

## 2008 NTSB REPORTS

NTSB Identification: **LAX08CA094**.

The docket is stored in the Docket Management System (DMS). Please contact [Records Management Division](#)

Accident occurred Thursday, March 20, 2008 in Riverside, CA

Probable Cause Approval Date: 04/30/2008

Aircraft: Ercoupe (Eng & Research Corp.) 415-D, registration: N3942H

Injuries: 1 Uninjured.

NTSB investigators used data provided by various entities, including, but not limited to, the Federal Aviation Administration and/or the operator and did not travel in support of this investigation to prepare this aircraft accident report.

The pilot fueled the airplane, sumped the wing tanks, and departed. The engine lost power at the end of the runway on climb out. He made a forced landing on the grass infield of the airport. The nose wheel went into a gopher hole, and the airplane nosed forward. Post crash examination established that the firewall sustained damage. The pilot reported that he also found water in the gascolator, and that the water most likely got into the fuel system during recent rains. He opined that a more thorough preflight could have prevented the accident.

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

Water contamination of the fuel system due to the pilot's inadequate preflight and failure to adequately drain the water from the fuel system.

LAX08CA094

On March 20, 2008, about 1430 Pacific daylight time, an Ercoupe 415-D, N3942H, made an off airport forced landing following takeoff from Flabob Airport, Riverside, California. The pilot was operating the airplane under the provisions of 14 Code of Federal Regulations (CFR) Part 91. The certificated airline transport pilot was not injured. The airplane sustained substantial damage to the firewall. The personal cross-country flight was en route to Santa Monica, California. Visual meteorological conditions prevailed, and no flight plan had been filed.

The pilot reported that he fueled the airplane with 12 gallons of gas, sumped the wing tanks, and departed from runway 24. The engine lost power at the end of the runway on climb out. He made a forced landing on the grass infield of the airport. The nose wheel went into a gopher hole, and the airplane nosed forward.

Post crash examination established that the firewall sustained damage. The pilot reported that he also found water in the gascolator; he said that it had recently rained. He opined that a more thorough preflight could have prevented the accident.

NTSB Identification: **LAX08LA142**.

The docket is stored in the Docket Management System (DMS). Please contact [Records Management Division](#)

Accident occurred Thursday, May 15, 2008 in Penngrove, CA

Probable Cause Approval Date: 08/28/2008

Aircraft: Ercoupe (Eng & Research Corp.) 415-C, registration: N99180

Injuries: 2 Uninjured.

NTSB investigators may not have traveled in support of this investigation and used data provided by various sources to prepare this aircraft accident report.

During cruise flight, the airplane's engine lost total power and the pilot executed a forced landing in an alfalfa field. During the landing roll in the 2 to 3-foot-tall grass, the airplane skidded sideways and the tail dug into the ground. The airplane's tail cone was buckled, and the right vertical stabilizer and rudder were bent. Federal Aviation

Administration (FAA) inspectors found that both magnetos had frayed primary wires ("P" leads) at the magnetos, which could have been shorting out and intermittently killing the ignition system. They noted numerous additional maintenance discrepancies with the airplane; however, none of these would have contributed to a loss of engine power. According to the inspectors, the airplane's most recent annual inspection was completed about 2 months before the accident. The maintenance discrepancies found by the FAA inspectors, including the frayed "P" leads, should have been repaired during this annual inspection.

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The loss of engine power resulting from frayed magneto "P" leads, which shorted out and killed the ignition system. Contributing to the accident was the lack of suitable terrain for the forced landing.

LAX08LA142

On May 15, 2008, about 1510 Pacific daylight time, an Ercoupe 415-C, N99180, sustained substantial damage during a forced landing following a loss of engine power in Penngrove, California. The sport pilot and his passenger were not injured. The airplane was being operated by the pilot under Title 14 Code of Federal Regulations Part 91. Visual meteorological conditions prevailed, and no flight plan was filed. The local personal flight departed from the Petaluma Municipal Airport, Petaluma, California, about 1450.

