



AVIATION



HIGHWAY



MARINE



RAILROAD



PIPELINE

Aviation Investigation Final Report

Location:	ANCHORAGE, Alaska	Accident Number:	ANC00LA092
Date & Time:	July 20, 2000, 12:30 Local	Registration:	N6296R
Aircraft:	Cessna 150F	Aircraft Damage:	Substantial
Defining Event:		Injuries:	2 Serious
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

According to the first pilot, a flight instructor and owner of the accident airplane, he was providing flight instruction to his daughter in a float-equipped Cessna 150F airplane. He was demonstrating an approach to landing stall about 2,000 feet mean sea level. The airplane was configured with 20 degrees of flaps. When the airplane stalled, the student pilot cross-controlled the airplane. The left wing dropped and the airplane entered an uncommanded, inverted left spin. The instructor was able to recover the airplane to an upright attitude about 300 feet above the ground by adding engine power. The airplane continued to descend in a nose down attitude during the recovery, and struck the ground. The airplane had numerous modifications, including a 160 horsepower engine. The airplane had fixed floats installed, and qualified for the float installation when the previous owner/mechanic designated that the airplane be operated as a Cessna 150G. Changes from wheels to floats resulted in several configuration changes including propellers, and propeller spacers, larger wheels and tires, and the use of a heavier than normal nose wheel strut assembly. As a floatplane, the airplane was required to be operated in the normal category, with intentional spins prohibited. No data was available to the pilot about the consequences, or recovery techniques for an inadvertent spin. A center of gravity calculation of the accident flight placed the airplane within weight and balance limits. The presence of an over-the-counter antihistamine, and a prescription anti-depression medication, were found in the pilot's toxicological samples.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The failure of the pilot-in-command (CFI) to adequately supervise the instructional flight. Factors in the accident were an inadvertent spin entry by the student, and the pilot-in-command's failure to utilize adequate altitude for a stall demonstration.

Findings

Occurrence #1: LOSS OF CONTROL - IN FLIGHT

Phase of Operation: MANEUVERING

Findings

1. STALL - INTENTIONAL - PILOT IN COMMAND(CFI)
2. (F) ALTITUDE - INADEQUATE - PILOT IN COMMAND(CFI)
3. (F) STALL/SPIN - INADVERTENT - DUAL STUDENT
4. (C) SUPERVISION - INADEQUATE - PILOT IN COMMAND(CFI)
5. USE OF INAPPROPRIATE MEDICATION/DRUG - PILOT IN COMMAND(CFI)

Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER

Phase of Operation: DESCENT - UNCONTROLLED

Findings

6. TERRAIN CONDITION - GROUND

Factual Information

HISTORY OF FLIGHT

On July 20, 2000, about 1230 Alaska daylight time, a float-equipped Cessna 150F airplane, N6296R, sustained substantial damage when it collided with the ground, about 18 miles northwest of Anchorage, Alaska, about latitude 61 degrees, 21.47 minutes north, and longitude 150 degrees, 26.88 minutes west. The airplane was being operated as a visual flight rules (VFR) local area instructional flight, when the accident occurred. The airplane was owned and operated by the first pilot/flight instructor. The first pilot, seated in the right seat, and the student pilot, seated in the left seat, received serious injuries. Visual meteorological conditions prevailed. The flight originated at the Lake Hood Seaplane Base, Anchorage, about 1200.

During an interview with a National Transportation Safety Board (NTSB) investigator on July 21, 2000, the first pilot reported that he was providing flight instruction to his daughter near the area of Figure Eight Lake. He said he was demonstrating an approach to landing stall about 2,000 feet mean sea level, and the student pilot was following on the controls. The airplane was configured with 20 degrees of flaps. The pilot said that when the airplane stalled, the student pilot cross-controlled the flight controls. The left wing dropped and the airplane entered an uncommanded, inverted left spin. The pilot said he attempted a variety of recovery techniques without success, but finally utilized full engine power to regain elevator authority. The pilot was able to recover the airplane to an upright attitude, and stop the spin about 300 feet above the ground. The airplane continued to descend in a nose down attitude during the recovery process, and struck the ground.

AIRCRAFT INFORMATION

The maintenance records of the accident airplane note numerous modifications that were accomplished before the pilot owned the airplane. An alteration to an aircraft requires a Federal Aviation Administration (FAA) Form 337, (major repair and alteration). An FAA airworthiness inspector's signature is not required on an FAA Form 337 if the repair or alteration is based on approved data, such as an approved supplemental type certificate (STC), or airworthiness directives (AD), or type certificate data sheets, etc. A major repair or alteration based on acceptable data, such as advisory circulars, manufacturer's technical data, or other FAA field approvals, etc., does require an inspector's signature.

