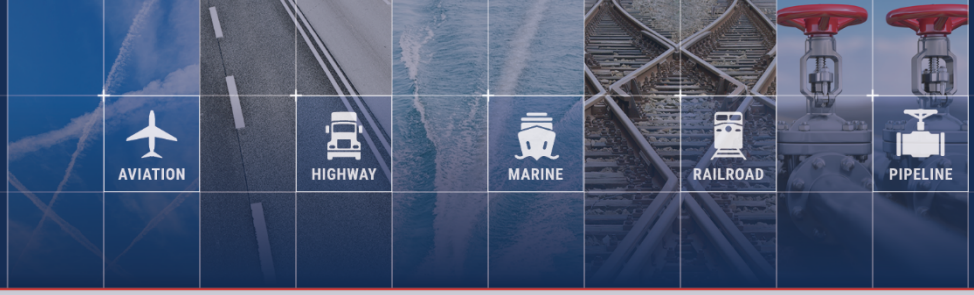

Aviation Investigation Factual Report

Location:	SO. LAKE TAHOE, California	**Accident Number:**	LAX00FA322
Date & Time:	September 1, 2000, 15:50 Local	**Registration:**	N88AM
Aircraft:	Piper PA-46-310P	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	4 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Factual Information

HISTORY OF FLIGHT

On September 1, 2000, at 1550 Pacific daylight time, a Piper PA-46-310P, N88AM, crashed into trees and terrain while turning downwind after takeoff from the Lake Tahoe Airport, South Lake Tahoe, California. The pilot had requested and been approved for a left downwind departure from runway 18 by the airport control tower operator. The airplane was destroyed by the collision sequence and post impact fire. The certificated private pilot and three passengers received fatal injuries. The airplane was owned and operated by the pilot as a personal flight under 14 CFR Part 91. The flight originated from South Lake Tahoe airport at 1549. Marginal visual meteorological conditions prevailed at the time and an IFR flight plan had been filed but not activated. The accident site was about 0.5 miles from the airport. The airport elevation was 6,264 feet msl.

According to the Lake Tahoe control tower operator, at 1542, a clearance to taxi to runway 18 was issued after a transmitted request from the pilot. Additional wind and altimeter information was given. At 1548, the pilot requested takeoff clearance and a left downwind departure. The controller gave the clearance to takeoff, approved a left downwind departure, and issued winds at 140 degrees and 12 knots. The controller then reported hearing an ELT (emergency locator transmitter) transmission at 1550. A verbal transmission from an unknown source was also received at 1550, and it communicated that there was an aircraft down. Smoke was observed 0.5 miles southeast of the airport. No emergency transmissions from the pilot were reported.

Witnesses on the ground reported the airplane lifted off on the 8,544-foot-long runway 18 abeam the terminal building at midfield, then almost immediately begin a crosswind turn. The turn had continued nearly 180 degrees when the airplane descended suddenly striking several pine trees before crashing between two houses. Several witnesses described the airplane's bank angle at nearly 90 degrees.

Additional witnesses reported seeing the airplane in flight moments before it crashed. An employee of Allegiant Air who was on the observation deck at the terminal saw the airplane bank hard to the left and stated that she thought it was in trouble and going to stall. "The turn was too steep [for having just lifted off] and the airplane had banked better than 45 degrees as it flew over the windsock," she continued. A mechanic who worked on the airplane earlier that day watched the airplane takeoff. He reported the engine sounding like it was under full power. Two other witnesses also gave an account of the engine sound. One lived just outside the airport and reported hearing the loud roar of the engine as it approached and crashed through the trees. The other reported hearing the engine revved up very loud and hearing an inconsistency in the sound just before the crash. According to the witness, the engine

sputtered and then the power returned. The statement also indicated that the wing attitude was vertical instead of horizontal before the crash.

