Aviation Investigation Final Report

Location:	HAWTHORNE, California	**Accident Number:**	LAX00FA208
Date & Time:	May 28, 2000, 11:59 Local	**Registration:**	N567YV
Aircraft:	Piper PA-46-310P	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	3 Fatal
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The aircraft collided with the ground in a steep nose down descent angle while maneuvering to return to the runway during the takeoff initial climb from the airport. Pilot and mechanic witnesses on the airport described the engine sounds during the takeoff as abnormal. The takeoff ground roll was over 3,000 feet in length, and the airplane's climb out angle was much shallower than usual. Two other witnesses said the engine sounded "like a radial engine," and both believed that the power output was lower than normal. One mechanic witness said the engine was surging and not developing full power; he believed the symptoms could be associated with a fuel feed problem, a turbocharger surge, or an excessively lean running condition. The ground witnesses located near the impact site said the airplane began a steep left turn between 1/4- and 1/2-mile from the runway's end at a lower than normal altitude. The bank angle was estimated by the witnesses as 45 degrees or greater. The turn continued until the nose suddenly dropped and the airplane entered a spiraling descent to ground impact. The majority of these witnesses stated that they heard "sputtering" or "popping" noises coming from the airplane. Engineering personnel from the manufacturer developed a performance profile for a normal takeoff and climb under the ambient conditions of the accident and at gross weight. The profile was compared to the actual aircraft performance derived from recorded radar data and the witness observations. The ground roll was 1,300 feet longer than it should have been, and the speed/acceleration and climb performance were consistently well below the profile's predictions. Based on the radar data and factoring in the winds, the airplane's estimated indicated airspeed during the final turn was 82 knots; the stall speed at 45 degrees of bank is 82 knots and it increases linearly to 96 knots at 60 degrees of bank. No evidence was found that the pilot flew the airplane from December until the date of the accident. The airplane sat outside during the rainy season with only 10 gallons of fuel in each tank. Comparison of the time the fueling began and the communications transcripts disclosed that the pilot had 17 minutes 41 seconds to refuel the airplane with 120 gallons, reboard the airplane, and start the engine for taxi; the maximum nozzle discharge flow rate of the pump he used is 24 gallons per minute. Review of the communications transcripts found that a time

interval of 3 minutes 35 seconds elapsed from the time the pilot asked for a taxi clearance from the fuel facility until he reported ready for takeoff following a taxi distance of at least 2,000 feet. During the 8 seconds following the pilot's acknowledgment of his takeoff clearance, he and the local controller carried on a nonpertinent personal exchange. The aircraft was almost completely consumed in the postcrash fire; however, extensive investigation of the remains failed to identify a preimpact mechanical malfunction or failure in the engine or airframe systems. The pistons, cylinder interiors, and spark plugs from all six cylinders were clean without combustion deposits. The cockpit fuel selector lever, the intermediate linkages, and the valve itself were found in the OFF position; however, an engineering analysis established that insufficient fuel was available in the lines forward of the selector to start, taxi, and perform a takeoff with the selector in the OFF position.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: A partial loss of power due to water contamination in the fuel system and the pilot's inadequate preflight inspection, which failed to detect the water. The pilot's failure to perform an engine run-up before takeoff is also causal. Additional causes are the pilot's failure to maintain an adequate airspeed margin for the bank angle he initiated during the attempted return to runway maneuver and the resultant encounter with a stall/spin. Factors in the accident include the pilot's failure to detect the power deficiency early in the takeoff roll due to his diverted attention by a nonpertinent personal conversation with the local controller, and, the lack of suitable forced landing sites in the takeoff flight path.

Findings

Occurrence #1: LOSS OF ENGINE POWER(PARTIAL) - NONMECHANICAL
Phase of Operation: TAKEOFF

Findings
1. (C) FUEL SYSTEM,TANK - CONTAMINATION,WATER
2. (C) AIRCRAFT PREFLIGHT - INADEQUATE - PILOT IN COMMAND
3. (C) IN-FLIGHT PLANNING/DECISION - INADEQUATE - PILOT IN COMMAND
4. (F) POWERPLANT - OUTPUT LOW
5. (F) UNSAFE/HAZARDOUS CONDITION - NOT RECOGNIZED - PILOT IN COMMAND
6. (F) DIVERTED ATTENTION - PILOT IN COMMAND

Occurrence #2: FORCED LANDING
Phase of Operation: EMERGENCY LANDING AFTER TAKEOFF

