Aviation Investigation Final Report

Location:	Essex, California	**Accident Number:**	LAX01FA113
Date & Time:	March 9, 2001, 09:50 Local	**Registration:**	N1965H
Aircraft:	Piper PA-32R-300	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	2 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The airplane did not return to the departure airport and an ELT signal directed searchers to the wreckage. The airplane had impacted a steep rock face near the top of a 4,900-foot mountain. Witnesses reported that, about the time of the accident, the mountain tops in the area were obscured in clouds above about 4,000 feet. The wreckage showed the airplane had "pancaked" against the side of the mountain while in a 45-degree left bank. Both communication radios were tuned to the emergency frequency. During the wreckage examination, the fuel injection flow divider diaphragm was found to have a tear in it. A tear in the diaphragm during flight would cause the engine to abruptly and completely cease operating. Examination of the diaphragm revealed that the Dacron fabric was not centered in the elastomer as called for in the manufacturer's drawing. The lack of centering in the elastomer led to micro buckling failure of the Dacron fibers due to tensile fatigue.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: Rupture of the fuel injection flow divider diaphragm due to improper manufacture of the raw material stock from which the diaphragm was fabricated. The diaphragm tear resulted in complete engine power loss, which required the pilot to descend into an undercast. The undercast obscured the mountain, which the airplane impacted. A factor in the accident was the manufacturer's inadequate quality control.

Findings

Occurrence #1: LOSS OF ENGINE POWER(TOTAL) - MECH FAILURE/MALF
Phase of Operation: CLIMB - TO CRUISE

Findings
1. (C) FUEL SYSTEM,FUEL FLOW DIVIDER/DISTRIBUTOR - OTHER
2. (C) FUEL SYSTEM,FUEL FLOW DIVIDER/DISTRIBUTOR - TEAR/TORN
3. (C) MATERIAL DEFECT - MANUFACTURER
4. (F) INADEQUATE QUALITY CONTROL - MANUFACTURER

Occurrence #2: FORCED LANDING
Phase of Operation: DESCENT - EMERGENCY

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: EMERGENCY LANDING

Findings
5. TERRAIN CONDITION - MOUNTAINOUS/HILLY
6. WEATHER CONDITION - OBSCURATION

Factual Information

HISTORY OF FLIGHT

On March 9, 2001, at 0950 Pacific standard time (PST), a Piper PA-32R-300, N1965H, was destroyed when the airplane impacted a mountain 15 miles south-southeast of Essex, California. The airline transport certificated pilot and one passenger were fatally injured. The personal flight was operated by the pilot under 14 CFR Part 91. The flight departed from Eagle Airpark at Bullhead City, Arizona, at 1030 mountain standard time (MST), and the destination was unknown. Visual meteorological conditions prevailed and no flight plan was filed.

The operator of the Eagle Airpark said that the pilot of the accident aircraft had a contract with the Bank of America to deliver bank mail (primarily cancelled checks). The route was from Burbank to Imperial and then to Needles (California). The pilot normally left Burbank in the morning, flew to Imperial and then on to Needles, landing at Eagle Airpark because it was closer to the city center than the municipal airport. The airplane normally stayed in Needles (Eagle) during the day until about 1930 MST when the flight returned to Burbank via Imperial with the evening mail. The trip was repeated daily, Monday through Friday.

The airport operator said the accident flight was not part of the bank flight itinerary. The pilot departed about midday with the passenger. The pilot had told the operator that he was considering getting into the agricultural application business and had identified two possible existing businesses for acquisition. The operator speculated that the pilot intended to fly to one or both of them. The airplane did not return to Needles to pickup the evening bank mail. The operator said that the bank courier normally brought the mail to the airport and left it in the airplane if the pilot was not there, or, left it in the pilot's van if the airplane was not there. The day following the accident (Saturday, March 10) the van was at the airport with the previous day's bank mail still in it.

A flight instructor, who operated a flight school at Eagle Airpark, was acquainted with the pilot of the accident aircraft and recognized the airplane. She recalled that on the day of the accident she was a little late for her 1000 MST student appointment, and they taxied out about 1020. She recalled sharing the run-up area with the accident airplane, and, because the run-up area is small, she told the pilot (on the radio) to go ahead and takeoff. The time was about 1030.