According to Sonoma County Sheriff's Department personnel, the pilot reported that while in cruise flight he noticed the oil pressure gauge begin to fluctuate erratically. The needle on the gauge "began to bounce up and down," and seconds later, the engine "began to cut out and sputter." The pilot headed back towards Petaluma Airport. However, the engine lost total power, and the pilot executed a forced landing in an alfalfa field about 4.5 miles northwest of the airport. During the landing roll in the 2- to 3-foot-tall grass, the airplane skidded sideways and the tail dug into the ground. The airplane's tail cone was buckled, and the right vertical stabilizer and rudder were bent.

The airplane was examined by Federal Aviation Administration (FAA) inspectors. The inspectors found that both magnetos had frayed primary wires ("P" leads) at the magnetos, which could have been shorting out and intermittently killing the ignition system. They noted numerous additional maintenance discrepancies with the airplane; however, none of these would have contributed to a loss of engine power. According to the inspectors, the airplane's most recent annual inspection was completed on March 19, 2008.

NTSB Identification: **CHI08CA208**.

The docket is stored in the Docket Management System (DMS). Please contact [Records Management Division](#)

Accident occurred Wednesday, July 23, 2008 in West Jefferson, OH

Probable Cause Approval Date: 08/28/2008

Aircraft: Ercoupe 415-G, registration: N94413

Injuries: 1 Serious, 1 Minor.

NTSB investigators used data provided by various entities, including, but not limited to, the Federal Aviation Administration and/or the operator and did not travel in support of this investigation to prepare this aircraft accident report.

The airplane impacted trees and terrain during takeoff about 500 feet from the departure end of a private grass airstrip during a personal flight that was en route to obtain fuel at the destination airport. The airplane wings were crushed rearward along the leading edge, the empennage was separated from the airframe, and the firewall was wrinkled. The airplane was not equipped with shoulder harnesses. The pilot sustained serious injuries that included a broken right arm and left leg and the passenger sustained serious facial and ankle injuries. Examination of the airplane revealed there was no usable fuel in either wing tank and header tank. Also, there was no residual fuel in the header tank to engine fuel lines. According to the Federal Aviation Administration, the airplane's center

of gravity, with no usable fuel aboard, was aft of its limit. The pilot's flight review and medical certificate were expired at the time of the accident.

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The improper preflight planning/preparation by the pilot and the loss of engine power due to fuel exhaustion during takeoff. Contributing factors were the pilot's expired flight review and airman medical, the aircraft weight and balance exceeded by the pilot, and the trees.

CHI08CA208

The airplane impacted trees and terrain during takeoff about 500 feet from the departure end of a private grass airstrip during a personal flight that was en route to obtain fuel at the destination airport. The airplane wings were crushed rearward along the leading edge, the empennage was separated from the airframe, and the firewall was wrinkled. The airplane was not equipped with shoulder harnesses. The pilot sustained serious injuries that included a broken right arm and left leg and the passenger sustained serious facial and ankle injuries. Examination of the airplane revealed there was no usable fuel in either wing tank and header tank. Also, there was no residual fuel in the header tank to engine fuel lines. According to the Federal Aviation Administration, the airplane's center of gravity, with no usable fuel aboard, was aft of its limit. The pilot's flight review and medical certificate were expired at the time of the accident.

NTSB Identification: **SEA08CA167**.

The docket is stored in the Docket Management System (DMS). Please contact [Records Management Division](#)

Accident occurred Saturday, July 26, 2008 in Corona, CA

Probable Cause Approval Date: 08/28/2008

Aircraft: Erco Coupe 415-C, registration: N93614

Injuries: 2 Uninjured.

NTSB investigators used data provided by various entities, including, but not limited to, the Federal Aviation Administration and/or the operator and did not travel in support of this investigation to prepare this aircraft accident report.