Findings
7. (F) TERRAIN CONDITION - NONE SUITABLE

Occurrence #3: LOSS OF CONTROL - IN FLIGHT
Phase of Operation: MANEUVERING - TURN TO LANDING AREA (EMERGENCY)

Findings
8. (C) AIRSPEED - INADEQUATE - PILOT IN COMMAND
9. MANEUVER - ATTEMPTED - PILOT IN COMMAND
10. (C) STALL/SPIN - ENCOUNTERED - PILOT IN COMMAND

Occurrence #4: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: DESCENT - UNCONTROLLED

Factual Information

HISTORY OF FLIGHT

On May 28, 2000, at 1159 hours Pacific daylight time, a Piper PA-46-310P, N567YV, collided with the ground in a shopping mall parking lot while maneuvering to return to the runway during the takeoff initial climb from the Hawthorne, California, airport. The airplane, owned and operated by the pilot under 14 CFR Part 91, was destroyed in the collision sequence and post crash fire. The private pilot and two passengers sustained fatal injuries. Visual meteorological conditions prevailed for the personal flight and no flight plan was filed. The flight was originating at the time of the occurrence as a cross-country flight to Las Vegas, Nevada.

The accident sequence was heard and observed by witnesses both on the airport and in the vicinity of the crash site.

The airport witnesses, who knew the pilot and the airplane, hold various pilot certificates, and were on the ramp at different locations around the airport. All described the engine sounds during the takeoff as abnormal in various degrees. One witness said that while the sound was "different" than he had heard coming from this airplane before, it was not unusual enough to make him stop polishing his airplane. When the witness did look at the departure end of the runway, he observed that the airplane's climb out angle was "much shallower" than he had ever seen this airplane climb before, and he believed the takeoff ground roll had been longer than usual. Two other witnesses said the engine sounded "like a radial engine" and both believed that the power output was lower than normal. These two witnesses also observed a shallow climb out angle as the airplane flew over the west boundary fence.

Additional airport witnesses included the aircraft mechanics at the Northrup-Grumman executive hangar, which is located near the mid point of the runway on the south side and almost opposite the Federal Contract Control Tower. The maintenance department's chief inspector stated that he saw the airplane on the takeoff roll, and heard the engine surging. He stated that the propeller tone did not change from a steady rpm, but that the engine was "not developing good power output" and just did not sound like it was at full power. He said, that in his experience, he associated it with a fuel feed problem, a possible turbocharger surge, or an excessively lean running condition. The engine was not missing. The exhaust tone would alternatively get loud, then fade out, and become loud again. He said that the airplane was about midfield when it rotated (about 3,000 feet down the runway). It appeared to him that the airplane had not accelerated to takeoff speed, but the pilot forced the rotation by "yanking it off the ground." He also observed that the takeoff initial climb appeared mushy. He watched the climb out to about 20 feet and then went back to work.

The ground witnesses located near the impact site were uniform in their description of the airplane beginning a steep left turn between 1/4- and 1/2-mile from the runway's end. Those witnesses, who are residents of the area, stated that the airplane's altitude was much lower during this turn than normally observed with other airplanes that are departing from the airport. The bank angle was variously estimated by the different witnesses as 45 degrees or greater. The turn did not stop after 90 degrees like most other airplanes departing the airport, but continued around until the nose suddenly dropped and it entered a spiraling descent to ground impact in the shopping mall parking lot. The majority of these witnesses stated that they heard "sputtering" or "popping" noises coming from the airplane.

The self-service automated fuel pump at the airport recorded that the pilot swiped his credit card through the machine reader at 1135:31 to turn the pump on (See AIRCRAFT INFORMATION section of this report for complete details on the fueling of the aircraft). According to the air-ground communications recording at the Hawthorne Federal Aviation Administration (FAA) Contract Tower (FCT), the pilot contacted ground control at 1153:12, stated that he had the ATIS information, and requested a clearance to taxi for takeoff. The ground controller cleared the aircraft to taxi and hold short of taxiway delta for crossing instructions. The controller subsequently cleared the aircraft to cross the runway and taxi to the approach end and the pilot acknowledged this clearance at 1153:58. The pilot reported to the local controller that he was ready for takeoff at 1157:33, and requested a downwind departure. He was issued a takeoff clearance on runway 25 with a left downwind departure at 1157:39, and the pilot acknowledged the clearance at 1157:46. Between 1157:49 and 1157:57, the pilot and the local controller exchanged transmissions about the pilot's trip to Las Vegas. By referencing a scale airport diagram, the approximate taxi distance from where the aircraft crossed the runway to the approach end of the runway is 2,400 feet. The run-up area for runway 25 is near the departure end of the runway. No distress calls were recorded on the local or ground control frequencies.