According to the Air Force Rescue Coordination Center (AFRCC) at Langley AFB, Virginia, they received the first signal from an emergency locator transmitter (ELT) beacon at 1003 PST. The AFRCC assigned the signal a mission number (01M0442) and subsequently refined the position of the beacon, passing the information to the San Bernardino County Sheriff's Department, who then located the wreckage at 1113 PST on March 10, 2001.

PERSONNEL INFORMATION

According to the San Bernardino County Coroner's Deputy, the male occupant was found in the left front seat and the female occupant was outside the aircraft on the left side of the fuselage. The stitched end of the outboard seatbelt attachment was separated on the right, front seat.

The pilot's logbook was not located after the accident. Hours contained in this report are from the pilot's certificate application dated 09/28/00.

AIRCRAFT INFORMATION

The airport operator reported that the airplane was fueled at 0926 MST on the morning of the accident and received 70.63 gallons of 100 octane, low-lead fuel.

According to the aircraft logbook, the airplane received an annual inspection on January 1, 2001, at a recording tachometer time (tach time) of 4,734.7 hours. After recovery of the wreckage, the tachometer read 4,928.32. The last pitot-static and transponder system were performed on January 3, 1999. According to the engine logbook, the engine was overhauled on September 25, 2000; however, there was no entry in the airframe logbook showing when the engine was installed in the aircraft. There was an entry in the engine logbook of a 50-hour inspection performed on October 29, 2000, at tach time 4,552.2 hours. With the engine overhaul records was an airworthiness approval tag, FAA Form 8130-3, dated September 15, 2000, pertaining to the "newly overhauled" fuel injection system fuel servo and flow divider.

The aircraft was equipped with a Honeywell/King KLN-88 LORAN radio receiver; however, a spokesman for Honeywell/King reported there was no flight track history memory in that model radio.

METEOROLOGICAL INFORMATION

The airport operator reported that the weather was "bad" the day of the accident. Needles is in a valley and it was clear overhead; however, the mountain tops were obscured in dark clouds in all directions. The mountain tops were obscured above 4,000 feet.

The flight instructor at Eagle Field who observed the pilot depart recalled the weather at Needles was "fine" but there were some rain showers moving through the area. The mountain tops were obscured in clouds and the accident location was "probably" obscured in clouds.

A Safety Board staff meteorologist evaluated the weather and the specialist's factual report is attached. A trough of low pressure extended from a low pressure area near Bishop, California, southeastward, passing near the accident site. Surface observations (METAR's) at Needles at 0856 reported few clouds at 3,100 feet (agl), scattered clouds at 4,900 feet, and broken clouds at 9,500 feet. At 0956, the sky condition was few clouds at 3,500 feet.

According to the Federal Aviation Administration (FAA) Southwest Region Quality Assurance Office, the pilot contacted Riverside Automated Flight Service Station at 0602 on the morning of the accident and filed an instrument flight rules (IFR) flight plan from Burbank to Palm Springs (California). The pilot was offered a weather briefing, Notices to Airmen (NOTAM's) and flight precaution advisories but declined; saying that he already had the information. There was no other record of FAA briefing, and FAA Direct User Access Terminal (DUAT's) vendors advised that no services were provided to the pilot.

WRECKAGE AND IMPACT INFORMATION

The accident site is in the eastern California desert near the Colorado River and the border with Arizona. The site is in the Old Woman Mountains, on a steep, rocky, desert mountain slope about 100 feet below a local peak. Because of early responder's description of the hazardous nature of accessing the site, the Safety Board did not respond to the scene. Deputies from the San Bernardino (California) Sheriff's Department (SBSD) reported that the location was latitude 34 degrees 30.2 minutes north and longitude 115 degrees 06.765 minutes west (GPS). The elevation was about 4,800 feet msl.

