



National Transportation Safety Board Aviation Accident Final Report

Location:	BYERS, CO	Accident Number:	FTW98FA073
Date & Time:	12/19/1997, 2017 MST	Registration:	N950TT
Aircraft:	Swearingen SA226-T	Aircraft Damage:	Destroyed
Defining Event:		Injuries:	1 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

The pilot departed Front Range Airport (elevation 5512 feet) at approximately 2008, climbed to 7,000 feet msl, accelerated to 270 knots, and requested his IFR clearance. Weather at the time of N950TT's departure was 500 feet overcast; witnesses reported the tops of the thin cloud condition were 8,500 feet msl and it was very dark on top (no stars or moon). The pilot made several changes in airspeed and climb rate until radar indicated that he had entered an 8,500 fpm decent. The pilot reported to ATC that he had 'stalled' the airplane. Radar indicated that he then climbed at 7,500 fpm until his estimated airspeed was 10 knots, and then subsequently descended again at 8,400 fpm until he impacted the frozen ground. The pilot had flown 4 times for 7 hours in the previous 40 days. Five airline pilots, each of who had 3,000 to 5,000 hours in Swearingens, stated individually that even though the airplane is single pilot certified, they believed that 'its a two pilot airplane--because the work load is too high.'

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The pilot inadvertently stalling the airplane and his subsequent spatial disorientation which prevented him from maintaining airplane control. Factors were excessive workload on the pilot and the dark night light conditions.

Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: CLIMB - TO CRUISE

Findings

1. (F) LIGHT CONDITION - NIGHT
2. (F) EXCESSIVE WORKLOAD (TASK OVERLOAD) - PILOT IN COMMAND
3. (C) STALL - INADVERTENT - PILOT IN COMMAND
4. (C) AIRCRAFT CONTROL - NOT MAINTAINED - PILOT IN COMMAND
5. (C) SPATIAL DISORIENTATION - PILOT IN COMMAND

Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Findings

6. TERRAIN CONDITION - OPEN FIELD
7. TERRAIN CONDITION - FROZEN

Factual Information

HISTORY OF FLIGHT

On December 19, 1997, approximately 2017 mountain standard time, a Swearingen SA226-T (Merlin III), N950TT, was destroyed following impact with terrain near Byers, Colorado. The airline transport rated pilot, the sole occupant in the airplane, was fatally injured. The airplane was operated by the pilot under Title 14 CFR Part 91. Instrument meteorological conditions prevailed (weather data and pilot reports indicate that visual meteorological conditions existed above an estimated 8,000 feet msl) for the night cross-country personal flight which originated from Front Range Airport (FTG) near Denver, Colorado, approximately 9 minutes before the accident. An IFR flight plan had been activated with the destination of Aspen, Colorado (ASE).

Witnesses reported to the Investigator-In-Charge (IIC) that maintenance personnel at Chicago Midway Airport (MDW), had been working on N950TT "right up to the pilot's departure from Midway." One witness further stated that he remembered the pilot departing Midway sometime between 1300 and 1315 MST. Data from the pilot's logbook indicated that he had flown to Waukegan Regional Airport (UGN) where a mechanic reported to the IIC that a second transponder was reinstalled. The mechanic further stated that "N950TT was on the ground for only a short period of time and that the pilot appeared very eager to get started on his flight to ASE." The mechanic reported that the airplane was "full of packages and personal stuff."

FAA records indicate that N950TT departed UGN at 1506 for ASE. Witnesses at FTG reported that N950TT landed on runway 35 at approximately 1920 and taxied to the ramp for fuel. Another pilot, in a Cessna 402, arriving from Scottsbluff, Nebraska, reported that he was given holding instructions by Air Traffic Control (ATC) because N950TT had not closed his flight plan. Witnesses at FTG reported that ATC telephoned them to see if N950TT had safely landed; ATC subsequently cleared the Cessna 402 for the ILS to runway 35.

The pilot told the lineman at FTG that he changed his destination to FTG while en route due to the fact that "headwinds were greater than expected [the 769 nm from UGN to FTG took the pilot approximately 4.2 hours to fly]." The pilot further stated to the lineman that "fuel at \$1.55 per gallon [at FTG] was a lot better than \$2.55 [at ASE]." The lineman reported that the airplane "appeared normal" and that he didn't notice any ice on the airplane. The lineman did say that "light was limited on the ramp and that it was a very dark night." The lineman stated that the pilot requested that he "top the tanks off"; he subsequently put 190 gallons of Jet-A fuel in the right tank and 200 gallons of Jet-A fuel in the left tank.

