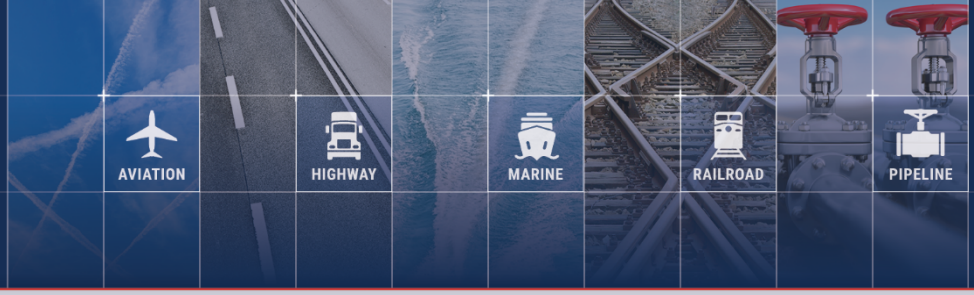

Aviation Investigation Factual Report

Location:	South Lake Tahoe, California	**Accident Number:**	WPR12FA369
Date & Time:	August 25, 2012, 21:45 Local	**Registration:**	N588ET
Aircraft:	Piper PA-32-301T	**Aircraft Damage:**	Substantial
Defining Event:	Collision during takeoff/land	**Injuries:**	5 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

On August 25, 2012, about 2145 Pacific daylight time, a Piper PA-32-301T Saratoga, N588ET, impacted trees shortly after departing from Lake Tahoe Airport, South Lake Tahoe, California. The right-seated pilot was operating the airplane under the provisions of Title 14 Code of Federal Regulations Part 91. The five occupants, which included the right and left-seated private pilots, were fatally injured; the airplane was destroyed. The personal cross-country flight was originating from Lake Tahoe Airport, with a planned destination of Fresno, California. Nighttime visual meteorological conditions prevailed, and no flight plan had been filed.

The occupants had departed Fresno earlier that day and landed at Lake Tahoe Airport. After touchdown, a pilot was in communication with two fixed base operator (FBO) attendants and received directions of where to taxi the airplane. While taxiing to the ramp, the airplane's engine shutdown and it took numerous attempts for the pilots to restart it. Upon parking, the pilots reported to the attendants that the airplane's fuel/air mixture was difficult to establish at such a high density altitude and that if one operates the engine too lean its temperature will exceed normal operation parameters. The pilots indicated that this was their first time of going to the Tahoe airport and he was under the impression that for the accident flight the left-seated pilot was the flying-pilot.

Following dinner, the occupants returned to the airport with the intention of flying back to Fresno, where the airplane was based. One of pilots made a radio transmission on the Common Traffic Advisory Frequency (UNICOM) stating that they were departing runway 36 and making a "straight out over the lake departure and then a crosswind departure to the left." This was the last radio call transmitted.

A review of the recorded security camera footage at the airport revealed that the airplane could be seen in the nighttime conditions by a blinking light. The airplane appeared to depart from runway 36 and near the end of the runway began an ascent. The light appeared to level off and then a flash of light occurs in the area of the accident site.

Numerous witnesses reported hearing the airplane depart and noticed that the engine noise sounded labored, as if it was not producing full power. A Civil Air Patrol Squadron Building was located at the airport where several cadets heard the departure and accident. A few cadets heard three "chirps," that sounded if the tires were touching back on the runway surface after becoming airborne. One cadet stated that one of the pilots showed signs of intoxication and noted that they forgot to turn the beacon on before startup and after takeoff. He observed the airplane become airborne far down the runway and appearing to be having engine problems. The airplane was only in the air about three seconds before descending and crashing into terrain.