The pilot said that he departed from runway 25 during gusty wind conditions. At 800 feet above ground level, he turned the airplane onto the crosswind leg and the left wing went down. The pilot recovered the airplane, added full throttle, and the airplane continued to descend. The pilot pulled back on the yoke to make the airplane climb; however, the airplane continued to descend. The airplane impacted trees and sustained substantial damage. According to the nearest aviation weather reporting system that was located at the airport, winds were from 290 degrees at 16 knots, gusting to 21 knots. The Federal Aviation Administration inspector examined the airplane and found no mechanical anomalies that would have resulted in a loss of airplane control.

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The pilot's inadequate compensation for wind conditions and failure to maintain an adequate airspeed, resulting in a stall/mush. Contributing to the accident was the gusty crosswind conditions.

SEA08CA167

The pilot provided a written statement to the Safety Board investigator. He reported that he departed from runway 25 during gusty wind conditions. At 800 feet above ground level, he turned the airplane onto the crosswind leg and the left wing went down. The pilot recovered the airplane, added full throttle, and the airplane continued to descend. The pilot pulled back on the yoke to make the airplane climb; however, the airplane continued to descend. The airplane impacted trees and sustained substantial damage. According to the nearest

aviation weather reporting system that was located at the airport, winds were from 290 degrees at 16 knots, gusting to 21 knots. The Federal Aviation Administration inspector examined the airplane and found no mechanical anomalies that would have resulted in a loss of airplane control.

**NTSB Identification: CHI08CA233.**

The docket is stored in the Docket Management System (DMS). Please contact Records Management Division

Accident occurred Saturday, August 02, 2008 in Cedarburg, WI

Probable Cause Approval Date: 08/28/2008

Aircraft: Ercoupe (Eng & Research Corp.) 415-C, registration: N93963

Injuries: 1 Minor.

NTSB investigators used data provided by various entities, including, but not limited to, the Federal Aviation Administration and/or the operator and did not travel in support of this investigation to prepare this aircraft accident report.

The pilot reported that during takeoff the airplane was "struck by wind shear" from its right side. He reported that the airplane "lost perhaps 20' - 30' of altitude" and that he "could not avoid impact with the tree." The pilot reported that there were no mechanical malfunctions with the airplane during the accident flight.

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The pilot not maintaining altitude/clearance from the tree during takeoff. Contributing to the accident were the windshear and the tree.

**CHI08CA233**

The pilot reported that during takeoff the airplane was "struck by wind shear" from its right side. He reported that the airplane "lost perhaps 20' - 30' of altitude" and that he "could not avoid impact with the tree." The pilot reported that there were no mechanical malfunctions with the airplane during the accident flight.

**NTSB Identification: MIA08LA164**

14 CFR Part 91: General Aviation

Accident occurred Wednesday, August 13, 2008 in Arcaida, FL

Probable Cause Approval Date: 05/11/2010

Aircraft: ERCOUPE 415-C, registration: N94339

Injuries: 1 Fatal.

NTSB investigators may not have traveled in support of this investigation and used data provided by various sources to prepare this aircraft accident report.

A witness observed the airplane depart toward the west from the 1,200-foot-long grass strip. During the takeoff the witness observed the airplane encounter what he believed to be a downdraft, causing it to lose altitude. The airplane seemed to reestablish the climb when it impacted an oak tree that was located about 50 feet past and 20 feet left of the runway. The airplane impacted several trees before impacting the ground inverted. The wreckage examination revealed no abnormalities or discrepancies that would have prevented the airplane and its systems from normal flight operations. The nearest weather reporting station was located 23 miles southwest from the accident location. The recorded temperature during the time of the accident was 32 degrees Celsius (90 degrees Fahrenheit) and the wind was reported from 250 degrees at 13 knots. The autopsy report noted evidence of moderate to severe coronary artery disease and a prior heart attack. The toxicology results were consistent with the recent use of an anti-acid medication, available over the counter. The medication was unlikely to have adversely affected the pilot's performance. Postmortem toxicology could not determine whether the pilot's heart disease or the symptoms for which he was taking medication were related to the accident.