PERSONNEL INFORMATION

A review of the Federal Aviation Administration (FAA) airmen records revealed the pilot held a private pilot certificate with airplane single engine land, multiengine land, and instrument ratings. His most recent certificate issuance was the addition of a multiengine land rating on November 16, 1999. The pilot also held a second-class medical certificate that was issued on December 21, 1999. It did not have any limitations or waivers. An examination of the pilot's logbook indicated a total flight time of 2,343.8, and the last entry recorded was November 16, 1999. The pilot reported having 2,428 hours on the certificate application for the multiengine rating. According to a personal associate of the pilot, he had over 2,500 hours of total flight time accumulated and had flown 200 hours in the last 6 months. The pilot was reported to have been logging the more recent flight time on a computer, which was not available for review by the Safety Board.

The FAA airmen and medical certification databases did not locate any U.S. airmen or aviation medical records on the passenger seated in the right front position.

The pilot was also the registered owner and operator of the airplane. A witness and associate of the pilot indicated that the airplane had been purchased about 6 months prior to the accident. FAA aircraft registry and ownership records identify the pilot as having obtained the airplane in March 2000.

AIRCRAFT INFORMATION

The 1985 Piper Malibu PA-46-310P airplane, serial number 46-8508056, last received an annual inspection on October 25, 1999. Review of the airplane logbooks revealed 2,845 hours on the airframe at that time. By March 15, 2000, the airplane had accumulated 2,900.3 hours. This airplane was equipped with a Teledyne Continental TSIO-550C1B engine, serial number 802521. It was installed on June 08, 1995, under Supplemental Type Certificate (STC) SA00380AT. Total time on the engine at date of the annual inspection was 815.9 hours.

A remanufactured Hartzell propeller, model number BHC-C2YF-1BF, hub serial number 4991SJ, was also installed on the airplane on June 08, 1995. The date of remanufacture recorded was March 22, 1995. The propeller maintenance logbook submitted for the investigation indicated that Palm Beach Propeller, Inc., had overhauled both the propeller and the governor.

Modifications made to the airplane included extended fuel caps, a wing spoiler system, and a nose gear door that provided engine cooling. According to New Piper Aircraft, Inc., the fueling ports were not a factory installation and allowed the operator to add an additional 10 gallons of fuel per tank, bringing the total capacity to 140 gallons. Maintenance logs established August 29, 1995, as the date of installation in accordance with an STC. The airplane weight

and balance form had been amended to reflect the additional filler caps. Total time on the airframe at that point was 2,068.9 hours.

A personal associate of the pilot who had previously flown in the airplane reported a problem with the autopilot. The statement indicated that the associate observed the pilot having difficulty disengaging the autopilot while on board. By the same account, the pilot reported to the associate that on earlier occasions it would activate without being switched on. The mechanic who worked on the airplane the day of the accident also reported the pilot having past problems with the electric trim system on the autopilot. No recent maintenance was performed on the autopilot according to logbook records kept by the previous owner. The operating manual states that the KFC-150 autopilot/flight director deactivates after a roll rate of 14 degrees per second and a pitch rate of 8 degrees is reached. When the heading mode is set, the autopilot will turn at a maximum bank angle of 20 degrees. Axis servos, bridle cables, and autopilot instrumentation was not located in the wreckage and presumed thermally destroyed.

The KFC-150 system incorporates an electric trim to relieve control pressures when the autopilot has engaged the pitch servo. The elevator trim surface was found with a downward deflection and a total of 9 threads on the jackscrew actuator were observed. New Piper Aircraft, Inc., reports that this position corresponds to a nose up setting of just above neutral. A jackscrew actuator position of 7 to 8 threads is the takeoff setting (neutral), and 14 to 15 threads equals a full nose up deflection of the trim. Both the electric trim and autopilot rocker switches are capable of adjusting the pitch attitude at a rate of approximately 0.9 degrees per second. Manual stick forces required to counteract the pitch trim adjustments were obtained through a Piper Aircraft flight test report; number VB-1352. The maximum setting for the flight test was minus 23 degrees (nose up), and it corresponded to 51 pounds of control force needed to override the trim adjustment. A setting of minus 12 degrees corresponded to 25 pounds of force. These results were found under climb altitude conditions and 110 knots of airspeed (published best rate of climb). Airworthiness standard limitations for stick forces are 75 pounds for pitch and 60 pounds for roll (14 CFR Part 23).