The pilot's wife reported that the pilot telephoned her from FTG to give her his location and estimated time of arrival at ASE. He then called FAA FSS to get a weather briefing and file an IFR flight plan for ASE.

Radar data indicated that the pilot departed FTG from runway 08, at 2008. FAA documentation and National Weather Service data indicated that the pilot departed FTG in IFR conditions without an IFR clearance. Radar data further indicated that the pilot climbed to 7,000 feet msl; accelerated to 270 knots; and requested an IFR clearance. He was then instructed by the ATC controller to proceed eastbound and remain VFR. Radar data further indicated that 3 minutes later, the pilot reduced N950TT's true airspeed to approximately 140 knots and reduced the average rate of climb as he started a right turn (per ATC instructions)

from 080 degrees to 270 degrees. From 2013:10 to approximately 2013:40, N950TT's true airspeed dropped to approximately 130 knots; over the next 30 seconds, the airspeed accelerated to 155 knots; and over the next approximated 35 seconds, the airspeed dropped to an estimated 105 knots. At approximately 2014:40, radar data indicated that N950TT began to descend from 12,400 feet msl at approximately 8,500 feet per minute; and approximately 2015:15, after an altitude loss of approximately 3,500 feet, the pilot reported that he "just had a stall."

Radar data indicated that at approximately 2015:25, N950TT was in a climb of approximately 7,500 feet per minute and was heading approximately 330 degrees. Over the next 20 seconds, N950TT climbed approximately 2,200 feet and decelerated to an estimated true airspeed of 10 knots. At 2015:45, N950TT entered a descent estimated to be 8,400 feet per minute and the radar data indicated that the airplane's airspeed was beginning to increase. At approximately 2016:10, FAA ATC audio tapes recorded a hot mike with a horn sound in it, which sounded like an airplane's stall horn. At this same time, radar data indicated that N950TT had made a left turn to approximately 200 degrees.

The last recorded radar return of N950TT was at 2016:20 and it indicated that the N950TT was descending through 6,900 feet msl and heading approximately 110 degrees. The longitudinal ground scar created by the impact of N950TT with terrain was measured to be 020 degrees.

PERSONAL INFORMATION

The pilot applied for his student pilot certificate on December 6, 1985. He graduated through a succession of FAA flight certificates until he successfully acquired his airline transport rating on June 13, 1993. At the time of the accident, he had accumulated a total of approximately 3,316 hours of flight experience. He began flying turbine power aircraft during the summer of 1991, and subsequently flew a Beech 65-A90 (King Air) for approximately 790 hours. During the winter of 1995, the pilot purchased N950TT, and he participated in an independent Merlin III training program which included 40 hours of ground school and 10.8 hours of flight training. At the time of the accident, he had acquired approximately 479 hours of flight experience in the Merlin III.

On November 9, 1997, the pilot successfully completed a flight review and instrument competency check. During the next 40 days, the pilot flew approximately 4 flights for 7 hours of flight, of which 2 of the flights and 4.5 hours of flight time were on the day of the accident.

On December 18, the day before the accident, the pilot was medically examined and received a new FAA First Class medical certificate. The pilot was flying with a Statement of Demonstrated Ability (SODA) for vision (waiver #10D19215).

AIRCRAFT INFORMATION

The airplane was built in 1973, and was a turbine powered propeller driven, IFR certified aircraft. The airplane's certified maximum gross takeoff weight was 12,500 pounds, the certified maximum gross landing weight was 11,500 pounds, and the September 1995 documented empty weight was 7,754.6 pounds. The airplane had a fuel capacity of 648 gallons (Jet A fuel weights 6.7 pounds per gallon for a total fuel weight of 4,341.6 pounds). That would have left 403.8 pounds for the pilot and his cargo.

The airplane's records and the pilot's logbook indicate that the airplane had flown 6,575.6 hours. The airplane completed maintenance letter checks A, B, C, and D, on October 10, 1998

(see attached documents). At the time of this maintenance work, it was determined that N950TT needed a new windshield wiper motor which had to be ordered. On the day of the accident, the maintenance personnel at Midway Airport installed the new windshield wiper motor.

The airplane was equipped with a stability augmentation and stall avoidance system (SAS2), operated by a computer which receives input from an angle-of-attack sensing vane located on the right wing tip. When the airplane decelerates through 180 knots, the SAS arm light illuminates and the stability augmentation system begins to apply nose down stick force. At approximately 5 to 10 knots above the stall speed, the computer actuates the aural stall warning horn. Prior to the airplane reaching a stall, the accumulated nose down forces (stick pusher) of approximately 65 pounds activates and simultaneously the autopilot disengages.