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The pilot's failure to maintain a proper climb rate after takeoff.

MIA08LA164

#### HISTORY OF FLIGHT

On August 13, 2008, at 1415 eastern daylight time, an Ercoupe 415-C, N94339, incurred substantial damage when it collided with trees during takeoff from a private airstrip (Southern Dreams Ranch) in Arcadia, Florida. The certificated commercial pilot was killed. Visual meteorological conditions prevailed and no flight plan was filed. The airplane was operated by the commercial pilot, under the provisions of Title 14 Code of Federal Regulations Part 91 as a personal flight.

A witness stated to a DeSoto County Sheriff's Office representative that the pilot routinely flew into the property from Venice, Florida, where he was based. On the day of the accident, the witness observed the airplane depart toward the west, from the measured 1,200-foot long grass strip, which veered to the left. During the takeoff, it appeared to the witness that the airplane encountered a downdraft, causing it to lose altitude. The witness added that it looked like the pilot attempted to reestablish a climb, but was unable to clear an oak tree, which was located about 50 feet past and 20 feet left of the runway. The airplane clipped the tree at an estimated height of 30 feet above the ground, entered an uncontrolled descent while impacting several pine trees, and came to rest inverted on the ground with a section of the left wing separating from the airplane.

#### PERSONNEL INFORMATION

The pilot held a commercial pilot certificate with an airplane single-engine land rating. He was issued a second-class medical certificate in March 04, 2005, with a limitation of must have available glasses for near vision. The pilot reported a total of 10,000 hours at the time of the last medical certificate application. The responding Federal Aviation Administration Inspector stated that a review of the pilot's flight logbooks revealed that his last entry was April 16, 2002, with a total of 7,209 hours. The pilot's last biennial review was on December 02, 2006.

#### AIRCRAFT INFORMATION

The 1946 Ercoupe 415-C, serial number 1562, was being operated in the Light Sport Aircraft category. The airplane was powered by a Teledyne Continental Motors (TCM), O-200-A, 100-horsepower engine. Maintenance records provided by the responding FAA inspector showed that the airplane's last annual inspection was on June 6, 2008, at a total time of 3,473 hours. A review of the airplane's engine records by FAA and TCM personnel determined the engine had a total time of 1,885 hours since overhaul.

#### METEOROLOGICAL INFORMATION

The closest official weather observation was at the Charlotte County Airport, Punta Gorda, Florida, 23 miles southwest from the accident site. On August 13, 2008, at 1353, an Aviation Routine Weather Report (METAR) recorded in part, winds at 250 degrees at 13 knots; visibility, 9 statute miles; sky clear; temperature 32 degrees Celsius (C); dew point 23 degrees C; altimeter 29.95 inches of mercury.

#### WRECKAGE AND IMPACT INFORMATION

Examination of the main wreckage showed the airplane's top section of the cockpit area was crushed and the windshield broken and separated. The fuselage was twisted aft of the cockpit area. The cockpit area was partially separated and ripped open. The right wing leading edge was crushed with impact damage and bent aft toward the tail section of the airplane. A section beyond the left wing spar area separated and the leading edge was observed

with impact damage similar to the right wing. The engine nacelle section was crushed aft and twisted toward the left. The propeller remained attached to the engine; both propeller tips were twisted and bent.

A wreckage examination was conducted by an FAA and TCM representative. There were no abnormalities or discrepancies noted that would have prevented the airplane and its systems from normal flight operations. A non-Technical Standard Order (TSO) electronic magneto (E-mag) was observed in the right magneto position of the certificated engine.

