Aviation Investigation Final Report

Location:	Dixon, California	**Accident Number:**	LAX06LA058
Date & Time:	December 14, 2005, 16:52 Local	**Registration:**	N8040G
Aircraft:	Cessna 177RG	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	1 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The airplane collided with a high tension static line associated with a high voltage transmission tower during a low altitude cruise flight at dusk and descended uncontrolled to the ground. A certified flight instructor who witnessed the accident noted the light blue colored airplane about 200 feet above ground level and traveling at a high groundspeed, prior to it impacting power lines. Prior to the line impact, the airplane did not appear to be increasing or decreasing in altitude and was traveling from east to west. Recorded radar data was used to establish a track on the airplane. The mode C altitude reports showed the airplane at 200 to 300 feet above ground level for an extended period. Due to the low altitude of the flight, the radar coverage was intermittent and ended 13 minutes prior to the accident site. Post accident examination of the airplane did not reveal any preimpact mechanical malfunctions to preclude normal operation of the airplane. The airplane was flying east-to-west toward the setting sun at the time of the accident.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the pilot's intentional flight at low altitude and failure to maintain obstacle clearance with a high tension static line. The glare from the setting sun was a factor.

Findings

Occurrence #1: IN FLIGHT COLLISION WITH OBJECT
Phase of Operation: CRUISE

Findings
1. (F) LIGHT CONDITION - SUNGLARE
2. (F) VISUAL/AURAL PERCEPTION - PILOT IN COMMAND
3. OBJECT - WIRE,TRANSMISSION
4. (C) LOW ALTITUDE FLIGHT/MANEUVER - INTENTIONAL - PILOT IN COMMAND
5. (C) CLEARANCE - NOT MAINTAINED - PILOT IN COMMAND

Factual Information

HISTORY OF FLIGHT

On December 14, 2005, at 1652 Pacific standard time, a Cessna 177RG (Cardinal), N8040G, collided with a high tension static line associated with a high voltage transmission tower in flight and impacted the ground at Dixon, California. The pilot, who was also the registered owner of the airplane, was operating it under the provisions of 14 CFR Part 91. The airline transport pilot, the sole occupant onboard, sustained fatal injuries. The airplane was destroyed. The pilot departed from the Calaveras County-Maury Rasmussen Field, San Andreas, California, about 1630, and was destined for Charles M. Schultz- Sonoma County Airport, Santa Rosa, California. Visual meteorological conditions prevailed and no flight plan had been filed.

At 1652:33, the Northern California Terminal Radar Approach Control (Nor Cal TRACON) received a report of a downed airplane from a certified flight instructor (CFI) and student flying in a Cessna 152. The CFI was interviewed the evening of the accident by the National Transportation Safety Board investigator and reported that he and his student were returning to Sacramento after a dual instructional flight. The student reported traffic and the CFI noted that the accident airplane was lower and would not be a factor. The light blue colored airplane appeared to be about 200 feet above ground level (agl) and was traveling at a high groundspeed. The CFI then noticed a flash or spark and saw the airplane impact transmission lines, followed immediately thereafter by the airplane's impact with the ground and post impact fire. Prior to the transmission line impact, the airplane did not appear to be increasing or decreasing in altitude and was traveling from east-to-west. The CFI did not see anything to indicate that the pilot was having a problem.

Another witness, who was a former air traffic controller, saw a blue and white airplane fly over him while he was riding his horse in an arena. The airplane was a high-wing and the landing gear was retracted. The airplane was flying straight and level from east to west, and there were no unusual sounds coming from the airplane. The witness thought that it was strange that the pilot would be flying the airplane so low. The airplane was just at tree level, which was about 80 feet above ground level. Approximately 20 minutes had passed from the time the witness saw the airplane until the news broadcast came out about the airplane accident. The witness lives in Galt, which is about 25 nautical miles southeast of the accident site.

A family member stated that the pilot had flown a corporate flight earlier that day and was on the return leg after dropping off his copilot at San Andreas. Normally the pilot would fly global positioning system (GPS) direct, and that he would usually fly the route at 2,500 or 4,500 feet mean sea level. At times, the pilot would fly low-level when looking at things on the ground.

The accident pilot's copilot said that the flight to San Andreas was uneventful. She flew the airplane and did not experience any control or mechanical problems with the airplane. The accident pilot was in good spirits.

RADAR INFORMATION

The Nor Cal TRACON facility supplied radar data and one track was identified that was consistent with the route and time of the accident flight. The data was provided to the Cessna Aircraft Company representative where it was plotted on a topographic map and on a graph. The target was squawking 1200.

The first hit on the target was at 1629:44, at an altitude of 1,900 feet, traveling westbound from Calaveras County-Maury Rasmussen Field. The highest altitude recorded was at 1630:30, and indicated 2,200 feet. From this time, the target gradually decreased in altitude to 500 feet at 1636:58. Following this hit, no target was recorded until 1638:29, at an altitude of 400 feet. The last target was at 1639:57, and no altitude was recorded. During the last minute of the track, the target indicated between 400 and 500 feet.