Recorded radar data in the form of primary targets and 1200 code secondary beacon returns were obtained from both the Los Angeles Air Route Traffic Control Center long range search radar antenna near San Pedro, and from the Southern California TRACON ASR-9 south-side antenna site at the Los Angeles International Airport. The primary and secondary beacon returns for this aircraft were isolated on the basis of the known takeoff time and the fact that no other aircraft were cleared for takeoff within 5 minutes either side of the accident aircraft. The targets were then plotted on a USGS 7.5 minute chart. The TRACON ARTS radar system computes average ground speed for secondary beacon targets. The wind direction and speed was recorded in the tower at the time of the accident as from 250 degrees at 9 knots. The first secondary beacon return from the west bound departing aircraft was recorded abeam the control tower with a mode C altitude report of 100 feet (the field elevation is 66 feet msl) and did not have a ground speed. The second beacon return was plotted 4 seconds later still over the runway about 700 feet east of the west boundary fence with a mode C altitude report of 200 feet and a computed ground speed of 74.7 knots. The third beacon return 4 seconds later was located about 750 feet west of the airfield boundary fence with a mode C altitude report of 200 feet and a computed ground speed of 74.7 knots. The fourth beacon return was about

1,500 feet west of the third return, with a mode C altitude report of 300 feet and a computed ground speed of 75.3 knots. The last recorded return was about 2,100 feet south-southwest of the fourth beacon return with a mode C altitude report of 400 feet and a computed ground speed of 82.0 knots. The last beacon return was noted to be about 800 feet west of the impact location.

The angle of bank versus stall speed chart for the aircraft in the Pilot's Operating Handbook was reviewed. For an airplane in a gross weight and a flaps and gear up condition, the stall speed in a 45-degree bank is 82 knots. For 60 degrees of bank, the stall speed rises linearly to 96 knots. The chart is appended to this report.

Engineering personnel at Piper Aircraft were asked by Safety Board investigators to compute a performance capability profile for a normal takeoff and climb. In the interests of conservatism, the analysis assumed a gross weight condition and a standard sea level atmosphere. The engineering analysis predicted that a normal ground roll would consist of 1,760 feet, with liftoff occurring at 77 knots indicated air speed (KIAS). The aircraft should have achieved 89 KIAS crossing runway end with an initial gear-down and flaps-up climb speed of 808 feet per minute. Normal climb speed is 110 KIAS, which should have been achieved at 200 feet agl, and the normal flaps and gear-up rate of climb would be 1,140 feet per minute.

PERSONNEL INFORMATION

Certified copies of the pilot's FAA airman and medical certification files were obtained for review. According to the files, the pilot held a private pilot certificate with airplane ratings for single engine land and instruments. The most recent issuance of the certificate was dated May 25, 1993, when the pilot passed his instrument airplane practical flight test. A third-class medical certificate was issued on May 13, 1999, with the limitation that he must possess correcting lenses for near vision while exercising the privileges of his airman certificate.

No personal flight records were recovered for the pilot. On the application for his May 13, 1999, medical certificate, the pilot stated that his total flight experience was 1,900 hours. On a May 20, 2000, application for the renewal of his aviation insurance policy, the pilot stated that he had 2,550 total hours, with 1,250 in the PA-46-310P. According to FAA aircraft registry records, the pilot has owned the airplane since October 1990.

At the request of Safety Board investigators, The New Piper Aircraft, Inc., reviewed factory records of the formal pilot training courses offered for the PA-46 series airplanes. No records were found that the pilot attended any formal factory course from 1997 through the date of the accident. According to Piper, a training vendor change occurred in 1997, and the previous company is no longer in business and no records exist prior to 1997.

Information provided to Safety Board investigators led to the identification of a flight instructor who endorsed a biennial flight review for the pilot in May 1999. The instructor stated that he had been an instructor with the Piper factory PA-46 training program throughout the 1980's.

The instructor reported that he had provided recurrency flight and ground training to the pilot for the last 5 years. The most recent session was in May 1999, and included 7 hours of ground instruction and 4 hours of flight instruction in the pilot's airplane. At the conclusion of the sessions, the instructor endorsed the pilot's logbook for an instrument competency check, a biennial flight review, and the recurrency training required by the pilot's insurance policy.