Pilot Information

Certificate:	Private	**Age:**	43
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Right
Other Aircraft Rating(s):	None	**Restraint Used:**	Lap only
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 Without waivers/limitations	**Last FAA Medical Exam:**	June 20, 2012
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 600 hours (Total, all aircraft)		

Pilot Information

Certificate:	Private	**Age:**	60
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Lap only
Instrument Rating(s):	None	**Second Pilot Present:**	Yes
Instructor Rating(s):	None	**Toxicology Performed:**	Yes
Medical Certification:	Class 3 With waivers/limitations	**Last FAA Medical Exam:**	March 1, 2011
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	(Estimated) 1025 hours (Total, all aircraft)		

Right-seated Pilot

A review of the airmen records maintained by the Federal Aviation Administration (FAA) disclosed that the right-seated pilot, age 43, was issued a private pilot certificate with a rating for single-engine land airplanes in October 2007. His most recent third-class medical certificate was issued without limitation on June 20, 2012.

The pilot's personal flight logbooks were not recovered. According to his last application for a medical certificate, he reported a total flight time of 600 hours, 40 of which he accumulated in the 6 months prior to the medical examination. On his application form, the pilot reported that he had previously been convicted of a traffic violation consisting of a Driving Under the Influence (DUI) offense in 1994; he did not note any other convictions or violations.

The right-seated pilot owned the airplane, with the bill of sale showing a purchase date of December 2011. An acquaintance of the pilot stated that he sold him fuel about 1800 on the day of the accident in Fresno. The pilot indicated that he was going to fly to Tahoe for dinner. He recalled a recent conversation he had with the pilot when he advised him to lean the airplane's engine while operating on the ground while at high-elevation airports. He speculated that the pilot may have followed his advice, but then failed to enrich the mixture prior to departure.

Second Pilot

According to the FAA airmen records, the left-seated pilot, age 60, held a private pilot certificate with an airplane rating for single-engine land. His most recent third-class medical certificate was issued March 28, 2011 with the restriction that he must wear corrective lenses.

The left-seated pilot's personal flight records were not recovered. On his last application for a medical certificate, he reported a total flight time of 1,025 hours, of which 37 hours were accumulated in the last six months.

Passenger information

The passengers included the pilots' spouses and the right-seated pilots' six-year old daughter. Neither of the spouses were certificated pilots.

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N588ET
Model/Series:	PA-32-301T	**Aircraft Category:**	Airplane
Year of Manufacture:	1980	**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	32-8024044
Landing Gear Type:	Retractable - Tricycle	**Seats:**	7
Date/Type of Last Inspection:	September 14, 2012 Annual	**Certified Max Gross Wt.:**	3600 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:	3381 Hrs as of last inspection	**Engine Manufacturer:**	LYCOMING
ELT:	Installed, not activated	**Engine Model/Series:**	TIO-540-S1AD
Registered Owner:	On file	**Rated Power:**	310 Horsepower
Operator:	On file	**Operating Certificate(s) Held:**	None

The Piper PA-32-301T, serial number (s/n) 32-8024044, was manufactured in 1980. A review of the logbooks revealed that the most recent annual inspection of the airframe and engine was performed on September 14, 2011 at a total time of 3,380.76 hours,

The powerplant, a Lycoming Engines TIO-540-S1AD, s/n L5741-61A, was last overhauled in November 2007, equating to 212.76 operational hours before the last annual inspection. The maintenance records listed the last maintenance as occurring on February 14, 2012, at which time the following items were replaced: the vacuum pump, oil filter, co-pilot seat linkage rod, and battery. The propeller, installed in November 2007 under a supplemental type certificate (STC), was a MT-Propeller MTV-9-B (s/n 070165) composite 3-bladed propeller.

A review of the airplane's history revealed that it had been involved in an accident (MIA05LA070) in

April 2006 causing substantial damage to the aircraft. The probable cause was determined to be a result of the pilot losing directional control during a crosswind landing.

According to the Lycoming Engines Illustrated Parts Catalog (IPC) PC 315-5, Section 2, page 2-5, the fuel pump installed on the engine was incorrect. The fuel pump listed for this engine model was RG-9570-P and a review of the engine logbook indicated that an RG9080J6A (s/n D-2570) had been installed at the overhaul dated October 17, 1991. The approval basis for the installation of this fuel pump was not documented in the record and could therefore not be determined. Additionally, there was no record indicating when the originally installed fuel pump was removed and the current one was installed.

