National Transportation Safety Board
Aviation Accident Final Report

Location:	PRESCOTT, AZ	**Accident Number:**	LAX93FA274
Date & Time:	07/04/1993, 0320 MST	**Registration:**	N9667C
Aircraft:	CESSNA T303	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	5 Fatal
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

THE FLIGHT HAD DEPARTED AT 0318. RADAR & COMMUNICATIONS DATA SHOWED THAT THE FLIGHT REMAINED IN THE TRAFFIC PATTERN. THE AIRPLANE CRASHED SHORT OF RUNWAY 21; THE GEAR WAS EXTENDED AND THE FLAPS WERE IN THE FULL-DOWN POSITION. WITNESSES INDICATED THAT THE PILOT HAD BEEN DRINKING BEFORE DEPARTING. THE PILOT'S TOXICOLOGICAL RESULTS WERE POSITIVE FOR ALCOHOL; 11.0 MG/DL (0.01%) ETHANOL CONCENTRATION IN THE URINE.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: THE PILOT MISJUDGING DISTANCE AND ALTITUDE DURING A NIGHT APPROACH. FACTORS WHICH CONTRIBUTED TO THE ACCIDENT WERE: THE PILOT'S IMPAIRMENT DUE TO FATIGUE EXACERBATED BY ALCOHOL CONSUMPTION, THE DARK NIGHT, AND THE HIGH DENSITY ALTITUDE AND TURBULENT WEATHER CONDITION.

Findings

Occurrence #1: UNDERSHOOT
Phase of Operation: APPROACH - VFR PATTERN - BASE LEG/BASE TO FINAL

Findings
1. (F) WEATHER CONDITION - TURBULENCE
2. (F) WEATHER CONDITION - HIGH DENSITY ALTITUDE
3. (F) LIGHT CONDITION - DARK NIGHT
4. (C) DISTANCE - MISJUDGED - PILOT IN COMMAND
5. (C) ALTITUDE - MISJUDGED - PILOT IN COMMAND
6. (F) FATIGUE(LACK OF SLEEP) - PILOT IN COMMAND

Occurrence #2: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: APPROACH - VFR PATTERN - BASE LEG/BASE TO FINAL

Factual Information

History of the Flight

On July 4, 1993, about 0320 hours mountain standard time, a Cessna T303, N9667C, collided with terrain about 2,000 feet short of the approach end of runway 21 at Ernest A. Love Field in Prescott, Arizona. The airplane was destroyed. The commercial pilot and four passengers were fatally injured. The airplane was being operated as a personal flight. The local flight departed Love Field about two minutes before the accident. Night visual meteorological conditions prevailed at the time.

The accident airplane arrived at Love Field about 2300 hours on July 3, 1994. An airport operations specialist employed by the City of Prescott greeted the airplane to see if the pilot needed fuel. Three males got out of the airplane, one of which was carrying a can of beer. One occupant of the airplane replied to the operations specialist fuel inquiry and stated, "Not right now, maybe later or in the morning." The operations specialist asked the three men if they had a place to stay and they indicated they were meeting friends.

The night manager of the Airport Centre Motel, located off the west boundary of Love Field, noticed the three men walking from the airport 2330 hours on July 3, 1994. The motel manager stated all three men were drinking beverages from cans. The manager was unable to state the type of beverages they were drinking.

At 2300 hours, July 3, 1994, the girl friend of one of the airplane's passengers received a call from her boy friend requesting a ride from Love Field to "downtown" Prescott. The girl friend met her boy friend with two other friends. According to the girl friend, all three men were holding beer cans. The girl friend dropped the men off in the downtown area with plans to meet later.

Approximately 0100 hours July 4, 1993, three females were leaving the Palace Saloon in downtown Prescott. The women were approached by three men on the sidewalk. One of the men identified himself as a pilot to the women. One of the women did not believe him and being associated with pilots in the past she asked him, "How many hours do you need [from] bottle to throttle?" The pilot responded, "Eight, but I guess I will have to break that rule tonight."

The six walked on the sidewalk continuing the conversations. The woman who previously challenged the pilot walked along side him. She described him as quiet, friendly, not intoxicated, and at one point apologetic for being quiet. The pilot expounded on his quietness by stating he was very tired, and that he had been in Laughlin, Nevada, the night before, worked all day, rented the airplane, and then flew to Prescott.