SBSD deputies, who were lowered into the site by hoist from a hovering helicopter, said the site is about 100 feet below the crest, on the northeast face, of the mountain marked "4882" (peak elevation) on the Phoenix Sectional aeronautical chart. The wreckage was lying at the base of a vertical rock face and there was a black mark resembling engine oil on the rock directly in front of the nose of the fuselage. There was shiny aluminum debris embedded in the rock face above the resting location of the wreckage oriented on approximately a 45-degree angle from the blackened area extending up and to the right a distance approximately equal to the span of one wing. Looking back to the northeast, Needles was visible in the distance.

The wreckage was recovered on March 22, 2001, and was examined by the Safety Board investigator on March 29, 2001, at the facilities of Aircraft Recovery Services, Compton, California. The wreckage was not involved in fire.

The fuselage and wings of the aircraft were destroyed and disintegrated from the nose aft to the trailing edge of the wing. The engine was separated from the airframe, and, according to the recovery contractor, had been located to the left of the fuselage wreckage. Similarly, the left wing was separated from the fuselage at the wing root and had been located about 50-feet downslope. The right wing and empennage remained attached to the cabin area of the fuselage.

The nose, forward of the wing leading edge, including the instrument panel, exhibited crushing and was rolled nose down and tucked under the wing center section. The skins on the underside of the fuselage and wings exhibited a rolled-and-folded appearance oriented in the forward-to-aft direction accompanied by longitudinal scraping striations that were not present on the upper surface of the wings. The wing spar was typically deformed about 30 degrees

bottom-edge-aft with respect to the longitudinal axis of the fuselage.

The flight control cables were separated at several locations but were attached to their terminations. The separated ends were splayed and the individual wires exhibited a shiny appearance. The flap control mechanism was destroyed. The pitch trim actuator was approximately in the neutral position although the cable system between the cockpit and the actuator was destroyed.

Avionics and instrument readings and cockpit control and switch positions are recorded on the attached Supplement B. Both control wheels were deformed on the outboard horn of the yoke. Both communication radios (King KX-170B's) were found with the communications frequency set to 121.5. Internal examination of both communication radios revealed that the frequency selector mechanisms were intact and locked in position by case distortion. One radio was in the "on" position. On the other radio the switch lever was broken; however, there was a dent in the radio faceplate approximately the width of the selector switch at the "on" position. The landing gear switch position was "up" and the landing gear downlocks were visibly undamaged. The engine throttle, mixture, and propeller controls were in the forward position. The fuel tank selector valve was separated from the attachment to the airframe and the bowl was absent. The selector valve was in the "off" position.

The propeller was separated from the engine at the attachment bolts to the crankshaft flange. The separated bolts exhibited bending. The 2-blade propeller was recovered in three parts; (1) the hub with one blade still attached; (2) the second blade, separated from the hub at the root end, and absent about 8 inches of the tip; and (3) the tip of the second blade. The blade that remained attached to the hub was bent smoothly aft about 15 degrees over the outer half span and exhibited torsional twisting over the outboard 1-foot, which was rolled leading-edge-aft about 45 degrees with modest leading edge damage. There was an irregular pattern of scratches and impact marks on the front face of the blade and a modest compression buckle in the trailing edge at midspan. The second blade also exhibited torsional twisting over the outer half span and was separated from the hub slightly below flush with the hub. The blade was deformed opposite the direction of rotation. The blade also exhibited a random pattern of impact marks and scratches on the front face. The hub was broken at the point of blade separation on the side opposite the direction of rotation. The fracture surface at the root end was irregular, brittle, and exhibited a uniform shiny, gray appearance. The fracture contour of the tip piece did not match the contour at the outboard end of the severed blade.

The engine could not be rotated by hand. The number one cylinder head was absent and the cylinder head, along with the spark plugs and fuel injection nozzle, was not recovered. The number 2 and number 6 cylinder heads were fractured. On the bottom of the engine, the oil sump was absent along with the alternator, starter motor, starter ring gear, muffler, air intake, fuel servo, and intake and exhaust tubes. The muffler was separated from the engine and was crushed. The interior surfaces of the muffler exhibited a uniform light gray/brown appearance. The alternator mounting bracket was bent aft under the crankcase. The oil suction screen was clear. The propeller governor, mounted at the upper, front of the engine, was visually

undamaged, rotated freely by hand (after removal from the engine), pumped a small quantity of clear, dark, oil, and the inlet screen was clear.