Weight and Balance

Weight and balance computations were made for the accident takeoff and based on the airplane's empty weight, total moment, and center of gravity that were obtained from the maintenance records. The takeoff condition was calculated for a full fuel tank condition based on the FBO personnel statements and fuel receipts showing the addition of 32.3 gallons, which topped off the tanks with full fuel (total fuel capacity was 107 gallons, of which 5 gallons was unusable). The occupant weights and seating positions were obtained from the Department of Coroner, Sacramento, California and based on their self-reported driver's license weights; the child's weight was estimated. The detailed computations are appended to this report.

For the takeoff condition, the gross weight was about 3,557 pounds and the center of gravity was 91.78-inches. The maximum authorized gross takeoff weight was 3,600 pounds with the center of gravity range at that weight between 90 and 95 inches forward and aft, respectively.

Review of the Piper Aircraft Corporation Pilot's Operating Handbook (POH) for the airplane disclosed that with the flaps in the retracted position, at the maximum gross weight, the takeoff distance required over a 50-foot obstacle at maximum effort was just less than 3,000 feet.

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Night/dark
Observation Facility, Elevation:	TVL,6269 ft msl	**Distance from Accident Site:**	
Observation Time:	21:53 Local	**Direction from Accident Site:**	
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	3 knots / None	**Turbulence Type Forecast/Actual:**	/ None
Wind Direction:	160°	**Turbulence Severity Forecast/Actual:**	/ N/A
Altimeter Setting:	30.07 inches Hg	**Temperature/Dew Point:**	16°C / 3°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	South Lake Tahoe, CA (TVL)	**Type of Flight Plan Filed:**	None
Destination:	Fresno, CA (FAT)	**Type of Clearance:**	None
Departure Time:	21:40 Local	**Type of Airspace:**	

A routine aviation weather report (METAR) generated by an Automated Surface Observation System (ASOS) at the airport, indicated that about 10 minutes after the accident the conditions were as follows: wind was from 200 degrees at 3 knots; temperature 16-degrees Celsius; dew point 3-degrees Celsius; sky clear; and altimeter 30.08 inHg. These conditions equate to a density altitude of 7,751 feet.

According to the U.S. Naval Observatory, on the night of the accident, the time of sunset was 1940. At the time of the accident, the moon was waxing gibbous with 64-percent of the visible disk illuminated - 1.61 degrees below the horizon on an azimuth of 285 degrees.

Airport Information

Airport:	Lake Tahoe Airport TVL	**Runway Surface Type:**	Asphalt
Airport Elevation:	6269 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	36	**IFR Approach:**	None
Runway Length/Width:	8541 ft / 100 ft	**VFR Approach/Landing:**	None

The Airport/ Facility Directory (AFD), indicated that the Lake Tahoe Airport (TVL) runway 36 was about 8,540 feet long and 100 feet wide. The runway surface was composed of asphalt. The airport elevation was 6.269 feet msl. The uncontrolled airport was situated in class "E" airspace. In the remarks section of the AFD was a note "345 ft. trees, 5700 ft. from runway, 500 ft. right of centerline, 15:1 slope to clear."

The airport was situated in the valley on the south shore of the lake, with the departure end of the runway about 2.5 nautical miles south of the shoreline. The mountain peaks and ridges that surrounded the valley rose to elevations in excess of 9,900 feet msl.

Wreckage and Impact Information

Crew Injuries:	2 Fatal	**Aircraft Damage:**	Substantial
Passenger Injuries:	3 Fatal	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	5 Fatal	**Latitude, Longitude:**	38.89389,-119.995277(est)

The accident site was located in high shrub about 0.43 nautical mile (nm) from the departure end of runway 36 on a heading of 359 degrees. In character, the terrain was flat, and populated by scattered mature large bush that bordered the north-south oriented creek adjacent to the site. The main wreckage was located at an estimated 38 degrees 54.75 minutes north latitude and -119 degrees 59.533 minutes west longitude, and at an elevation of about 6,255 feet msl.

The main wreckage, consisting of the engine and remains of the fuselage, came to rest inverted in tall brush and had burned the terrain in the surrounding 5 to 10 feet. The wreckage was consumed by post-impact fire and a majority of the wings and skin panels were molten metal and ash. The front of the airplane (nose section) was measured to be pointed to a magnetic bearing of about 160 degrees.