The airplane was sent to Airborne Electronics to have maintenance performed on the elevator trim, according to a work order from Clarksburg Air Repair dated August 21, 2000. A voided record from Airborne Electronics dated 08/24/00 was obtained and it noted that the aircraft was returned to the owner before the work was done at the owner's request.

The associate also reported the pilot's disappointment in the airplane's climb performance after it was painted. The airplane was disassembled for the paint application and the painting was completed on June 21, 2001. Static ports were not identified in the wreckage and also presumed thermally consumed.

The airplane was last refueled at Oasis Aviation on September 1, 2000, and a copy of the fueling record was obtained for review. At that time, 99.5 gallons of 100 octane low lead fuel was added. An employee of Oasis Aviation reported receiving a phone call from the pilot

asking to fuel all tanks on the airplane. This employee also drove one of the passengers from the hanger to the airplane, which was parked on the north end of the tarmac. Oasis Aviation fueled six other aircraft from the same fuel truck. There were no problems reported from the day's previous customers.

The Safety Board investigation produced the post accident calculations for takeoff performance and weight and balance examination. The front and rear seat passenger weights were taken from department of motor vehicle records, and baggage was conservatively estimated, based on the remains found at the wreckage site not thermally consumed in the post impact fire.

Weight and Balance Computation Matrix:

	Weight (lbs.)	Arm (inches)	Moment		
Basic Empty Weight	2837.04	135.06	383170.62		
F-seat (left)	190	135.5	25745.00		
F-seat (right)	176	135.5	24254.50		
M-seat (left)	0	177.0	0		
M-seat (right)	0	177.0	0		
R-seat (left)	105	218.75	22968.80		
R-seat (right)	160	218.75	35000.00	Fuel	840
150.31	126260.40				
F-baggage	20 est.	88.6	1772.00		
R-baggage	20 est.	248.23	4964.60		
Totals		4351.04	624135.92		

Center of Gravity = 624135/4,338 = 143.446

The report submitted by New Piper Aircraft, Inc. on this airplane included a weight and balance work-up, which calculated a gross weight of 4,426 pounds.

The published maximum gross takeoff weight was 4,100 pounds (maximum ramp weight was 4,118). Forward limit of the center of gravity envelope is 130.7 inches while the aft limit is 147.1 inches from the datum plane. Accurate takeoff, ground roll, and climb performance data could not be determined from the Pilot Operating Handbook due to the gross weight calculations being outside the performance envelope.

According to the takeoff and climb performance charts in the Airplane Flight Manual, under the prevailing weather conditions and at the published maximum gross takeoff weight, the airplane has a ground roll of approximately 2,010 feet (see witness statements under history of flight). Climb performance results under equal conditions, gear and flaps retracted, indicated a climb rate of 1,095 feet per minute.

METEOROLOGICAL INFORMATION

The METAR report for the Lake Tahoe Airport (TVL) indicated winds were at 140 degrees at 13 knots. Visibility was 7 miles with rain showers in the vicinity. Before takeoff the pilot was given an advisory by the controller that the winds were at 170 degrees at 14 knots and the altimeter setting was 30.00 inHg. The reported cloud ceiling was broken at 3,000 feet. A witness who was at the airport that day reported light rain. The mountains surrounding the airport were reported as being obscured by the cloud cover.

COMMUNICATIONS

FAA air traffic records that the pilot received a weather briefing and filed an IFR flight plan to San Diego at 1419 local time before embarking on the flight.

AERODROME INFORMATION

The Lake Tahoe Airport located in the city of South Lake Tahoe, has an elevation of 6,264 feet. It is served by a part time non-federal air traffic control tower. The Airport Facility Directory reports the preferred runway for high performance aircraft as 18 and a right downwind departure is recommended. The airport is surrounded on the east, south, and west by trees and rapidly rising terrain. Runway 18 is 8,544 feet long and 150 feet wide. It is surfaced with grooved asphalt.

Using the Engineering Airport Layout Plan, the Lake Tahoe Airport Manager measured the distance from a point on the runway perpendicular with terminal building to the end point of runway 18 and found it to be 4,850 feet (see History of Flight and Aircraft Information). The distance was calibrated using the scale provided in the layout plan.