On the engine accessory case, the oil filter was absent and the (dual) magneto was broken off at the magneto attachment flange. The spark plug wires were severed at numerous locations. The vacuum pump remained attached to the accessory case; however, the internal (carbon) vanes were broken and the pump was seized. The pump drive coupling was twisted although not totally separated.

The single-drive, dual magneto had impact damage on the right-hand end of the case and the left-hand case capacitor tower was shattered and the capacitor was absent. On the right-hand end, the case was deformed inward above the timing inspection hole approximately 1/4 inch and the distributor block was broken adjacent to the impact. The distributor block and breaker point mount assembly was visibly shifted to the left. The magneto shaft turned freely and the impulse coupling produced sparks at all six posts of the left-hand system; however, the right-hand system breaker points did not open during shaft rotation and did not produce any sparks at the output posts. The Safety Board investigator loosened the four screws holding the distributor block and breaker point assembly and shifted it to the left toward where marks on the case indicated it's preimpact position was and the right-hand breaker points then opened with shaft rotation and the right-hand system produced sparks at all six towers. No carbon tracking was visually apparent in the cap.

The mechanical fuel pump was separated from the accessory case and remained attached to the fuel servo unit by the fuel hose. When the hose was loosened, approximately 1/8 cup of a clear, blue liquid resembling aviation gasoline came out. The diaphragm in the fuel pump was intact. The finger screen in the fuel injection servo was clear. The fuel injection flow divider remained attached to the mounting bracket atop the engine. There were no visible impact marks on the flow divider casting and no fuel stain visible at the vent hole. When the fuel injection flow divider was opened, the diaphragm had a 3/8-inch tear in the right front quadrant near the flange of the spring retainer. There was no identifying part number on the diaphragm. The number 1 fuel injection nozzle was absent, the number 3 nozzle was partially obstructed, and the remaining four nozzles were clear.

When the engine accessory case cover was removed, the accessory drive gears were intact, as was the accessory gear drive pin on the crankshaft. The oil pump turned smoothly. When the camshaft drive gear was removed from the gear train, the camshaft turned freely and valve action was normal on cylinders 3, 4, and 5. When the cylinders were removed, the cylinder bores were shiny and unscored. The pistons and piston rings were intact. The combustion chambers exhibited modest, light gray deposits (the number 1 cylinder head was absent). The spark plug electrodes were round, un-fouled and exhibited a tan appearance. When the crankcase halves were separated, the crankshaft bearings were in place, and exhibited a uniform gray appearance. The camshaft lobes were uniform in shape and undamaged. The crankshaft journals exhibited a uniform, bright, chrome-like appearance.

MEDICAL AND PATHOLOGICAL INFORMATION

The FAA's Civil Aeromedical Institute in Oklahoma City, Oklahoma, performed a toxicological analysis of the pilot. The report, attached, shows that "bupropion metabolite" was detected. In an "Aeromedical Certification Update" to Aviation Medical Examiners, the FAA's Federal Air Surgeon wrote:

"Our physicians are still receiving many calls on the use of Zyban or bupropion hydrochloride as a means of assisting in smoking cessation. Please note that Zyban contains the same active ingredient as Wellbutrin SR, which is used to treat depression. Zyban is contraindicated for duties requiring flight. You should all know by now that this class of drug has a side-effect profile that is incompatible with flying. If an AME has the airman refrain from taking this drug for 72 hours prior to flight, then Zyban may be taken. However, this is not the way the medication is supposed to be used. If something is needed to help refrain from smoking, then nicotine gum or the nicotine patch should be used."

The pilot's fiancée told the Safety Board investigator that the pilot had been prescribed a drug to help with smoking cessation. She was not certain of the drug name but said it was "not the [nicotine] patch and not gum."

An autopsy was performed on the pilot by the San Bernardino County Coroner (case number A-136-01). The coroner attributed the cause of death to multiple blunt force injuries.