Five airline pilots, who each had 3,000 to 5,000 hours in Swearingens, were interviewed by the IIC and made the following statements about the airplane. They each stated that they believed "Swearingen airplanes are two pilot airplanes, because the work load is too high." They all did report to the IIC that they knew it was FAA certified for single pilot operation, but one pilot stated that "such a pilot [who flies Swearingens single pilot] should fly it all the time [full time], very regular." Another one of the five airline pilots interviewed stated that "the airplane has a lot of systems, so it's difficult for one pilot to keep up with it." Two of these pilots reported that they believe that Swearingens have "undesirable stall characteristics, and it may take between 8,000 and 10,000 feet of altitude to recover from an actual stall."

METEOROLOGICAL INFORMATION

The weather at Front Range Airport at 2020 was: 600 feet overcast, visibility 10 sm, temperature 26 degrees F., dew point 26 degrees F., wind 070 degrees for 3 knots, and altimeter 30.29 inches of mercury. There was an AIRMET for Colorado for occasional moderate mixed rime icing in clouds below 20,000 feet msl which was good through 0200 on December 20, 1997. Two PIREPs were reported 10 nm north of Denver on December 19: the first reported light rime icing at 10,000 feet msl at 1830 with cloud tops at 10,000 feet; and, the second reported light rime icing at 10,000 at 1853 with cloud tops at 10,000 feet. At 1854, another aircraft reported that the cloud tops 8 nm west of Denver were at 8,500 feet.

The pilot reported to Denver FSS, while getting a weather briefing and filing an IFR flight plan for his flight to ASE, that he got "just a little bit of icing while coming in." A pilot of a Cessna 402, who had landed at Front Range Airport approximately 15 to 20 minutes after N950TT landed, said that the cloud tops were 7,500 to 8,000 feet msl with VMC conditions on top and he could not see any stars above the clouds. He reported to the IIC that "it was very black up there." The witness further stated that he flew an ILS to runway 35 and he broke out "about 500 feet agl."

A National Weather Service spokesperson reported to the IIC that the Doppler Radar, located at Front Range Airport, indicated the highest returns of approximately 8,500 feet msl at the time of the accident. He further indicated that there was no precipitation above that level. The captain on United Airlines flight 726, that was on departure from runway 8 at Denver International Airport at the time of the accident, reported he encountered no icing during his departure and he estimated the cloud tops to be 8,500 feet msl. He remembered that it was a "very black night with no visible stars above." The first officer on flight 726 also remembered that they did not encounter any icing during their departure. He further remembered that "the

clouds were thin enough for me to observe a large flash of light from an apparent explosion beneath the clouds off our low right side at approximately 10 miles."

The United States Naval Observatory records indicate that the moonrise time in Colorado on December 19, 1998, was 2227. It was a waning gibbous moon with 69 percent of its visible disk illuminated.

AERODROME INFORMATION

Front Range Airport, the airplane's departure airport, located at an elevation of 5,512 feet, was a non-towered uncontrolled airport with two non-intersecting runways. Runways 17-35 and 08-26, both 8,000 feet by 100 feet, and are constructed of asphalt. The airport is located under class B airspace approximately 120 degrees for 5 nm from the Denver International Airport.

WRECKAGE AND IMPACT INFORMATION

The airplane impacted the terrain approximately 16 nm from the Front Range Airport's departure end of Runway 08 (39 degrees 42.605 minutes North, 104 degrees 07.463 minutes West). The terrain was a flat field of wheat stubble and the soil was frozen hard from several days of below freezing weather conditions. The initial ground scar had a beveled earth surface approximately 30 degrees down from the horizon. The lateral initial ground scar was aligned at approximately 52 degrees and was segmented with three indentations. The two outer indentations had propeller hub components in them and the snow prior to these indentations was covered with frozen soil particles from dust size to one inch in diameter. The longitudinal centerline of the impact energy ground scar extended from the initial impact point on a 020 degree track. The airplane's rate-of-turn indicator was found at its maximum scale left turn rate (see attached cockpit instrument manufactures report).

Two parallel soot trails were located on the left and the right side of the longitudinal ground scar centerline, extending from the initial impact point for approximately 300 feet. No other evidence of postimpact fire was identified.