The first identified impact point consisted of broken trees located about 260 feet south of the main wreckage, where a 3.5-foot section of the right outboard wing (near the aileron pivot) was entangled in the branches. The inboard area of that wing was deformed aft about 2 feet 2 inches from the leading edge creating an accordion appearance, with the aluminum skin folded over on itself. This u-shaped divot that was about 1 foot and 5 inches in diameter and still had a portion of upper skin attached. The right aileron was located in an adjacent tree. Additionally, there was about a 1 foot section of the right side outboard stabilator found along the debris trail.

The impact created a 5-foot long crater-like depression about 20 feet prior to the main wreckage, the crater was consistent in size and orientation of the fuselage. The main wreckage was found on a heading of about 020 degrees from that disturbance, consistent with the airplane traveling in that direction and colliding into terrain before flipping over inverted.

Medical and Pathological Information

The Department of Coroner Sacramento completed autopsies on both pilots. The FAA Toxicology and Accident Research Laboratory performed toxicological testing on their specimens.

The results of analysis of the right-pilot's specimens revealed the following:

>> 33 (mg/dL, mg/hg) Ethanol detected in Blood (heart)

>> 54 (mg/dL, mg/hg) Ethanol detected in Vitreous
>> 41 (mg/dL, mg/hg) Ethanol detected in Brain
>> 40 (mg/dL, mg/hg) Ethanol detected in Urine
>> 37 (mg/dL, mg/hg) Ethanol detected in Muscle

The results of analysis of the left-pilot's specimens were negative for carbon monoxide, cyanide, and ethanol.

Tests and Research

Following the on-site investigation an additional examination of the wreckage was conducted on August 28, 2012, at the facilities of Plain Parts, Sacramento, California. Present to the examination was a Safety Board investigator, as well as representatives from both Piper Aircraft and Textron Lycoming.

Airframe

The left wing and its respective control surfaces were mostly consumed by post impact fire. The left main landing gear, wingtip, and several pieces of skin were located at the main wreckage and remained with remnants of the main spar. The aileron control cable was secure to the bellcrank and continuous to the control wheel chain. The balance cable was secure to the bellcrank attach point and continuous to the right side aileron bellcrank. The left fuel filler cap was found in the skin pieces and observed to be secured in place.

The inboard portion of the right wing was consumed in the post impact fire. The right main landing gear structure remained with a portion of the main spar. Both the aileron control cable and the balance cable were secure to the bellcrank. The control cable was continuous and secure to the control wheel chain. The balance cable was continuous and secure to the left bellcrank. The right fuel filler cap was found in the skin pieces and observed to be secured in place.

The flap torque tube was loose in the wreckage, with the surrounding structure having been consumed by fire. The flap handle was positioned between the fully retracted position and first notch (10-degree) setting.

A majority of the empennage was consumed in the post impact fire. The remaining parts of the empennage were manufactured from steel and included the lower rudder bellcrank hinge point (with stop bolts), one stabilator hinge (with stop bolts) and the control cables. Both rudder cables were secure to the rudder bellcrank and continuous to the rudder pedals in the cockpit. Both the stabilator cables were secure to the balance tube and continuous to the control wheel T-bar in the cockpit. The stabilator

pitch trim drum showed a nine-thread upper extension, which according to the Piper representative was consistent with a position of about a 3-degree nose-up trim.

Removal of the fuel selector revealed that it was positioned on the left main fuel tank. The remainder of the fuel system had been consumed by fire. The instruments and radios were destroyed by impact and fire and provided no useful information.

Engine

An external visual examination of the engine revealed that it remained attached to the engine mounts. The engine case and accessories sustained deformation from a combination of impact energy forces and being subjected to the post impact ground fire. There was no evidence of pre impact catastrophic mechanical malfunction or fire.

The top spark plugs were removed; no mechanical damage was noted and the electrodes and posts exhibited a light ash gray coloration, which corresponds to normal operation according to the Champion Aviation Check-A-Plug AV-27 Chart.; the upper No.2 plug had a light film of oil, which is consistent with the engine coming to rest inverted.