AIRCRAFT INFORMATION

The aircraft's maintenance records were presented by family members to Safety Board investigators for review following a search of his business and residence for the records. In addition, the Aircraft and Aircraft Registry files maintained by the Federal Aviation Administration at the Aircraft Registry in Oklahoma City, Oklahoma, were reviewed for historical information.

Review of these records disclosed that the airframe, serial number 46-8408016, was manufactured by the Piper Aircraft Corporation in January 1984. The pilot purchased the airplane on September 19, 1990. The two most recent annual inspections were accomplished on August 21, 1999, and July 1, 1998, at total airframe times of 2,946 and 2,746 hours, respectively. The records note that Airworthiness Directives applicable to the airframe were complied with through 99-15-04. The recording hour meters in the airplane were destroyed in the accident sequence and no information was available on the total time as of the accident.

The Teledyne Continental TSIO-520-BE1B engine, serial number 273651-R, was remanufactured by the factory on October 29, 1990, and was installed in the airframe on December 21, 1990, at an airframe total time of 1,813 hours. The two most recent annual inspections corresponded to those recorded for the airframe; the engine total time recorded on the August 20, 1999, annual inspection was 1,132 hours. During this last annual inspection, the No. 3 cylinder was removed for overhaul, and subsequently reinstalled on the engine. New magnetos and a new ignition harness were also installed at that time. On September 1, 1997, all six cylinders were removed and then replaced with overhauled units.

The records also disclosed that the airplane had been modified with the installation of several items of equipment under Supplemental Type Certificate (STC) approval authority. The following is a list of the major modifications, the date installed, and the STC number:

1. Graphic Engine Monitoring System; 12/21/90; STC SA157NE 2. Wing SP9000 Spoilers; 03/18/92; STC SA5196NM 3. Increased Fuel Capacity Filler Ports; 12/19/95; STC SA00859AT 4. MT MTV-14-D 4-bladed wooden propeller and spinner assembly; 11/21/98; STC SA01542AT.

Concerning the propeller modification, the STC holder supplied the Safety Board investigators with the following information. The European certificated constant speed propeller is manufactured in Austria by MT-Propeller Entwicklung GmbH & Company and has been issued a US Type Certificate (P3BO). It consists of a conventional metal hub and hydraulically

actuated pitch change mechanism coupled with four wooden core blades. The blades have integral steel rods incorporated into the metal blade butts that are in turn secured by conventional clamps into the hub. The internal steel rods in the blades are surrounded by glued-up wooden bodies that provide the blade shape and contour. The wooden blade bodies are further covered by thin composite skin and have a stainless steel leading edge abrasion strip. The diameter is about 70 percent of the 2-bladed metal propeller originally installed, and the principal advertised application of this propeller is a reduction in noise signature coupled with an increase in cruise performance.

Piper Aircraft Corporation was asked if they had any information on the MTV-14 propeller installation on the Malibu/Mirage series. According to Piper, in 1998 they evaluated the propeller for installation in the PA-46-350 Mirage and performed some limited cruise and climb performance tests. The MTV-14 did not perform as well as the standard propeller in some conditions. Takeoff performance tests were not performed. Piper said they elected not to use the MTV-14 propeller due to concerns over oxidation/corrosion of the leading edge strip, and the lack of firm data on the lightening and icing protection capability of the propeller.

According to Piper Aircraft, the fuel system for the PA-46-310P consists of wet-wing fuel tanks, one in each wing, with a capacity of 61 US gallons each, for a total of 122 gallons. One gallon in each tank is unusable. The aircraft maintenance records, the FAA Aircraft Registry file, and physical examination of the wreckage disclosed that it had been modified on December 19, 1995, with the installation of fuel filler ports outboard of the factory ones on each wing under STC SA 00859AT; this modification added 10 US gallons to the capacity of each tank.

Fueling facility records at the Hawthorne airport revealed that the airplane was fueled prior to takeoff with the addition of 120.2 gallons of 100LL aviation gasoline. According to the fueling facility at Hawthorne, the pump used by the pilot is a self-service pump, where you swipe a credit card to enable the pump. The time stamp on the receipt, 1135:31, is the time he swiped his credit card through the reader to turn on the pump. The fueling facility reported that the pump utilized by the pilot to refuel the airplane has a maximum discharge capacity at the nozzle of 24 gallons per minute. Other airplanes fueled before and after the accident airplane completed flights without difficulty.