PERSONNEL INFORMATION

The pilot was a retired airline captain and was employed as a corporate pilot for a local company at the time of the accident. A review of Federal Aviation Administration (FAA) airman records showed that the pilot held an airline transport pilot certificate for single and multiengine land airplanes. He held commercial privileges for airplane single engine sea. He also held a current certified flight instructor certificate for single and multiengine airplanes and instrument airplane. In addition, the pilot held a ground instructor certificate, authorized to teach advanced and instrument ground instruction, and a flight engineer certificate for turbojet and turbo propeller. The pilot was issued a first-class medical certificate in December 2004, which held the restriction that the pilot must wear corrective lenses.

According to a family member, the pilot was in good health and did not have any medical problems. He did not keep a personal flight logbook. On the pilot's most recent medical application, he reported a total flight time of 23,000 flight hours.

AIRCRAFT INFORMATION

The Cessna 177RG single engine airplane was manufactured in 1971. It was equipped with a Lycoming IO-360-A1B6. The last annual inspection was completed on November 21, 2005, at a total tachometer time of 2,772.0 hours. The airplane had accumulated 212 hours since its last annual. The last altimeter, static system, altitude reporting tests, and transponder tests were completed on August 13, 2004.

METEOROLOGICAL INFORMATION

An automated surface observation system (ASOS) report was issued for Nut Tree Airport, Vacaville, California, at 1653, and reported the following conditions: wind calm; visibility 10 statute miles; sky condition clear; temperature 50 degrees Fahrenheit; dewpoint 30 degrees Fahrenheit; and altimeter 30.13 inches of Mercury. Nut Tree Airport is located about 10 nautical miles southwest of the accident site location.

According to the United States Naval Observatory Astronomical Applications Department, sunset took place at 1647. The end of civil twilight occurred at 1717. At 1640, the altitude and azimuth of the sun were 0.8 degrees and 239.3 degrees, respectively. At 1650, the sun was -1.3 degrees below the horizon on an azimuth of 240.9 degrees.

WRECKAGE AND IMPACT INFORMATION

Solano County Sheriff's department personnel responded to the accident site. The on scene deputy reported that the transmission lines were east of and approximately 1/4-mile from the main wreckage, which impacted an agricultural field. The right wing was intact; the left wing was in various pieces within the debris path between the transmission lines and the main wreckage. Forward of the main wreckage, aeronautical charts and pieces of cockpit instrumentation spanned outward an additional 20 feet. The main wreckage came to rest inverted. The majority of the airplane fuselage structure was consumed in a post impact fire. Inspectors from the FAA Flight Standards District Office responded to the accident site the following morning.

On scene responders from Pacific Gas and Electric Company (PG and E) reported that the airplane collided with a static line. The static line is positioned at the top of the 500 kilovolt transmission lines and acts both as a lightening deterrent and static electricity gatherer from the transmission lines. The static line was strung between the towers about 140 feet agl. As the static line was struck, it dropped over one of the transmission lines and resulted in a fault. PG and E records showed that the fault occurred at 1652.

MEDICAL AND PATHOLOGICAL INFORMATION

The Solano County Coroner completed an autopsy on the pilot. The cause of death was attributed to multiple blunt force injuries due to a general aviation aircraft crash. The FAA Forensic Toxicology Research Team completed toxicology. The results were negative for carbon monoxide, cyanide, volatiles, and all tested drugs.

TESTS AND RESEARCH

The airplane was examined at Plain Parts on January 9, 2006, by the Safety Board investigator, an FAA inspector, and representatives from Cessna Aircraft Company and Textron Lycoming, both parties to the investigation. The fuselage section of the airplane was consumed by a post impact fire. The largest recovered portions were the rear seat frames. The forward seats were identified though the seat base frames and three rollers recovered loose within the wreckage.

The lap belt buckles remained latched and the provisional latches for shoulder harnesses were installed. The seat belt material was destroyed. Loose within the wreckage a transponder face plate was identified and read a squawk code of 1200. The altimeter, airspeed indicator, and unidentified gauge were recovered, but due to the fire and impact damage, no usable information could be ascertained from their face plates or housings.

The empennage section of the airplane was cut during recovery just aft of the baggage area. The entire left side of the structure sustained considerably more thermal damage than the right. The top portion of the vertical stabilizer was crushed and a 2-foot by 16-inch area was burned away at its top portion. A 6-inch gash was present on the aft inboard side of the right stabilator that was similar in size to the lower portion of the rudder. The left horizontal stabilator tip was melted. Manual control actuation was obtained to the horizontal stabilator and trim tab control surface (anti servo tab) using the control cables. The rudder was jammed into the horizontal stabilator and bent. Investigators noted that the rudder control cable attachment was secure at the lower portion of the rudder. From the empennage, all of the control cables were cut prior to the examination to facilitate the recovery efforts.