#### MEDICAL AND PATHOLOGICAL INFORMATION

A postmortem examination of the pilot was conducted under the authority of the Florida State Medical Examiner, Sarasota, Florida, on August 14, 2008. The cause of death for the pilot was attributed to multiple blunt force injuries. The autopsy report noted heart weight of 490 grams, "moderate to early severe atheromatous eccentric and concentric calcified stenosis" (up to 80% in the left anterior descending and right coronary arteries) and "a 1.5 x 0.7 x 1.0 cm focus of healed fibrosis of the left posterior lateral ventricular free wall midway between base and apex."

The FAA Civil Aeromedical Institute (CAMI) conducted toxicological testing on specimens from the pilot. The tests were negative for alcohol. Ranitidine was detected in the blood and urine.

NTSB Identification: **NYC08CA297**.

The docket is stored in the Docket Management System (DMS). Please contact [Records Management Division](#)

Accident occurred Friday, August 29, 2008 in Sebring, FL

Probable Cause Approval Date: 09/26/2008

Aircraft: Ercoupe (Eng & Research Corp.) 415-C, registration: N87376

Injuries: 2 Uninjured.

NTSB investigators used data provided by various entities, including, but not limited to, the Federal Aviation Administration and/or the operator and did not travel in support of this investigation to prepare this aircraft accident report.

The pilot of the Ercoupe 415-C stated that while on climb out at approximately 1,300 feet, he noticed wood pieces and feathers coming into the cockpit through the open canopy, and "an extreme vibration ensued throughout the airplane." The pilot shut down the engine, and performed an emergency landing in a pasture. The airplane subsequently impacted a shallow ditch that was obscured by tall grass. The nose gear collapsed, the right wing spar bent aft, and the firewall buckled. The airplane was equipped with a two blade Sensenich wooden propeller; after the accident the pilot reported that "one blade was splintered." The pilot reported no mechanical malfunctions prior to the event, which was determined to be a bird strike.

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

A bird strike which substantially damaged the propeller and required the engine to be secured. Contributing to the accident was the damaged propeller.

NYC08CA297

According to the pilot of an Ercoupe 415-C, while on climb out at approximately 1,300 feet, he noticed wood pieces and feathers coming into the cockpit through the open canopy, and "an extreme vibration ensued throughout the airplane." The pilot shut down the engine, and performed an emergency landing in a pasture. The airplane subsequently impacted a shallow ditch that was obscured by tall grass. The nose gear collapsed, the right wing spar bent aft, and the firewall buckled. The airplane was equipped with a two blade Sensenich wooden propeller; after the accident the pilot reported that "one blade was splintered." The pilot reported no mechanical malfunctions prior to the event, which was determined to be a bird strike.

NTSB Identification: **ERA09FA087**

14 CFR Part 91: General Aviation

Accident occurred Saturday, December 13, 2008 in Sebring, FL

Probable Cause Approval Date: 03/03/2010

Aircraft: ERCOUBE 415-D, registration: N99154

Injuries: 2 Fatal.

NTSB investigators either traveled in support of this investigation or conducted a significant amount of investigative work without any travel, and used data obtained from various sources to prepare this aircraft accident report.

Witnesses observed the accident airplane as it performed a low-level, local flight in the vicinity of the passenger's home. The witnesses reported that the airplane entered a high-speed dive before pulling up and rolling steeply left. One of the witnesses reported that both ailerons were "fluttering" just before both wings separated from the fuselage and the airplane broke up. Examination of the wreckage revealed that the wing spar failed in overload at its center, in an aft and downward direction. Though a hole not specified in the design of the airplane was present at the point where the separation of the spar began, its effect on the preaccident structural strength of the spar could not be determined. No corrosion or evidence of a fatigue failure was observed in the vicinity of the initial separation.

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

The pilot's exceedance of the design stress limitations of the airplane.

ERA09FA087

#### HISTORY OF FLIGHT

On December 13, 2008 at 1206 eastern standard time, an Ercoupe 415-D, N99154, was destroyed during an in-flight breakup near Sebring, Florida. The certificated commercial pilot and the passenger were fatally injured. Visual meteorological conditions prevailed, and no flight plan was filed for the local flight, which departed Avon Park Executive Airport (AVO), Avon Park, Florida about 1115. The personal flight was conducted under the provisions of 14 Code of Federal Regulations Part 91.