According to family members and employees of the pilot's business, he had taken the airplane in December 1999 on a trip to points in the Caribbean and had returned after Christmas. No one could recall any flight activity by the pilot in the accident airplane between December and the accident flight. Security Aviation at the Hawthorne airport is the only fuel concessionaire on the field. A search of their records disclosed that the first record of the accident aircraft refueling prior to the accident flight was on December 21, 1999, when the pilot purchased 87.4 gallons. Safety Board investigators telephonically contacted all known aircraft fueling facilities in the greater Los Angeles area requesting information on any fuel purchases between December 1, 1999, and the date of the accident under either the pilot's name or the aircraft registration number. There were no records of any fuel purchases during this time frame.

Records at the Hawthorne Municipal Airport administration office disclosed that the pilot rented an outside tie down space from the airport. Checks with the Fixed Base Operators on the airport with hangar space to rent disclosed no record of temporary hangar space rental by the pilot for the time frame from December 1999 to the date of the accident. The rainy season in the Southern California area extends from December to April.

The mechanic who performed the most recent annual inspection was contacted. He stated that he holds an FAA Inspection Authorization and had done the last annual he was aware of in August 1999; however, he did not retain any records (inspection sheet, work orders etc.). He said that the pilot had all of the records pertaining to the annual. He reported that he has done the last four or five annuals on the airplane and does not recall it having any major problems. He said that it was a very well maintained airplane, and the pilot complied with all Service Letters, Service Bulletins, and Airworthiness Directives as they were issued.

METEOROLOGICAL INFORMATION

At 1208, the aviation surface weather observation for the Hawthorne Airport was reporting in part: Sky clear; visibility 10 miles; temperature 79 degrees Fahrenheit; dew point 61 degrees Fahrenheit; wind from 250 degrees at 9 knots; and an altimeter setting of 29.92 inHg. No wind gusts or other unusual atmospheric phenomena were observed by any witness.

COMMUNICATIONS

Review of the recorded air-ground communications tapes at the Hawthorne Federal Contract Control Tower revealed that the airplane first contacted ground control at 1153:12 for clearance to taxi for takeoff. The aircraft next communicated with the local controller at 1157:33, when the pilot reported ready for takeoff. During the review of the recordings, no distress calls were heard.

AERODROME INFORMATION

At an elevation of 66 feet msl in the city of Hawthorne, the Hawthorne Municipal Airport is bordered on all sides by commercial manufacturing, retail sales, and residential buildings. Beyond city streets, no open areas exist within 1 mile or more of the west field boundary fence. The airport has one concrete runway, 4,956 feet long by 100 feet wide, which is oriented on a magnetic bearing of 251 degrees.

WRECKAGE AND IMPACT INFORMATION

The accident site is in the rear parking lot of a fast food restaurant at the corner of Birch Avenue and El Segundo Boulevard in the city of Hawthorne. With reference to a scale map of the area, the site was determined to be about 3,000 feet from the departure end of runway 25 on a magnetic bearing of 235 degrees.

An oval shaped 3 by 2 foot crater was found in the parking lot directly behind the restaurant; fragments of propeller hub and the butt ends of propeller blades were found in the crater. Assuming the crater to be the face of a clock with the 12 o'clock position oriented to the north, five slash-like scars were noted over an arc from the 4 to 9 o'clock positions with the nearest end of the closest scars about 12 inches from the center of the crater. The distances in inches between the five scars were measured at 18, 16, 15.5, and 20 inches, respectively.

A long thin ground scar consisting of color transfer and scratches in the asphalt was noted that extended on a 240 to 060 bearing line on each side of the crater, and was about 24-inches below the southern crater lip. At the western end of this line, fragments of red glass material were found imbedded in the asphalt. The color transfer consisted of separate lines of white and black material, with the black color on the northern side and the white transfer on the southern side. No smearing of the transfer was observed on the west side of the crater; however, to the east of the crater the color was smeared toward the east. From the red glass fragments to the center of the crater, a distance of 25 feet 11 inches was measured. The tip-to-tip wingspan of the PA-46-310P is 43.0 feet. The accident aircraft was equipped with leading edge de-ice boots.

While on the accident site, investigators noticed a video surveillance camera mounted on a pole at the rear of the restaurant overlooking the area surrounding the crater. With the assistance of the Hawthorne Police Department, the video recording medium from the camera was downloaded and 5 frames recorded over the 1-second interval time stamped 1153:28 were printed to hard copy (all 5 frames are appended to this report).