As the evening progressed, the group went to a restaurant, ate, and walked to the women's hotel. The men solicited a ride to the airport and the women agreed. During the ride to the airport, two of the men were talkative but the pilot remained quiet. The pilot was observed closing his eyes with his head back.

The group arrived at the airport about 0245 hours. The men offered to show the women the airplane. The pilot opened the airplane and moved into the cockpit. The woman, who earlier challenged the pilot, asked one of the other men, "Why is the pilot so quiet, is he drunk?" The other man said, "No, he only had a few drinks."

The woman then heard the pilot and the other man talking in the cockpit. The pilot was trying to turn on the pilot-controlled airport lighting. The woman heard the other man tell the pilot to "stop clicking the button so many times, and that it was supposed to be three clicks and then stop."

The men then offered the women a 10-minute ride in the airplane. The woman who earlier challenged the pilot refused. Her two friends accepted and got into the airplane and she went back to their vehicle and waited.

At 0254 hours, the pilot contacted the Prescott Flight Service Station (FSS) on frequency 122.4 Mhz and asked about the pilot- controlled lighting system. The pilot indicated that he tried to activate the lights but was unsuccessful. After consulting the Airport/Facility Directory, the air traffic control (ATC) specialist informed the pilot the lights were pilot activated on frequency 125.3 Mhz. The ATC specialist then heard seven "clicks" on 122.4 Mhz. He advised the pilot that he was still on 122.4 Mhz. The pilot replied, "Thank you, sir, we got 'em."

At 0259 hours, the ATC specialist asked the pilot if he needed any further assistance. The pilot indicated that further assistance was not needed. The ATC specialist then issued the Prescott altimeter setting, 29.92 inHg, and asked the pilot if he had the flight precaution for turbulence. The pilot responded he did not. The ATC specialist issued AIRMET Tango for occasional moderate turbulence below 20,000 feet. The pilot then acknowledged he had received it. There were no further communications between the pilot and the Federal Aviation Administration ATC specialist.

FAA radar data from Albuquerque Center tracked a single aircraft in the Love Field traffic pattern at 0319 hours. The radar data listed ten positions corresponding to right traffic off runway 21. The radar data indicates the tracked airplane reached an altitude of 6,500 feet mean sea level (msl), or about 1,500 feet above the ground.

Pilot Information

First Pilot

The first pilot held a commercial pilot certificate with airplane single and multi-engine land and instrument-airplane ratings. The most recent first class medical certificate was issued to the pilot on July 30, 1992, and contained the limitation that correcting lenses be worn while exercising the privileges of his airman certificate.

The pilot's logbook listed his total aeronautical experience at approximately 550 hours, of which about 105 hours were accrued in multi-engine airplanes. Review of invoices at Sawyer Aviation revealed the pilot had rented Cessna T303 aircraft on about twenty occasions in the past, accruing about 40 hours of flight experience.

The pilot's family indicated he returned from work at 1415 hours on July 3, 1993, after completing a normal shift that started at 0600 hours. The pilot then ate and left. At 1500 hours, a friend of the pilot received a telephone call from him. The pilot told him he was tired and was going to get some sleep. About 2100 hours, the pilot was at the Sky Harbor Airport and rented the accident airplane.

Second Pilot

Operation of the Cessna 303 does not require a second pilot; however, a second pilot was seated in the right front seat and had access to the flight controls. The second pilot held a

commercial pilot certificate with airplane single and multi-engine land and instrument-airplane ratings. The most recent first class medical certificate was issued to the second pilot on September 23, 1992, and contained no limitations.

No personal flight records were located for the second pilot and the aeronautical experience listed on Supplement E of this report was obtained from a review of the airmen FAA records on file in the Airman and Medical Records Center located in Oklahoma City.

Meteorological Information

The Prescott FSS is the closest official weather observation station. The FSS is located about one nautical mile southwest of the accident site. At 0252 hours, a scheduled recorded surface observation was reporting in part: Sky condition and ceiling - clear; visibility - 15 statute miles; temperature - 64 degrees Fahrenheit; dew point - 47 degrees Fahrenheit; surface winds - 170 degrees at 4 knots; altimeter - 29.92 inHg.

Aerodrome and Ground Facilities

Ernest A. Love Field is owned and operated by the City of Prescott, Arizona. The published elevation of the airport 5,042 feet msl.