According to a friend of the accident pilot, who was also a certificated aircraft mechanic, he and the pilot flew together in the accident airplane on a local sightseeing flight immediately prior to the accident flight. The friend did not note any abnormalities with the performance of either the airplane or the pilot during their flight, and upon returning to AVO, the friend disembarked the airplane and the accident passenger boarded.

Numerous witnesses observed the airplane flying in the local area around the time of the accident. One witness was outside talking with a neighbor when he observed the airplane flying overhead. The airplane was initially flying southwest, and made a "very slight dip and turned to the right. Then the airplane pulled up severely and started turning to the left." As the airplane continued upward and banked to the left, something "shiny" exited from the tail area of the airplane. The witness remarked to his neighbor, "What the heck is he dumping," and the airplane then began to break apart. The witness added that he did not hear any type of explosion and did not observe any smoke or fire.

Another witness, who was also a certificated airline transport pilot, stated that while outside working on his house he observed the accident airplane flying overhead. He estimated that the airplane was flying at an altitude about 1,200 feet above ground level, and did not note anything abnormal about its flight path. About 45 minutes after first seeing the airplane, he heard an abnormal engine sound that diverted his attention again back to it.

The witness stated that the engine sound was smooth, continuous, and sounded as if the engine was being "over-

sped," as if the engine were at full power and the airplane was in a high speed dive. When he looked up, he saw the airplane pitching up and rolling into a steep left bank, and initially thought that the pilot was attempting to perform a "barrel-roll or a slow roll." From his position, he could see the bottom of the airplane, as well as both wings, as the airplane traveled north. He additionally noted that while the airplane was banking, both ailerons were "fluttering" at a high frequency. The bank angle increased to almost 90 degrees, when the left wing of the airplane "folded back" and separated from the fuselage. The airplane then pivoted about the lateral axis 90 degrees, and the right wing then separated from the fuselage along with a portion of the cabin. The wings "fluttered" or "twirled" to the ground, while the portion of the cabin continued forward and down to the ground. He recalled hearing three distinct "thuds" as the pieces of the airplane impacted the ground.

The witness also reported that during the breakup the airplane released what initially looked like "confetti," which he later determined to be painted chips of dope from the airplane's fabric covered wings.

#### METEOROLOGICAL INFORMATION

The weather conditions reported at Bartow Municipal Airport (BOW), Bartow, Florida, located about 24 nautical miles west of the accident site, at 1152, included winds from 020 degrees at 9 knots, gusting to 15 knots, 20 statute miles visibility, clear skies, a temperature of 16 degrees Celsius (C), a dewpoint of 6 degrees C, and an altimeter setting of 30.21 inches of mercury.

#### PERSONNEL INFORMATION

The pilot, age 70, held a commercial pilot certificate with ratings for airplane single engine land and sea, airplane multiengine land, and instrument airplane. He also held a flight instructor certificate with ratings for airplane single engine, airplane multiengine, and instrument airplane. His most recent FAA second class medical certificate was issued on June 2, 2008.

Examination of the pilot's most recent logbook, which began on May 3, 2001, revealed that he had logged 7,126 total hours of flight experience, 12 hours of which were in the accident airplane make and model.

#### AIRCRAFT INFORMATION

According to records provided by the FAA, the accident airplane was manufactured in 1946. According to maintenance records, the airplane's most recent annual inspection was completed on May 9, 2008. At the time of the inspection, the airplane had accumulated 2,588 total hours of operation.

#### WRECKAGE AND IMPACT INFORMATION

The in-flight breakup occurred over a residential community built around a golf course, and was the same community where the passenger resided. Portions of wreckage were found along a wreckage path that was 3,100 feet long, and oriented on a magnetic heading about 020 degrees. The first pieces of wreckage, found at the most southern end of the wreckage path, included both aft cabin windows. Paint chips, inspection panels, and various personal effects from inside the airplane were located further along the wreckage path, with the right wing being the next most substantial component located.