Frame No. 1 shows the asphalt parking lot with the eventual crater location nearly centered in the frame. The shadow of the airplane can be seen in center frame in what appears to be a near vertical nose down descent. The wings and all empennage surfaces are visible in the frame, with the fuselage top oriented to the north, and the wings nearly aligned with the eventual color transfer ground scar. Shadow lines in the proper locations to represent the landing gear are visible beneath the wings. Individual propeller blades are not visible in the frame.

Frame No. 2 shows the long thin color transfer already deposited on the asphalt and a fuselage structure that has collapsed to about 5-feet in length. The vertical stabilizer and rudder are visible. A white colored cloud is beginning to form around the aircraft.

In frame No. 3, the aircraft has moved east of the crater toward a concrete trash bin wall and Birch Avenue. The outboard 2/3 of an unidentified wing is visible pointing up and the white colored cloud has fully enveloped the wreckage. Frame Nos. 4 and 5 show the progressive growth of a large fireball.

Fragments of white colored wood splinters were observed distributed over the parking lot in a wide arc from west through north to east. Some fragments had composite material bonded to one side and one large fragment displayed a decal like sticker with the word "Flugplatz."

A 6-foot-high concrete wall surrounding a trash bin was located about 20 feet north east of the crater. The wall was heavily sooted and thermally damaged metal components later identified as right wing structure were located within the walled enclosure and in the trash bin. A section of thermally affected wing skin panel that contained the fuel filler port was found in the enclosure. The fuel cap was in place in the filler opening and locked.

A large ground mounted utility power transformer was located just beyond the concrete wall. The transformer was thermally damaged and was lying on its side, pointed toward the east. Propeller and engine compartment contents were found distributed along the distance between the concrete enclosure and the power transformer.

The outer left wing panel with aileron attached was found on the sidewalk beyond the transformer. The bottom portion of the flap remained attached to the hinges and hangars on this portion of the wing. The wing section was thermally damaged and sooted. The flush mounted fuel filler cap was in place and locked. The leading edge of the wing panel was accordioned back to the main spar, with the leading edge tip folded up and back. The wing section had de-ice boots installed.

The fuselage was found right side up in the southbound lanes of Birch Avenue with the nose oriented toward the south. The inboard left wing remained associated with the fuselage in the normal manner. The entire fuselage and the inboard portion of the left wing were thermally destroyed. The burned remains of the vertical and left horizontal stabilizers and their associated flight control surfaces remained in the correct placement and orientation with respect to the fuselage remains. The right horizontal stabilizer and elevator were reduced to molten metallic ash; however, the remains were noted to measure the approximate dimensions of the left side. The ashen remains of the inboard portion of the right wing remained associated with the fuselage.

Cockpit contents and debris associated with the cabin were found scattered in a fan-shaped arc to the southeast of the fuselage.

Examination of the thermally destroyed wreckage disclosed that the actuators for the landing gear were in the down position, with the locks engaged. The flap actuator was found positioned at approximately 2 inches of extension, which according to Piper Aircraft, equates to 7 degrees. The elevator trim tab actuator was observed with 10 threads showing on the jackscrew. According to information supplied by Piper, this equates to about 6 degrees of nose up trim. The main cabin entry doorframe was recovered from the ashen remains of the rear cabin; the door locking mechanism was in the closed/locked position, and all pins and hooks were in their extended/locked positions.

The thermally affected airspeed indicator was recovered from the left side of the cockpit ash debris. The indicator needle was at 43 knots, and examination of the face with a 10-power loupe revealed needle-sized marks at 50 and 65 knots. The fuel selector handle was in the off

detent.

Within the ashen remains of the fuselage, the empennage primary and secondary steel control cables remained in the approximate geometry of their cable runs from the remains of the cockpit controls to the flight control surfaces. The aileron cables also remained in their approximate cable runs from the cockpit controls to the wing roots. The cables for the right and left wing aileron controls were separated beyond the wing root rib location, with broom strawing evident at the separation points.

The thermally destroyed remains of what appeared to be three overnight luggage bags were noted in the area of the rear baggage compartment. The contents appeared to be burned clothing and toilet articles. While a weight could not be estimated for this material, no objects of significant mass or anticipated weight were observed.