The ignition harnesses were consumed by fire, but appeared to have been attached from both magnetos and their respective spark plugs. The single drive dual magneto was found securely clamped at the mounting pad and had been subjected to fire. The magneto sustained varying degrees of damage that rendered the unit inoperative and therefore, could not be functionally tested.

The crankshaft was rotated by hand utilizing the propeller. The crankshaft was free and easy to rotate in both directions. "Thumb" compression was observed in proper order on all six cylinders. The complete valve train was observed to operate in proper order, and appeared to be free of any pre-mishap mechanical malfunction. Normal "lift action" was observed at each rocker assembly. Clean, uncontaminated oil was observed at all six rockerbox areas. Mechanical continuity was established throughout the rotating group, valve train and accessory section during hand rotation of the crankshaft.

The cylinder assemblies were removed, examined and photographed. The cylinder(s) combustion chamber and barrels remained mechanically undamaged, and there was no evidence of foreign object ingestion or detonation. The valves were intact and undamaged. There was no evidence of valve to piston face contact observed. The pistons were intact. The ring assemblies at each piston were intact and free to rotate within their respective ring land. According to the Lycoming representative, the gas path and combustion signatures observed at the spark plugs, combustion chambers and exhaust system components displayed coloration consistent with normal operation. There was no oil residue observed in the exhaust system gas path. The exhaust system was found free of obstructions.

The vacuum pump, mounted on the accessory case, remained affixed to its respective flange. The drive coupler was melted due to thermal effect. The rotor/vanes were undamaged when opened for examination. The oil suction screen was found secure and uncontaminated by any pre-mishap debris. The oil filter was destroyed by fire. There was no evidence observed of any pre-mishap lubrication system contamination found during the examination.

The turbocharger system components remained secure at their respective mountings and had sustained varying degrees of thermal effect damage resulting from the post impact ground fire. The turbocharger compressor and turbine impellers remained intact and undamaged. The turbine was free to hand rotate. The turbocharger was disassembled and remained free of pre-impact anomalies. Each exhaust system clamp was secure at each location. The exhaust bypass butterfly valve remained intact and undamaged.

All engine compartment fuel lines were found to be in place and secure at their respective fitting of each fuel system component. Each fuel system component sustained some degree of thermal effect damage that rendered them unsuitable for testing. The fuel injection servo remained securely attached at the mounting pad of the plenum. The fuel servo had sustained moderate thermal effect damage resulting from the post impact fire.

The throttle and mixture control cables were found securely attached at their respective control arms on the servo. The servo fuel inlet screen was found properly installed and free of contamination. The fuel injection servo and induction system were examined and observed to be free of obstruction. The fuel injection nozzles remained secure at each cylinder with the respective fuel line attached. The fuel pump, part number RG9080J6A/X, s/n B-551, was attached to the engine at the mounting pad. The fuel lines remained secure at their respective fittings. Removal and disassembly of the fuel pump revealed that it remained free of internal mechanical malfunction and obstruction to flow.

Propeller

The propeller was a MT-propeller Model MTV9-B, s/n 070165 installed by STC SA02695CH. The hub was secure to the engine. The composite/wooden three bladed constant speed propeller hub remained attached at the crankshaft flange. The composite/wooden propeller blades remained secure within their respective hub sockets. The propeller blades had been fractured/splintered leaving approximately 8 inches of blade remaining at each location. The detached blade sections were consumed in the post impact ground fire.

The propeller governor, a Hartzell F-4-11BZ (s/n D974UJ) was securely attached at the mounting pad with the pitch control rod securely attached at the control wheel. The governor was removed for examination. The drive was intact and freely rotated by hand. The gasket screen was free of visible contamination. The governor was disassembled.

There was no evidence of pre-impact mechanical malfunctions or failures found during the examination of the airplane that would have precluded normal operation.

Administrative Information

Investigator In Charge (IIC):	Keliher, Zoe
Additional Participating Persons:	William Kunder; Federal Aviation Administration; Reno, NV Michael McClure; Piper Aircraft, Inc.; Vero Beach, FL Mark Platt; Textron Lycoming; Williamsport, PA
Report Date:	May 14, 2014
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=84801

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