WRECKAGE AND IMPACT INFORMATION

The wreckage site was located in a 100-foot by 75-foot wooded area in the backyard of a residence on the 1600 block of Semat Street. The El Dorado County Sheriff reported that the airplane was fully engulfed in flames upon arrival. The sheriff report referenced a diagram of the site that was taken and portrayed the impact debris pattern. Wreckage was found through an east-northeast direction with the initial impact (tree damage) reported on the southwest side. The tip of one tree and a 4-foot section of an 80-foot tall tree had been sheered off. Two other trees showed impact damage on the southwest sides as well. The first tree exhibited damage 10 to 20 feet from the ground. The second, a 3-foot diameter tree located about 6 feet away from the first, was sheered off approximately 15 feet from the ground. A large area of the backyard and several trees had been burned from the post impact fire. Firefighters extinguished the fire about 1620.

The airplane wreckage lay in two main areas on the ground below several trees, some of which

were damaged by the impact of the airplane. The engine and propeller were still joined together but separated from the main fuselage. The propeller exhibited twists and the outboard half of one blade was bent forward away from the cockpit. The nose cone was dented around its circumference in several places on its surface without torsional deformation. Both turbo chargers were separated from the engine assembly. A small portion of the airplane's skin or structure was found imbedded in a fallen tree segment.

Part of the cockpit, nose gear strut and wheel assembly, and engine mounting brackets were lying a few feet away. They were damaged from impact and post impact fire. The front cockpit section was not complete and had been partially incinerated. The canopy had been thermally consumed. Instruments from the cockpit and the panel itself had been destroyed by impact and consumed by the post impact fire. The manufacturer's representative recorded an altimeter reading of 44,300 feet and reported that flying surface control cables had been destroyed by fire. The full span of the right wing remained attached to the fuselage. The right wing had two large fractures; the first was evident upwards about the first third and the other was located at the second third of it's span. The first fracture exhibited separation completely through the wing from the leading edge through the flap section. There was also some thermal damage to the skin surface. Paint discoloration from the heat and soot were noted near the wing root and found near this first fracture zone. The second fracture extended from the leading edge where a circular impact feature had left about a 3-foot diameter semicircular depression. The fracture ran through the fueling cap assembly to a middle section main wing spar. The outboard wing tip was broken away. The leading edge of the wing and top surface was bent and disfigured along the expanse. The flap section was still joined to the wing but also exhibited the warped features and was torn in places. Other areas of thermal discoloration were also evident along the surface.

The left wing was not complete and remnants exhibited severe impact damage. Larger segments had broken away. Other segments were missing and presumed to be totally consumed by fire. Some paint was still evident on the main wing spar segment attached to the fuselage. There was soot and blistering damage to the paint surface. The upper and outer extension of this main spar was bent down 90 degrees toward the ground. The Safety Board investigator found the airplane to be configured with the landing gear and flaps in the retracted position.

Remaining portions of the passenger cabin and empennage not totally consumed by fire were found in the area of initial impact. Empennage movable control surfaces were also found in the same debris. Remaining vertical and horizontal stabilizer portions were found lying one on top of the other and separated from the tail. Both exhibited burn and soot discoloration that had covered about 40 percent of the remaining areas. They were lying near the base of a tree damaged from the impact and another tree that had partially fallen. A rudder hinging mount was exposed under the torn vertical stabilizer skin but lying intact with no burn damage evident.

MEDICAL AND PATHOLOGICAL INFORMATION

An autopsy was conducted by the El Dorado County Coroner with specimens retained for toxicological examination by the FAA Civil Aeromedical Institute. The results of the toxicology analysis from the pilot and front passenger were as follows: For the pilot, no traces of controlled substances, carbon monoxide, volatiles, or cyanide was detected. Carbon monoxide and cyanide were not detected in any of the other passengers.

TESTS AND RESEARCH

Teledyne Continental (TCM) Engine Inspection:

The TSIO-550-C1B engine, serial number 802521, was put in a crate and shipped to the manufacturer in Mobile, Alabama, for examination. It was received on October 15, 2000.