The maintenance records contain several FAA Form 337's with the date of March 31, 1993, as the date of alteration. Each of the reviewed 337's had an approval date for return to service, signed by the same mechanic who performed the alterations. The mechanic who performed the alterations holds an FAA Inspection Authorization (IA). The first Form 337 reflected

installation of a nose wheel fork assembly from a Cessna 182, along with a 6.00 by 6 nose tire, and 8.50 by 6 main landing gear tires.

A second FAA Form 337 reflected the installation of a Lycoming O-320 E2D engine (150 horsepower), in accordance with STC SA1034SW, issued to Air Mod Engineering, Oklahoma City, OK. This Form 337 was the only one without an airworthiness inspector's signature. STC SA1034SW is applicable to Cessna 150D through 150L models, and contains two limitations, one of which required a placard which states, "Intentional Spins Prohibited." The installation instructions also required the elimination of all references to spins on existing cockpit placards.

Another Form 337 reflected work performed on April 21, 1993, to install a McCauley model 1C160/CTM 7553 propeller (for wheelplane operations), along with a machining of a propeller spacer and the installation of a propeller bolt kit. The installation of the nose fork, the propeller, and the Lycoming engine had a return to service date of April 23, 1993.

A Form 337 with March 31, 1993, as the date of alteration, reflected a change from a Cessna 150F, to a Cessna 150G, and the installation of EDO 88A fixed floats. The language utilized on the Form 337, stated, in part: "Structurally and aerodynamically the 150F and the 150G are identical. The aircraft is to be operated as per the limitations for the 150G." The 337 included a reference to engineering drawings contained in STC SA1052SW, issued to Air Mod Engineering, for installing a Lycoming O-320 E2D engine, in accordance with STC SA1034SW, for Cessna 150G, 150H, and 150J floatplanes, and reflected a change from utility to normal category for a floatplane configuration. According to the Air Mod personnel, STC SA1052SW provides for the installation of an O-320 engine on floatplanes.

The Cessna Aircraft Company reported that a 150F model Cessna is not eligible for the installation of fixed floats, but a 150G model is eligible for floats. Airplane type certificate data for a Cessna 150F, lists only landplane information with a maximum gross weight of 1,600 pounds. Type certificate data for a Cessna 150G, lists the same gross weight of 1,600 pounds for a landplane, and also lists gross weight data for a seaplane of 1,650 pounds.

Another FAA Form 337, dated March 31, 1993, reflected the removal of a previously installed McCauley model 1C160/CTM propeller, and the installation of a McCauley model 1A175/ETM 8042 propeller (for floatplane operations). Alterations listed in this paragraph had a return to service date of June 8, 1993.

A review of the accident airplane weight and balance data revealed that changes in the landing gear, (floats to wheels to floats) did not reflect the changes in propeller installations (each utilized different spacers and bolt kits), and the use of a heavier, Cessna 182 nose wheel strut.

A weight and balance data sheet, completed July 28, 1993, reflected the installation of a float equipment kit, and a Lycoming O-320 engine. The computations were based on original aircraft data from June 23, 1965. The empty weight of the airplane was increased from

1,095.5 to 1,163.2 pounds, with a center of gravity of 33.29 inches. The maximum gross weight for a wheelplane, as stated on the form, was 1,600 pounds. A separate weight and balance data sheet for a floatplane indicated an empty weight of 1,264.7 pounds, with a center of gravity of 33.5 inches, with a floatplane gross weight of 1,700 pounds.

On August 13, 1993, citing STC SA4795SW, the weight and balance data sheets reflected an increase in the gross weight of the airplane to 1,760 pounds. The empty weights and center of gravity for the wheelplane and floatplane configurations remained unchanged. According to Aircraft Conversion Technologies personnel, STC SA4795SW, kit number 287, was an upgrade package for airplanes that already had a 150 horsepower engine installed. The STC kit was sold to the airplane's previous owner/installer, in August, 1993. The upgrade package included a gross weight increase to 1,760 pounds, data sheets, and modifications to the engine cowl, nose bowl, and spinner.

An FAA Form 337 was located in the maintenance records that documented the installation of a Lycoming O-320-E2D engine under STC SA4795SW. It had a date of alteration of October 24, 1995, with a return to service date of November 10, 1995. The 337 notes that "no flight manual supplement required as per STC SA4795SW." The 337 also states that the fuel fillers were placarded for 100/130 octane fuel, and the engine was converted to 160 horsepower in accordance with STC SE3692SW, which included the remarking of the engine tachometer.