The airport has two intersecting hard surfaced runways on a 210- to-030 degree and 110-to-290 degree magnetic orientation. Runway 21 is 7,616 feet long by 150 feet wide and is equipped with medium intensity runway lights, a medium intensity approach lighting system with runway alignment indicators, runway end identifier lights, and a visual approach slope indicator. The elevation of Runway 21 at the approach end of the runway is 4,958 feet msl.

The last annual Part 139 Certification/Safety Inspection of the airport was conducted by the FAA on July 6-8, 1992. Four discrepancies were noted with the airport's lighting system, none of which were associated with Runway 21. Airport personnel stated that there were no difficulties with the runway and taxiway lighting systems prior to, or at the time of, the accident.

The airport facility was subsequently inspected on August 4-5, 1993, by the FAA Western Pacific Region Airport Certification Division. At the request of the National Transportation Safety Board, the FAA Safety/Compliance Inspector tested the airport's pilot controlled lighting system. According to the FAA inspector, the airport's pilot-controlled lighting system "responded normally to all commands," and there were no discrepancies noted in the FAA report.

Wreckage and Impact Information

The airplane came to rest about 2,000 feet from the approach end of Runway 21 and about 120 feet south of the centerline. The nose of the airplane was oriented on a 210-degree magnetic azimuth and was resting against a five-foot high man made embankment. The initial impact point was marked by an approximate three-foot long ground disturbance aligned with the longitudinal axis of the airplane's right wing. The ground disturbance was approximately the same width as the chord of the right wing tip.

The right wing was bent upward at the tip. The green position light and landing light were broken. Pieces of the green position light were found on the embankment forward of the right wing tip. The paint on the bottom of the wing was scratched along the wing's longitudinal axis and aligned with the ground scar axis.

The right wing fuel tank was ruptured and there was no fuel found in the tank. The leading edge sheet metal was separated at a row of pulled rivets from the right wing tip to the engine nacelle exposing the interior of the right wing and its integral fuel tank. Fuel was found in the lines from the tank to the right engine.

The left wing fuel tank was also ruptured and there was no fuel found in the tank. Holes in the aft outboard section of the wing compromised the fuel tank's integrity. Fuel was found in the lines from the tank to the left engine. The left rear inlet float valve was found to have debris partially blocking the inlet. The airplane's airframe logbook indicated that a recent Airworthiness Directive AD 93-05-03, to operationally check the inlet fuel valve, had been complied with on March 31, 1993. The airworthiness directive does not require the fuel inlet valve be visually inspected for debris in the inlet screen.

The landing gear was found extended. The airplane landing gear handle was found in a mid range position about 1/2 inch up from the full down position. Both the right and left main landing gears were broken at the wheel link. The main gear struts did not collapse. The wings were supported by the struts and not touching the ground. Two ground scars were found to the right of the main gear struts. The ground scars were oriented in the same direction as the ground disturbance located off the right wing.

The nose gear was collapsed. The strut and wheel assemblies were aft of the extended position and embedded in the belly of the airplane.

The airplane's flap handle and flaps were found in the full-down position. The flap jackscrew extension was about 6.5 inches. According to Cessna Aircraft Company, the measurement corresponded to a 30-degree flap setting.

The airplane's fuselage came to rest on the gear. The wing spars between the main landing gear were bent downward. A circumferential split in the fuselage was found on the right side opposite the aft post of the airplane's entry door. There was a break in the empennage at the dorsal fin where the vertical stabilizer attaches.

The right propeller separated from its mounting flange a few feet to the right, at the base of the embankment. One propeller blade separated and was buried a few feet to the right of the propeller hub in the soil of the embankment. The separated blade exhibited diagonal scoring across its chord width on the blade's cambered side and leading edge nicks.

One other blade was found turned in the hub in a high pitch angle position. The propeller blade was bent opposite to its direction of rotation. The blade actuating links for the separated propeller blade and bent propeller blade were visible through a break in the hub at the separated propeller. The actuating links were found bent with its dowel pin holes elongated.

The right propeller's third blade remained attached to the hub and was in a low pitch angle position. The blade exhibited leading edge nicks and damage to the leading edge of the deice boot.

