	Type of Airspace:	

Wreckage and Impact Information

Crew Injuries:	1 Fatal	Aircraft Damage:	Destroyed
Passenger Injuries:	N/A	Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	On-Ground
Total Injuries:	1 Fatal	Latitude, Longitude:	36.229167, -88.271389

Administrative Information

Investigator In Charge (IIC):	Butch Wilson	Report Date:	09/14/2007
Additional Participating Persons:	Dennis A Roesti; Memphis FSDO; Memphis, TN Mike Terrill; Tri Coastal Air, Inc; Swanton, OH Jack Morgan; M-7 Aerospace; Seguin, TX David G Sunday; Tri Coastal Air, Inc; Swanton, OH Michael S McNerny; Federal Aviation Administration; Memphis, TN Marlin J Kruse; Honeywell; Phoenix, AZ Lee G Fisher; Honeywell; South Bend, IN Dave Keenan; Federal Aviation Administration; Washington, DC		
Publish Date:			
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov , or at 800-877-6799. Dockets released after this date are available at http://dms.nts.gov/pubdms/ .		

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The Independent Safety Board Act, as codified at 49 U.S.C. Section 1154(b), precludes the admission into evidence or use of any part of an NTSB report related to an incident or accident in a civil action for damages resulting from a matter mentioned in the report. A factual report that may be admissible under 49 U.S.C. § 1154(b) is available [here](#).