Debris, consisting of airplane parts and personal possessions, extended for 1,761 feet with the main fuselage located approximately 1,000 feet from initial impact ground scar (see attached wreckage diagram). All structural components were accounted for, but control continuity could not be determined due to the degree of impact damage. The two propellers were located: the first one was found on the left side of the ground scar centerline at 500 feet, and the second one was located on the right side of the ground scar centerline at 550 feet.

The power control quadrant was found with both power levers in the full forward position and the propeller RPM controls full forward (see photograph). One engine was found enveloped in the fuselage debris and the other engine was found left of the ground scar center line approximately 100 feet from the fuselage debris. The flap control handle, next to the propeller RPM controls, was found in the full up position. The landing gear control handle was not located.

The pilot was found strapped to his seat approximately 50 feet from the fuselage debris.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy and toxicological tests were ordered and performed. The autopsy was performed by the Arapahoe County Coroner's Office on December 22, 1997 at Littleton, Colorado. Toxicology test results were negative.

TEST AND RESEARCH

The airplane's weight and balance could not be determined, based on available information, due to the damage to the airplane and inadequate records. The two turboprop engines were shipped to their manufacturer (AlliedSignal Aerospace in Phoenix, Arizona), and in the presence of the IIC, they were torn down and documented (see attached engine report). Both propellers were shipped to Hartzell Propeller, Inc., in Piqua, Ohio, and in the presence of an FAA inspector, they were torn down and documented (see attached propeller report). The airframe manufacturer (Fairchild Aircraft, Inc.) and avionics manufacturer (Rockwell Collins, Inc.) both had representatives look at their respective components. No preaccident anomalies were identified in any the airplane's parts or components which would have interfered with their normal operation.

ADDITIONAL DATA

The airplane, including all components and logbooks, was released to the owner's insurance representative on August 4, 1998.

Pilot Information

Certificate:	Airline Transport; Private	Age:	52, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	Seat Occupied:	Left
Other Aircraft Rating(s):	None	Restraint Used:	Seatbelt
Instrument Rating(s):	Airplane	Second Pilot Present:	No
Instructor Rating(s):	None	Toxicology Performed:	Yes
Medical Certification:	Class 1 Valid Medical--w/ waivers/lim.	Last FAA Medical Exam:	12/23/1996
Occupational Pilot:		Last Flight Review or Equivalent:	
Flight Time:	3316 hours (Total, all aircraft), 479 hours (Total, this make and model), 27 hours (Last 90 days, all aircraft), 7 hours (Last 30 days, all aircraft), 4 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Swearingen	Registration:	N950TT
Model/Series:	SA226-T SA226-T	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	No
Airworthiness Certificate:	Normal	Serial Number:	T-225
Landing Gear Type:	Retractable - Tricycle	Seats:	8
Date/Type of Last Inspection:	12/18/1997, Annual	Certified Max Gross Wt.:	12500 lbs
Time Since Last Inspection:	1 Hours	Engines:	2 Turbo Prop
Airframe Total Time:	6599 Hours	Engine Manufacturer:	Garrett
ELT:		Engine Model/Series:	TPE331-3U303G
Registered Owner:	BIG BANG AVIATION, INC.	Rated Power:	840 hp
Operator:	BIG BANG AVIATION, INC.	Operating Certificate(s) Held:	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument Conditions	Condition of Light:	Night/Dark
Observation Facility, Elevation:	FTG, 5512 ft msl	Distance from Accident Site:	17 Nautical Miles
Observation Time:	2000 MST	Direction from Accident Site:	270°
Lowest Cloud Condition:	Thin Overcast / 600 ft agl	Visibility	10 Miles
Lowest Ceiling:	Overcast / 600 ft agl	Visibility (RVR):	0 ft
Wind Speed/Gusts:	4 knots /	Turbulence Type Forecast/Actual:	/
Wind Direction:	60°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	30 inches Hg	Temperature/Dew Point:	-3° C / -3° C
Precipitation and Obscuration:			
Departure Point:	DENVER, CO (FTG)	Type of Flight Plan Filed:	IFR
Destination:	ASPEN, CO (ASE)	Type of Clearance:	IFR
Departure Time:	2007 MST	Type of Airspace:	Class B

Wreckage and Impact Information

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

Administrative Information

Investigator In Charge (IIC): JAMES F STRUHSAKER **Report Date:** 04/15/1999

Additional Participating Persons: DALE W SHUEL; DENVER, CO
JACK D MORGAN; SAN ANTONIO, TX
PETER B BAKER; PHOENIX, AZ

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](#).