The left propeller remained attached to the engine. All three blades were found secure in the hub at a low pitch angle. One propeller blade was found at a twelve o'clock position and was not damaged. A second blade was positioned under the engine and bent aft. The third blade was positioned to the left and was partially buried in the soil at the base of the embankment. The third blade was found relatively undamaged after it was excavated from the soil.

Examination of the throttle quadrant revealed the throttle, propeller, and the mixture levers

were all positioned aft. The right propeller lever was aft of the detent in the feather position.

Medical and Pathological Information

Post mortem examinations of the pilot and right front seat passenger were conducted by the Yavapai County Medical Examiner's Office on July 5, 1992, with specimens retained for toxicological examination. According to the Medical Examiner's report, the cause of death for the pilot was attributed to basilar skull fracture. The cause of death for the four passengers was attributed to a fracture of the cervical spine.

Toxicological specimens were sent to the FAA's Civil Aeromedical Institute (CAMI) for analysis. CAMI's toxicological analysis revealed positive results for alcohol in the pilot and right front seat passenger. The pilot's urine sample was determined to have a concentration of 11.0 mg/dl of ethanol. The passenger's blood was determined to have a concentration of 11 mg/dl of ethanol in the blood and 28 mg/dl in urine.

Tests on the pilot's blood and urine revealed negative results for carbon monoxide, cyanide, and negative for a drug screen that included major drugs of abuse. Copies of the toxicological reports are included as part of this report.

Tests and Research

Engine Examination

The engines were examined on July 28, 1993, at Lynn's Aircraft Engines, Inc., El Monte, California. Continuity of all reciprocating and rotating parts was established. All the cylinders produced compression during the continuity check.

Both magnetos of each engine produced electrical arcing through their respective spark plug harnesses. The spark plugs exhibited the proper gap and revealed normal electrode wear patterns. The black sooty deposits on the left engine spark plugs were compared to the Champion aviation spark plug illustrations. According to Champion Spark Plug Company, the black soot is the result of a rich idle mixture setting.

There were no discrepancies found with either engine fuel systems. The engine driven fuel pumps rotated and produced a vacuum at the fuel inlet. The manifold valve filter screens were clean and contained a small quantity of fuel. There was no evidence of debris in the left engine fuel system similar to the debris found in the left rear inlet float valve.

Turbocharger Examination

The turbochargers were examined at manufacturer's facilities on July 29, 1993, in Torrance, California. Both turbocharger systems received slight impact damage. There was rubbing found in the left engine turbocharger compressor. The examination revealed the backplate bolts were loose which allowed end play in the turbine shaft. The manufacturer attributed the rubbing to the end play and attributed the end play to improper torque of the backplate bolts.

According to the turbocharger data plate, the turbocharger was last overhauled by Lamar Electro-Air. According to the left engine logbook, the turbocharger was installed on the airframe on April 14, 1990, the same date as the left engine.

According to the turbocharger manufacturer, there was no evidence that would have precluded the turbochargers from functioning normally.

Inlet Float Valve Tests

The left rear inlet float valve was tested on January 11, 1994, at Cessna Aircraft Company, Wichita, Kansas. The valve was placed in test apparatus with the debris in the inlet opening. Care was taken to insure the debris remained in the opening in the same manner as it was found on the airplane.

Flow data was extracted from the test apparatus and compared to baseline data obtained from an exemplar inlet valve. Observation of the fuel flow did not reveal any occlusion by the debris. The data comparison indicated the left inlet valve flowed in the same range as the exemplar valve. According to Cessna Aircraft Company, the left rear inlet float valve provided sufficient flow to the engine without interruption.

Additional Information

Alcohol

FAA research has provided a number of facts about the hazards of alcohol consumption and flying. The Federal Aviation Regulations (FAR) prohibit pilots from performing crewmember duties within 8 hours after drinking any alcoholic beverage or while under the influence of alcohol. According to the FAA, "As little as one ounce of liquor, one bottle of beer, or four ounces of wine can impair flying skills, with the alcohol consumed in these drinks being detectable in the breath and blood for at least 3 hours. Alcohol also renders a pilot much more susceptible to disorientation and hypoxia." The FAA recommends that pilots allow at least 12 to 24 hours between "bottle and throttle," depending on the amount of alcoholic beverage consumed.