MEDICAL AND PATHOLOGICAL INFORMATION

The pilot and both passengers sustained fatal injuries. Autopsies were conducted by the Los Angeles County Coroner/Medical Examiner, with specimens retained for toxicological examination by both the Medical Examiner's office and the FAA Civil Aeromedical Institute.

The results of the toxicological tests on the pilot's specimens were negative for carbon monoxide, cyanide, and ethanol. The substances ephedrine, pseudoephedrine, and phenylpropanolamine were detected in samples of the pilot's blood, and in tissue samples of his liver and kidney.

According to standard pharmacological references, all three substances are available in various over-the-counter preparations, and are often found together in herbal dietary supplements and weight loss products. Pseudoephedrine is a common decongestant under the trade name Sudafed; it does not usually result in impairment and has been shown to exhibit stimulant effects. Ephedrine is sold as an asthma medication under the trade name Primatene; it does not usually result in impairment and has also been shown to exhibit stimulant effects. Phenylpropanolamine is marketed in several weight loss products, is also an over-the-counter decongestant, and is also a metabolite of ephedrine and pseudoephedrine.

No carbon monoxide or cyanide was detected in blood samples from the two passengers.

TESTS AND RESEARCH

1. Engine Teardown

The engine was disassembled for examination following recovery of the wreckage. Comparison of the data plate information revealed that the serial number matched the maintenance record information. It sustained both thermal and impact damage. Thermal destruction was noted to all hoses and electrical wires from the firewall to the engine

accessory section. The ignition harness was thermally destroyed. With the exception of the right magneto, all accessories sustained near destruction by either thermal processes or impact damage. The right magneto was broken from its mount and exhibited thermal damage; it would rotate, but would not produce sparks at any leads.

The fuel pump and the metering unit were damaged by impact and thermal processes. The fuel lines forward of the pump/metering unit, and the distributor, were thermally damaged. Injector nozzles Nos. 2 and 4 were destroyed. Injector nozzles Nos. 1, 3, 5, and 6 were clear.

The induction and exhaust risers and tubes were broken and crushed in various places, with portions of the induction tubing melted. The upper deck tubing was crushed and burned.

The throttle body was broken into two sections. The control linkages were stretched and broken. The butterfly valve was in the full open position. The turbocharger waste gate controller and valve house were impact damaged; the valve was found about 90 percent closed.

Cylinder heads Nos. 1, 5, and 6 were impact damaged, with the forward rocker arm bodies broken off. The rear rocker arm body for cylinder No. 6 was also broken. All cylinders, the oil pan, and the case halves were thermally affected.

The oil pan was crushed upwards. Following removal from the case, the oil pan exhibited a pattern of scoring and gear teeth marks in an area directly below the cam gear in the rear of the engine. The scoring, with metal removal, was observed on each side of the gear teeth impressions. The impressions of the gear teeth were compared to the size of the gear teeth and found to be about twice as wide as the teeth on the gear. No metal debris was observed in the oil pan interior. Gross visual examination of the engine interior from the bottom revealed no unusual operating signature or condition.

Both turbochargers were broken from their mounts and exhibited both thermal and impact damage. Both turbocharger wheels were frozen and could not be moved. The scroll housings over the compressor impellors were removed. The impellor blade tips were bent slightly opposite the direction of rotation and scoring was evident to the scroll-housing interior. Once the compressor housings were removed, the wheels of both turbochargers would rotate. No metallic debris was noted in the exhaust gas path and the turbine wheels for both turbochargers were undamaged.

The oil pump and suction screen were clean of debris. The oil pump impellors were undamaged.

All six cylinders were removed from the case. The piston crowns appeared to be in a near new condition, with very light combustion deposits evident. The cylinder combustion chambers had very light combustion deposits, and the intake and exhaust valves were unremarkable. The spark plugs were Champion RHB-32S and were a very light gray color and clean of

deposits. No scoring was observed on the pistons or cylinder barrels. The rings were intact on each piston.

Internal examination of the case disclosed a smeared pattern of governor drive gear teeth impressions in the case nose section. No scoring or heat distress was observed on any journal or bearing.

2.0 Fuel Selector Position

The fuel selector system from the cockpit lever to the selector valve was isolated for detailed study. The cockpit lever handle was found securely in the OFF detent. The lever arm is attached to linkages, which move a cable that actuates another lever arm on the valve body. The linkage positions and amount of exposed cable from the cable housing to the arm attach bolt were measured in comparison to factory drawings; the positions of all components were consistent with the OFF position. With the aid of drawings, the ports for line connections to each fuel tank and the engine were identified. The valve body actuating arm was found in the full OFF position. The valve body was opened following the scribing of reference marks. The internal valve cock was found in the OFF position.