Both the right and left wings were burned by fire. Two deformed and twisted leading edge sections of the left wing had noticeable scrape marks on their leading edges and saw teeth marks along their edges. The first section, approximately 50 inches in length, contained a scrape mark that ran 35 inches along the leading edge to the skin splice on the outboard section. On the second section, a 67-inch outboard section of the left wing, fore to aft scrape marks ran from the leading edge over a distance of about 35 inches, over the stall warning horn area. These scrape marks did not appear as deep as those on the outer section. Both marks had lighter colored scrapes running fore to aft.

The remaining sections of the wing were the inboard edge outward to the aileron where the wing had separated. The majority of the leading edge of the inboard section was consumed in the fire. Approximately 101 inches from the inboard edge, the spar was bent aft and crushed where the separation of the two sections occurred.

The flap actuator is located in the left wing and the screw was measured to be 4.3 inches, consistent with the flaps being retracted. The control cables, which run to the flap bellcrank, were intact and the torque tube extension from the bellcrank was melted. At its attach point to the flap, the torque tube with a melted end was present. The aileron cables within the wing structure were still attached to the aileron but one was cut and the other end was broomstrawed where they routed inboard to the fuselage.

The right wing contained a 32-inch scratch mark that was 30 degrees diagonally from the leading edge to wing tip on its underside. The outboard leading edge separated from the main structure of the wing at the aileron cable pulley. Saw tooth-like marks ripped through the upper and lower skins of the wings and the skins were curled in ringlets in an outboard and downward direction.

The flap control cables were attached to the bellcrank and a torque tube ran from the bellcrank to the flap attach point. The aileron control cables remained attached to the ailerons but were broomstrawed and burned where they routed inboard to the fuselage controls.

The airplane was equipped with a four-cylinder, fuel injected, Lycoming IO-360-A1B6 engine (serial number L-7537-51A). The entire engine sustained fire damage; major crushing and impact damage occurred to the number 1 cylinder. The fuel injection servo was displaced from the bottom of the engine. The mixture cable was secure at the control arm and although the throttle rod end was displaced from the cable, the control arm was secure to its attachment point at the servo. The fuel screen was removed and examined with no contaminants noted.

The flow divider positioned at the top of the engine was intact. The fuel flow divider was disassembled; the diaphragm was melted but the spring and plunger were intact. The fuel lines running from the flow divider were attached at each fitting. The fuel pump and magnetos were secure at their mounting pads but were not functionally tested due to the post impact fire damage.

The spark plugs for top cylinders 2, 3, and 4 were removed. Due to the crush damage of the number 1 cylinder top spark plug, the lower spark plug was removed. Spark plugs from cylinders 2 and 4 were oil soaked and the spark plugs from cylinder 1 and 3 showed normal operation condition when compared to a Champion Aviation Check-A-Plug chart. According to the manufacturer's representative, the oil soaked spark plugs were due to the post accident position of the engine. The plug electrodes were measured using a Champion massive electrode tester (CT-482) and did not exceed the specified limits. Thumb compression was obtained on all four cylinders in the specified firing order of cylinders 1, 3, 2, and 4. The camshaft geared dowel pin was intact and there was no obvious damage to the accessory gear box. The cylinders were inspected using a borescope and there was no peening evident on the surfaces of the cylinder walls or piston heads. The valve train was intact and functional.

The propeller was a two-bladed, constant speed McCauley (SN 736180). One blade was separated from the hub. Approximately mid-blade on the separated blade there was a nick mark along its leading edge. The blade that remained attached had significant heat damage and trailing edge buckling.

Pilot Information

Certificate:	Airline transport; Commercial; Flight engineer; Flight instructor	**Age:**	56,Male
Airplane Rating(s):	Single-engine land; Single-engine sea; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 With waivers/limitations	**Last FAA Medical Exam:**	December 1, 2004
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	23000 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N8040G
Model/Series:	177RG	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	177RG0040
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	November 1, 2005 Annual	**Certified Max Gross Wt.:**	2800 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	2772 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	IO-360-A1B6D
Registered Owner:	On file	**Rated Power:**	180 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Dusk
Observation Facility, Elevation:	VCB,114 ft msl	**Distance from Accident Site:**	15 Nautical Miles
Observation Time:	16:53 Local	**Direction from Accident Site:**	230°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	/ None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.12 inches Hg	**Temperature/Dew Point:**	10°C / -1°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	San Andreas, CA (CPU)	**Type of Flight Plan Filed:**	None
Destination:	Santa Rosa, CA (STS)	**Type of Clearance:**	None
Departure Time:	16:30 Local	**Type of Airspace:**	

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:**	38.336666,-121.706108

Administrative Information

Investigator In Charge (IIC):	Dunks, Kristi
Additional Participating Persons:	Kenneth Meyer; Federal Aviation Administration; Sacramento, CA Peter Basile; Cessna Aircraft Company; Wichita, KS Mark Platt; Textron Lycoming; Williamsport, PA
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