Fatigue

According to the FAA, fatigue is a "normal occurrence of everyday living, acute fatigue is the tiredness felt after long periods of physical and mental strain, including strenuous muscular effort, immobility, heavy mental workload, strong emotional pressure, monotony, and lack of sleep. Consequently, coordination and alertness, so vital to safe pilot performance, can be reduced. Acute fatigue is prevented by adequate rest and sleep, as well as by regular exercise and proper nutrition."

The FAA further states, "Fatigue continues to be one of the most treacherous hazards to flight safety, as it may not be apparent to a pilot until serious errors are made. Fatigue is best described as either acute (short-term) or chronic (long-term).

Chronic fatigue occurs when there is not enough time for full recovery between episodes of acute fatigue. Performance continues to fall off, and judgment becomes impaired so that unwarranted risks may be taken. Recovery from chronic fatigue requires a prolonged period of rest."

Hypoxia

According to the FAA, hypoxia is a state of oxygen deficiency in the body sufficient to impair functions of the brain and other organs.

FAA publications indicate a deterioration in night vision occurs at a cabin pressure altitude as low as 5,000 feet, other significant effects of altitude hypoxia usually do not occur in the normal healthy pilot below 12,000 feet.

The altitude at which significant effects of hypoxia occur can be lowered by a number of factors. Small amounts of alcohol, through its depressant action, render the brain much more

susceptible to hypoxia.

Wreckage Release

The wreckage was released to the representatives of the owner on February 16, 1994.

Pilot Information

Certificate:	Commercial	**Age:**	24, Male
Airplane Rating(s):	Multi-engine Land; Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	**Second Pilot Present:**	
Instructor Rating(s):	Airplane Single-engine	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Valid Medical--w/ waivers/lim.	**Last FAA Medical Exam:**	07/30/1992
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	550 hours (Total, all aircraft), 40 hours (Total, this make and model), 386 hours (Pilot In Command, all aircraft), 16 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	CESSNA	**Registration:**	N9667C
Model/Series:	T303 T303	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	200
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	06/28/1993, Continuous Airworthiness	**Certified Max Gross Wt.:**	5150 lbs
Time Since Last Inspection:	14 Hours	**Engines:**	2 Reciprocating
Airframe Total Time:	3123 Hours	**Engine Manufacturer:**	CONTINENTAL
ELT:	Installed, not activated	**Engine Model/Series:**	TSIO-520-AE
Registered Owner:	SAWYER AVIATION	**Rated Power:**	250 hp
Operator:	SAWYER AVIATION	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Night/Dark
Observation Facility, Elevation:	PRC, 5042 ft msl	**Distance from Accident Site:**	1 Nautical Miles
Observation Time:	0252 MST	**Direction from Accident Site:**	210°
Lowest Cloud Condition:	Clear / 0 ft agl	**Visibility**	15 Miles
Lowest Ceiling:	None / 0 ft agl	**Visibility (RVR):**	0 ft
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	170°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	18°C / 8°C
Precipitation and Obscuration:			
Departure Point:		**Type of Flight Plan Filed:**	None
Destination:		**Type of Clearance:**	None
Departure Time:	0319 MST	**Type of Airspace:**	Airport Advisory Area

Airport Information

Airport:	ERNEST A. LOVE FIELD (PRC)	**Runway Surface Type:**	Asphalt
Airport Elevation:	5042 ft	**Runway Surface Condition:**	Dry
Runway Used:	21	**IFR Approach:**	None
Runway Length/Width:	7616 ft / 150 ft	**VFR Approach/Landing:**	Full Stop; Traffic Pattern

Wreckage and Impact Information

Crew Injuries:	2 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	3 Fatal	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	5 Fatal	**Latitude, Longitude:**	

Administrative Information

Investigator In Charge (IIC):	THOMAS H WILCOX,	**Report Date:**	04/02/1997
Additional Participating Persons:	RICHARD C ROWLAND; SCOTTSDALE, AZ DAVID S RYAN; WICHITA, KS SCOTT BOYLE; MOBILE, AL STEVEN G MACON; PHOENIX, AZ		
Publish Date:			
Investigation Docket:	NTSB accident and incident dockets serve as permanent archival information for the NTSB's investigations. Dockets released prior to June 1, 2009 are publicly available from the NTSB's Record Management Division at pubinq@ntsb.gov, or at 800-877-6799. Dockets released after this date are available at http://dms.ntsb.gov/pubdms/.		