According to the Teledyne Continental report, it was opened in the presence of the FAA coordinator and four of the manufacturer's representatives were participating in the inspection. The representatives included two Analytical Inspectors, a Metallurgist, and an Air Safety Investigator. The engine was mounted on an engine stand for disassembly. Observations recorded are itemized in a number sequence:

1. The engine exhibited impact and fire damage. The number 3 and 4 cylinder heads were broken from impact. Number 5 cylinder head and barrel were separated. The oil sump was crushed. Sump rails on both halves of the crankcase were broken. The exhaust system was damaged. Both turbochargers were damaged and shipped loose. All engine mount legs were broken. The fuel pump was impact damaged. The throttle body was broken at its mounting flange. Both vacuum pumps were fire damaged. The starter adapter mount to the crankcase was broken out. The number 5 fuel injection nozzle and fuel line were broken. The left pre-cooler and induction systems were damaged from impact and fire. The propeller deicer was fire damaged and broken loose from the propeller flange. The alternator was broken up; only the rear half remained.

2. Items missing: Right pre-cooler, starter, and starter adapter.

3. The oil pressure relief valve seat and plunger were clean. The oil sump and oil pick up tube were crushed and damaged by fire. The sump contained no oil and a small quantity of carbon debris was present in the sump bottom.

4. Thermal and impact damage was noted for the engine driven fuel pump. The fuel pump drive coupling was intact. The pump would not turn. The inlet fuel fitting was broken out. A small hole was burnt into the fuel pump housing.

5. The throttle and fuel control linkage was thermally damaged. The throttle body mounting flange was broken. The manifold valve, lines, and nozzles had impact and fire damage. The number 5 injector line was broken off at the nozzle. All fuel injection nozzles were removed

and unrestricted. The manifold valve fuel screen was clean.

6. The starter adapter mounting surface on the crankcase was broken out from impact.

7. Cylinder numbers 1, 2, 3, and 5 are TCM part number 653462 A2 cylinders. Cylinders 4 and 6 are AEC rebarreled cylinders; Part number 634501 with work order number 5802, oversized .005 inch, and the head is dated 12/86. Combustion deposits were dark in color. The hone patterns were visible with a light coating of rust. Number 1 cylinder contained a small amount of water and a heavy coating of rust.

8. All valves appeared to be seated properly, with the exception of cylinder 5, which had impact separation from impact. Number 3 cylinder head was damaged exposing the intake valve. The remaining cylinders intake and exhaust valves were removed for inspection. Number 6 intake valve had a part number of SA539988; number 4 exhaust valve had a part number of SA643873; and the number 6 exhaust valve was part number AC637781P. Number 5 cylinder intake and exhaust, and number 3 intake rocker arms exhibited impact and post fire damage.

9. Number 5 cylinder push rods and housings were damaged by post impact and fire. The remaining push rods and housings had post impact fire damage.

10. Piston rings were free in their respective ring grooves. Number 1 piston was covered with a white and rusty colored, emulsified substance.

11. Babbitt overlays were intact. No bearing movement was observed.

12. Sump rails for both crankcase halves were broken from impact. Both crankcase halves were cracked above the number 3 and 4 cylinders. The starter adapter crankcase mount was broken out.

13. The crankshaft flange was cracked in the propeller flange radius. Crankshaft counterweights' movement was free and unrestricted. Number 1 rod was removed and its bearing Babbitt was intact. All connecting rod bolts were intact.

14. The engine lifters exhibited rust etching signatures on the lifter bodies. Lifter face spalling was not observed.

TCM Engine Analysis:

Engine oil pump gears and their respective cavities exhibited normal operational signatures. The fuel pump was disassembled, all internal components appeared functional, except for heat damage from the post accident fire. The valves, guides, and seats exhibited normal operating signatures. With the exception of cylinder number 5 rocker arms and cylinder number 3 intake rocker arms, all remaining exhibited normal operational signatures. All piston

crown deposit colors were normal except for number 1. Piston skirt color was normal. All piston pins exhibited normal operational signatures. Crankcase main bearings exhibited normal operational signatures. Main bearing supports appeared normal, except number 4, which exhibited light fretting. The connecting rod journals exhibited normal operating signatures with no lubrication distress observed. The crankshaft gear teeth appeared normal. Crankshaft oil transfer collar exhibited normal operational signatures. The connecting rod bushings exhibited normal operating signatures. Number 1 bearing Babbitt exhibited normal operating signatures.