STC SA4795SW is currently owned by Aircraft Conversion Technologies Inc., Lincoln, California, for Cessna models 150, 150A thru 150M, A150K thru A150M, 152, and A152, for the installation of a Lycoming O-360 or O-320 engine, and an increase in airplane gross weight to 1,760 pounds. The STC contains limitations and conditions that state, in part, "Cessna model 150, 150A thru 150C, A150K thru A150M, and A152 airplanes require Airplane Supplemental Flight Manual dated June 26, 1990... Airworthiness Directive (AD) 86-15-07 is applicable to airplanes modified by this design."

A review of the revision history of STC SA4795SW revealed that the AD 86-15-17 limitation was incorporated on November 18, 1986, when revision 6 of the STC was issued. At that time, the STC was owned by J & S Engineering, San Antonio, Texas. Aircraft Conversion Technologies purchased the STC from J & S Engineering in 1986.

The language of AD 86-15-17, as written, indicates that it applies to Cessna 150, 150A, 150B, and 150C airplanes that had been modified by the installation of an engine larger in size and/or horsepower than the original Continental Motors O-200-A (100 horsepower) engine. The AD specifies, among other items, the requirement that the airplane must be weighed, and the center of gravity (CG) limits be determined to include the weight of a 170 pound pilot, engine oil, and unusable fuel, and ballasting the airplane, if necessary, so that the forward CG does not exceed 32.2 inches. The AD also contains a stipulation that if the empty weight of the airplane exceeds 1,142 pounds, the airplane must have a limitation, and a warning placard on the instrument panel that states, "WARNING: THIS AIRPLANE LIMITED TO SINGLE OCCUPANT." The AD further states that if the empty weight exceeds 1,195 pounds, equipment must be

removed so as to not exceed 1,195 pounds. The 1,142 and 1,195 pounds are weight limitations established by Civil Air Regulations (CAR) 3.74(b)(1) and 3.74(b)(2). The CAR regulations are empty weight limitations.

The AD does not specify other models beyond Cessna 150C with larger engines, but the language of STC SA4795SW refers to the AD as applicable to the Cessna models covered by the STC design, making the interpretation and applicability unclear. In a telephone conversation with Aircraft Conversion Technologies personnel on December 15, 2000, the company's FAA designated engineering representative (DER) confirmed that the AD should only apply to Cessna 150 through 150C model airplanes. The airplanes referred to in the AD were early model Cessna 150 airplanes having a maximum weight of 1,500 pounds.

The most current weight and balance data for the accident airplane that could be located was dated October 27, 1995, and reflected a wheelplane empty weight of 1,157 pounds, with a center of gravity of 33.3 inches aft of the datum. A more current weight and balance data sheet for a floatplane, other than the August 13, 1993, entry of 1,264.7 pounds, was not located.

The pilot of the accident airplane stated that he did not research each and every Form 337 or modification to the airplane. He said he relied on the maintenance history provided by the previous owner. The most recent annual inspection of the airplane was conducted on March 17, 2000, by the previous owner.

The pilot reported that he performed a weight and balance calculation before the accident flight, using supplemental weight and balance data from the airplane (floatplane) flight manual. His calculation placed the airplane within the airplane's weight and balance center of gravity limits. Weight and balance calculations by the NTSB IIC, utilizing data provided by the pilot, and an FAA inspector, including calculations with heavier propeller weights and arm positions for the floatplane configuration, placed the weight and balance within limits.

The airplane does have a placard on the instrument panel that specifies the center of gravity limits at 1,600 pounds, and 1,760 pounds. The placard includes the notation that states, "No acrobatic maneuvers are approved for normal category operations."

The airplane does not have a placard stating "Intentional Spins Prohibited." No data was found that provided information to a pilot about the consequences, or the recovery techniques, of an inadvertent entry into a spin with the O-320 engine installed.

ADDITIONAL INFORMATION

Following the accident, the pilot and his daughter (the student pilot), were initially treated at a hospital emergency room. During their course of treatment, blood and urine samples were gathered by hospital personnel. Blood and urine samples, identified by the hospital as those from the pilot, were submitted to the FAA's Civil Aeromedical Institute (CAMI), Oklahoma City,

Oklahoma, for toxicological testing.

The results of the toxicological testing revealed the presence of Lidocaine and Diphenhydramine in the urine, and the presence of Bupropion in the blood and urine. Also found was 0.018 ug/ml of Diphenhydramine in the blood, and 14.288 ug/ml Acetaminophen in the urine.

On March 1, 2001, at the request of the NTSB IIC, FAA's CAMI reported that a DNA test was conducted on the original toxicological samples submitted for testing. The DNA test indicated the gender of the sample was male.

Diphenhydramine is an antihistamine found in numerous over-the-counter cold medications, and may produce drowsiness.

Bupropion is prescription drug marketed as Wellbutrin, used for treatment of depression, attention deficit hyperactivity disorder, and under the name Zyban, for use in smoking cessation. Side effects of this medication include restlessness, agitation, and insomnia. High dosages of bupropion has an increased risk of seizure.