TESTS AND RESEARCH

According to the FAA's Southwest Region Quality Assurance Office, the minimum altitude for air traffic control radar reception in the area of the accident is between 7,000 and 8,000 feet, and there is no military radar coverage in the area. There was no FAA radar data recorded for the flight.

A spokesman for the company that manufactures the fuel injection system said it was "very unlikely" that the tear in the flow divider diaphragm was the result of impact although they couldn't rule it out. If the diaphragm ripped in flight (before the accident impact), the engine should have abruptly and completely stopped and there should have been no power to the propeller. On diaphragms made by this manufacturer, the part number is ink stamped on the back of the diaphragm, opposite the fuel surface. There is no shelf life for the part, assuming proper storage, and thus no date stamp.

The flow divider was placed on a test bench at the facilities of Airmotive Carburetor Company in Burbank on June 5, 2001. When a manufacturer-specified fluid pressure was applied to the inlet port a geyser of fuel shot from the vent hole in the divider upper case-half. No fuel was emitted from the six outlet ports or the fuel pressure gauge port.

The flow divider was sent to the Safety Board laboratory in Washington, D.C. for further

examination. The specialist's factual report is attached. The report states, in part: "The diaphragm, according to the drawing is a 'double coated DE-4Z0364 flurosilicone elastomer' with a fabric reinforcement." And, regarding figure 9 of the report, "The green arrow indicates where the diaphragm reinforcing fabric is located at the surface adjacent to the washer. The examination revealed that this condition, indicated by the blue arrow, continued around the diaphragm. According to the drawing the reinforcement is 'DF-10601 Dacron fabric centered in the elastomer'." Regarding the tear in the diaphragm, the specialist said: "The fractured ends were perpendicular to the strands of the fabric. Closer examination revealed that the fractured end of each filament in the strands was flat, perpendicular to the longitudinal axis of the filament and displayed no signs of reduction in diameter at the fracture. Such features, in a unidirectional long fiber reinforced composite such as this diaphragm, are consistent with a process known as micro buckling. Micro buckling is a fiber-dominated fracture due to tensile fatigue."

ADDITIONAL INFORMATION

The aircraft wreckage was released to Mr. Doug Brown, insurance adjuster for Kern and Wooley, on November 19, 2001.

Pilot Information

Certificate:	Airline transport; Commercial; Flight instructor	**Age:**	46,Male
Airplane Rating(s):	Single-engine land; 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 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	September 28, 2000
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	
Flight Time:	13000 hours (Total, all aircraft), 250 hours (Last 90 days, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N1965H
Model/Series:	PA-32R-300	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	32R7780211
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	January 1, 2001 Annual	**Certified Max Gross Wt.:**	3600 lbs
Time Since Last Inspection:	193 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	4928 Hrs at time of accident	**Engine Manufacturer:**	Lycoming
ELT:	Installed, activated, aided in locating accident	**Engine Model/Series:**	IO-540-K1G5D
Registered Owner:	Aero Alliance LLC	**Rated Power:**	300 Horsepower
Operator:	Jay Black	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	EED,983 ft msl	**Distance from Accident Site:**	29 Nautical Miles
Observation Time:	09:56 Local	**Direction from Accident Site:**	42°
Lowest Cloud Condition:	Few / 3500 ft AGL	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	5 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	80°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.9 inches Hg	**Temperature/Dew Point:**	18°C / -1°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Bullhead City, AZ (AO9)	**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	None
Departure Time:	10:30 Local	**Type of Airspace:**	Class G

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	1 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	2 Fatal	**Latitude, Longitude:**	34.960227,-115.310028(est)

Administrative Information

Investigator In Charge (IIC):	Parker, Richard
Additional Participating Persons:	GARY J KAPPA; FAA Flt Stnds Dist Office; Riverside, CA CHARLES R LITTLE; The New Piper Aircraft Co.; Vero Beach, FL MARK W PLATT; Textron Lycoming; Williamsport, PA RANDALL R KNUTESON; Consolidated Fuel Systems; Montgomery, AL
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Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=51896

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