The right wing was located about 2,000 feet from the aft cabin windows, along the wreckage path. The wing was lodged in the ground, oriented perpendicular to the terrain. The wing remained largely intact, and was separated from the fuselage at the wing root, just inboard of the leading edge fuel tank. The wing spar remained intact to a point about 1-foot inboard of the wing root, where it separated from the remainder of the airplane's structure. Ten of the right wing's 17 inspection port covers were dislodged, and located at various points along the wreckage path in an inverted, or "popped" position. All of the displaced covers had, with one exception, come from the wing root, leading edge, and outboard edge, while the inspection covers from the center and trailing edge portions remained in place.



The left wing was located about 900 feet beyond the right wing, along the wreckage path. The left wing spar was fractured at a similar location as the right wing spar. Several of the inspection port covers were dislodged, but did not display any discernable pattern as was observed on the right wing. The inboard portions of both wing spars were forwarded to the Safety Board Materials Laboratory for further examination.

The main portion of wreckage came to rest about 200 feet beyond the left wing, along the wreckage path. The nose, cabin, and aft portion of fuselage exhibited extensive crush damage, and its entirety was contained within an area about 10 by 10 feet. The cabin was severely compromised, and the seat pan, where both occupants were located, was found about 125 feet north of the main wreckage. The empennage, horizontal and vertical stabilizers remained largely intact, but separated from the remainder of the fuselage, and was co-located with the main wreckage. The propeller was lodged in a shallow impact crater, and remained attached to the engine at the propeller flange. Chordwise scratching and burnishing was present on both blades.

Aileron and rudder control continuity was traced from the flight control surfaces to the control "mixing" bellcrank, normally located just aft of the main spar carrythrough. Separations of the aileron control push-pull tubes were noted at both wing roots, and the elevator push-pull tube was separated about 1-foot forward its bellcrank.

#### MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was performed on the pilot by the Office of the District Medical Examiner, Winter Haven, Florida. The autopsy report noted the cause of death as "blunt impact."

The FAA's Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, performed toxicological testing on the pilot. No traces of carbon monoxide, cyanide, ethanol, or drugs were detected.

#### ADDITIONAL INFORMATION

The inboard portions of both separated portions of the wing spar were examined in the Safety Board Materials Laboratory. According to the Materials Laboratory report, the deformation to the top spar cap and the appearance of the fracture surfaces along the centerline of the main spar were consistent with ductile overstress in an aft and downward bending of the center wing spar.

Examination of the fracture surfaces revealed an apparent modification to the top spar cap that reduced the cross-sectional area by 10-percent. Three screw holes were observed in the spar cap with the tip of a broken self-tapping screw still in one of the holes. According to information provided by the airframe manufacturer, two screw holes, spaced 1-inch apart, oriented longitudinally across the spar (fore and aft), were specified in the original design of the airplane (to fasten the seat pan to the spar). The broken self-tapping screw was found in the forward-most of these two holes. The third hole, not specified in the design, was located in-between and less than 1 inch from the other holes, and was threaded for a larger size than the other two holes.

The fracture surface on the top spar cap contained radial lines emanating from the screw holes, shear lips at the edges, and necking at the edges consistent with tensile overstress in the top spar cap. There was no evidence of fatigue. The radial lines from the aft screw hole emanated from the top surface of the spar cap. The radial lines on the forward portion of the fracture surface appeared to originate near the tip of the broken screw. The appearance of the aft portion of the fracture surface was consistent with crack face re-contact on both left and right fracture faces.

Markings on the fractures on the top and bottom spar caps were consistent with an initial break at the center of the top spar that progressed outboard. Additional damage noted on both sections of the spar was consistent with ground impact. No evidence of corrosion was observed on any portion of the wing spar.