In a letter to the pilot, dated December 8, 2000, the FAA's Alaska Region Flight Surgeon informed the pilot that the use of diphenhydramine is disqualifying for airman within 12 hours of flying, and bupropion is a disqualifying medication for use by pilots.

Pilot Information

Certificate:	Commercial; Flight instructor	Age:	49, Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land	Seat Occupied:	Right
Other Aircraft Rating(s):	None	Restraint Used:	
Instrument Rating(s):	Airplane	Second Pilot Present:	Yes
Instructor Rating(s):	Airplane single-engine	Toxicology Performed:	Yes
Medical Certification:	Class 2 Valid Medical--no waivers/lim.	Last FAA Medical Exam:	March 20, 2000
Occupational Pilot:	Yes	Last Flight Review or Equivalent:	
Flight Time:	15500 hours (Total, all aircraft), 100 hours (Total, this make and model), 14500 hours (Pilot In Command, all aircraft), 62 hours (Last 90 days, all aircraft), 15 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	Registration:	N6296R
Model/Series:	150F 150F	Aircraft Category:	Airplane
Year of Manufacture:		Amateur Built:	
Airworthiness Certificate:	Normal; Utility	Serial Number:	15061596
Landing Gear Type:	Float	Seats:	2
Date/Type of Last Inspection:	March 17, 2000 Annual	Certified Max Gross Wt.:	1760 lbs
Time Since Last Inspection:	20 Hrs	Engines:	1 Reciprocating
Airframe Total Time:	4057 Hrs	Engine Manufacturer:	Lycoming
ELT:	Installed, activated, aided in locating accident	Engine Model/Series:	O-320-E2D
Registered Owner:	KAL:OTTER88KA, LLC	Rated Power:	160 Horsepower
Operator:	CRAIG L. KETCHUM	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:	PAN ,144 ft msl	Distance from Accident Site:	18 Nautical Miles
Observation Time:	11:53 Local	Direction from Accident Site:	135°
Lowest Cloud Condition:	Scattered / 1800 ft AGL	Visibility	10 miles
Lowest Ceiling:	Broken / 6000 ft AGL	Visibility (RVR):	
Wind Speed/Gusts:	5 knots / None	Turbulence Type Forecast/Actual:	/
Wind Direction:	296°	Turbulence Severity Forecast/Actual:	/
Altimeter Setting:	29 inches Hg	Temperature/Dew Point:	13°C / 10°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	ANCHORAGE (PALH)	Type of Flight Plan Filed:	None
Destination:		Type of Clearance:	None
Departure Time:	12:00 Local	Type of Airspace:	Class G

Airport Information

Airport:		Runway Surface Type:	
Airport Elevation:		Runway Surface Condition:	
Runway Used:	0	IFR Approach:	None
Runway Length/Width:		VFR Approach/Landing:	None

Wreckage and Impact Information

Crew Injuries:	2 Serious	Aircraft Damage:	Substantial
Passenger Injuries:		Aircraft Fire:	None
Ground Injuries:	N/A	Aircraft Explosion:	None
Total Injuries:	2 Serious	Latitude, Longitude:	61.160923,-149.990798(est)

Administrative Information

Investigator In Charge (IIC):	Erickson, Scott
Additional Participating Persons:	DARREL WOODWORTH (FAA); ANCHORAGE , AK
Original Publish Date:	July 10, 2001
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.nts.gov/Docket?ProjectID=49807

The National Transportation Safety Board (NTSB) is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant events in other modes of transportation—railroad, transit, highway, marine, pipeline, and commercial space. We determine the probable causes of the accidents and events we investigate, and issue safety recommendations aimed at preventing future occurrences. In addition, we conduct transportation safety research studies and offer information and other assistance to family members and survivors for each accident or event we investigate. We also serve as the appellate authority for enforcement actions involving aviation and mariner certificates issued by the Federal Aviation Administration (FAA) and US Coast Guard, and we adjudicate appeals of civil penalty actions taken by the FAA.

The NTSB does not assign fault or blame for an accident or incident; rather, as specified by NTSB regulation, “accident/incident investigations are fact-finding proceedings with no formal issues and no adverse parties ... and are not conducted for the purpose of determining the rights or liabilities of any person” (Title 49 *Code of Federal Regulations* section 831.4). Assignment of fault or legal liability is not relevant to the NTSB’s statutory mission to improve transportation safety by investigating accidents and incidents and issuing safety recommendations. In addition, statutory language prohibits the admission into evidence or use of any part of an NTSB report related to an accident in a civil action for damages resulting from a matter mentioned in the report (Title 49 *United States Code* section 1154(b)). A factual report that may be admissible under 49 *United States Code* section 1154(b) is available [here](#).