3.0 Fuel Consumption for Start, Taxi and Takeoff

Piper Aircraft and Teledyne Continental were asked by Safety Board investigators to determine the amount of fuel contained in the lines from the selector to the cylinder injectors, and, the amount of fuel required to start the engine, taxi for 3 minutes and complete a takeoff. The fuel quantity in the lines was estimated by Piper to be about 0.35 gallons. The minimum fuel necessary to start the engine, taxi, and complete a takeoff was 3.0 gallons.

4.0 Propeller Blade Reconstruction

As noted in the wreckage and impact section of this report, the 4-bladded wooden propeller shattered and was widely scattered around the impact crater. During recovery of the aircraft, attention was paid to collecting all the fragments. Careful sorting of the wreckage debris following recovery isolated the fragments, which could be associated with the propeller. The propeller hub was fragmented into six major pieces, with some smaller fragments; the majority of these were found in the impact crater. The hub's rear face and crankshaft attaching flange remained attached to the crankshaft. The remaining hub pieces were reconstructed into the approximate shape of the hub; all fractures were irregular and granular. All four blade butts and their associated hub clamps were identified. The internal steel rods in each blade were identified and compared for length; the rods were equal. All four abrasion strips were identified in the wreckage and compared for length; the strips were equal.

ADDITONAL INFORMATION

With the exception of one engine cylinder, the wreckage was released to an insurance adjuster

for USAIG, who was representing the pilot's estate, on November 30, 2000, at the conclusion of the wreckage examinations. At the time of release, the wreckage was located at the facilities of Aircraft Recovery Services in Compton, California.

One cylinder from the engine was retained for further analysis and was shipped to the Teledyne Continental factory in Mobile, Alabama. Tracking documents from the freight firm show that the cylinder was received in the Continental factory on September 14, 2000. Subsequent conversations with factory personnel to arrange for Safety Board supervision of the planned examinations revealed that the cylinder could not be located in the Bond Storage room. Teledyne Continental personnel attempted to locate the shipment during the course of the next 4 months without success. On February 7, 2001, the company formally acknowledged that they in fact received the shipment on September 14, 2000, but could not locate the cylinder in the factory. The relevant correspondence concerning this event is appended to this report. As of the date of this report, the cylinder remains missing.

Pilot Information

Certificate:	Private	**Age:**	46,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
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 3 Valid Medical--w/ waivers/lim	**Last FAA Medical Exam:**	May 13, 1999
Occupational Pilot:	No	**Last Flight Review or Equivalent:**	
Flight Time:	2550 hours (Total, all aircraft), 1250 hours (Total, this make and model)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N567YV
Model/Series:	PA-46-310P PA-46-310P	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	46-8408016
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	August 21, 1999 Annual	**Certified Max Gross Wt.:**	4100 lbs
Time Since Last Inspection:		**Engines:**	1 Reciprocating
Airframe Total Time:		**Engine Manufacturer:**	Continental
ELT:		**Engine Model/Series:**	TSIO-520-BE
Registered Owner:	ANDREW J. LOWE	**Rated Power:**	310 Horsepower
Operator:		**Operating Certificate(s) Held:**	None
Operator Does Business As:		**Operator Designator Code:**	

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	HHR ,66 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	12:08 Local	**Direction from Accident Site:**	85°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	None	**Visibility (RVR):**	
Wind Speed/Gusts:	9 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	250°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	79°C / 61°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	(HHR)	**Type of Flight Plan Filed:**	None
Destination:	LAS VEGAS , NV (LAS)	**Type of Clearance:**	VFR
Departure Time:	11:58 Local	**Type of Airspace:**	Class D

Airport Information

Airport:	HAWTHORNE MUNICIPAL HHR	**Runway Surface Type:**	Concrete
Airport Elevation:	66 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	25	**IFR Approach:**	None
Runway Length/Width:	4956 ft / 100 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	2 Fatal	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	On-ground
Total Injuries:	3 Fatal	**Latitude, Longitude:**	33.909965,-118.339202(est)

Administrative Information

Investigator In Charge (IIC):	Rich, Jeff
Additional Participating Persons:	MICHAEL ARNOLD; EL SEGUNDO , CA R. S BOYLE; ARVADA , CO CHARLES LITTLE; CHINO , CA
Original Publish Date:	January 2, 2002
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=49294