The TCM Metallurgist examined the separated cylinder head from the number 5 cylinder and determined the fractures were in overload and separation was from impact.

Other than fire and impact damage as noted, the engine internal components exhibited normal operational signatures and lubrication.

Hartzell Propeller Inspection:

A representative from Hartzell Propeller inspected the blades and hub section on two occasions, February 5, 2002 and March 26, 2002. A teardown inspection was performed. Observations recorded are as follows:

Both of the blades exhibited damage from impact. One of the blades had a large radius bend, bent forward of the plane of rotation about 90 degrees. It had additional multiple fore and aft bends near the tip. Most of the paint on the surface was missing due to thermal damage. The second blade was mildly bent aft and not twisted. It had relatively little damage. Both blades were at a very high angle, near feather, blade angle position. They were somewhat loose and could be manually turned.

The propeller hub was blackened from fire. The mounting flange was intact and unremarkable; however, the engine flange was cracked.

After the disassembly, the propeller pitch change rod was found fractured on both sides of the fork. This disconnected the blade pitch change knobs from the piston assembly. The preload plate had an impact mark caused by contact with the opposing number 1 blade pitch change knob. This mark was calculated to have occurred at an approximate 27.5-degree blade angle. Other component parts were intact and unremarkable.

A governor inspection and disassembly was performed. Aside from minor corrosion and heat damage, all parts were intact and operable.

Hartzell Propeller and Governor Analysis:

No discrepancies were noted on either the propeller or governor that would have precluded normal operation.

The propeller was rotating at the time of impact, but the amount of the power output could not be determined.

ADDITIONAL INFORMATION

The wreckage was released on June 27, 2001. Parties to the investigation were New Piper Aircraft, Inc., Teledyne Continental Motors, and the Federal Aviation Administration.

Pilot Information

Certificate:	Private	**Age:**	43,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Unknown
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	December 21, 1999
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	November 16, 1999
Flight Time:	2500 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N88AM
Model/Series:	PA-46-310P PA-46-310P	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	46-8508056
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	October 25, 1999 Annual	**Certified Max Gross Wt.:**	4118 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	2845 Hrs as of last inspection	**Engine Manufacturer:**	Teledyne Continental
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	TSIO-550-C
Registered Owner:	JEFFREY THOMAS NEEDHAM	**Rated Power:**	310 Horsepower
Operator:		**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	TVL,6264 ft msl	**Distance from Accident Site:**	
Observation Time:	15:48 Local	**Direction from Accident Site:**	280°
Lowest Cloud Condition:	Clear	**Visibility**	7 miles
Lowest Ceiling:	Broken / 3000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	13 knots / None	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	140°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29.97 inches Hg	**Temperature/Dew Point:**	9°C / 4°C
Precipitation and Obscuration:	Light - None - Rain		
Departure Point:	SO. LAKE TAHOE, CA (TVL)	**Type of Flight Plan Filed:**	IFR
Destination:	SAN DIEGO, CA (SDM)	**Type of Clearance:**	VFR
Departure Time:	15:49 Local	**Type of Airspace:**	Class D

Airport Information

Airport:	South Lake Tahoe TVL	**Runway Surface Type:**	Asphalt
Airport Elevation:	6264 ft msl	**Runway Surface Condition:**	Wet
Runway Used:	18	**IFR Approach:**	None
Runway Length/Width:	8544 ft / 150 ft	**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	3 Fatal	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	On-ground
Total Injuries:	4 Fatal	**Latitude, Longitude:**	38.89389,-119.995277

Administrative Information

Investigator In Charge (IIC):	Crispin, Robert
Additional Participating Persons:	DAVID H BUTLER; FEDERAL AVIATION ADMINISTRATION; RENO, CA CHARLES LITTLE; NEW PIPER AIRCRAFT ; CHINO HILLS, CA MICHAEL GRIMES; TELEDYNE CONTINENTAL MOTORS; LANCASTER, CA
Report Date:	July 29, 2002
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=50159