



# National Transportation Safety Board Aviation Accident Final Report

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<b>Location:</b>	Corona, CA	<b>Accident Number:</b>	LAX04FA001
<b>Date &amp; Time:</b>	10/01/2003, 1541 PDT	<b>Registration:</b>	N481CA
<b>Aircraft:</b>	Piper PA-32R-301T	<b>Aircraft Damage:</b>	Destroyed
<b>Defining Event:</b>		<b>Injuries:</b>	2 Fatal
<b>Flight Conducted Under:</b>	Part 91: General Aviation - Personal		

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## Analysis

Shortly after takeoff the pilot contacted air traffic controllers and declared an emergency due to an in-flight fire. An airborne witness in another aircraft reported seeing the accident airplane in level flight with black smoke emanating from it. The airborne witness then reported seeing the airplane bank to the left and enter a nose down spiral towards the ground. The airplane impacted flat level terrain in a steep nose down attitude and the post-impact fire consumed the majority of the airplane. The flight was airborne for about 4 minutes before it crashed. The on-scene and detailed post recovery examinations revealed evidence consistent with an in-flight fire in the lower aft engine compartment area in proximity to the turbocharger and the adjacent firewall. Evidence on the nose landing gear strut cylinder suggests that temperatures in this area exceeded the melting point of aluminum while the airplane was in flight. During the engine examination investigators noted that the tension ring of the turbocharger exhaust clamp that retains the exhaust duct to the turbine side of the turbocharger had fractured at the 11 o'clock position. The exhaust clamp bolt remained connected and properly safetied. With this clamp broken and the exhaust ducting loose, hot exhaust gasses would have been directed against the lower firewall. The examination of the turbocharger exhaust clamp showed a high temperature creep/stress rupture that initiated from a crack at one of the resistance welds that joins the sheet metal retainers to the tension ring. The turbocharger gases are approximately 1,200 to 1,500 degrees Fahrenheit, and the tension ring fracture surface showed intergranular brittle fracture across approximately 80-percent of the cross-sectional area initiating at the resistance weld. The heavily oxidized resistance weld region, when compared to the lighter oxidized sheet metal, suggested that the weld crack was pre-existing. A review of past historical Safety Board data revealed three other accidents, FTW98FA325, FTW99LA241, and CHIO2FA042, with similar fractures of exhaust clamps, and other referenced data showed that Inconel 718 could crack in an intergranular mode in a time-dependent creep/stress rupture mode in this temperature range. Cockpit/cabin material that showed exposure to fire was found in the wreckage debris field away from any areas affected by the ground fire.

## Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be:

failure of the turbocharger exhaust clamp due to a pre-existing weld crack, which allowed the release of high temperature exhaust gasses in the engine compartment, causing an in-flight fire.

## Findings

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Occurrence #1: FIRE

Phase of Operation: CLIMB - TO CRUISE

Findings

1. EXHAUST SYSTEM, TURBOCHARGER
2. (C) EXHAUST SYSTEM, CLAMP - FATIGUE
3. (C) EXHAUST SYSTEM, CLAMP - SEPARATION

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Occurrence #2: LOSS OF CONTROL - IN FLIGHT

Phase of Operation: DESCENT - EMERGENCY

Findings

4. AIRCRAFT CONTROL - NOT POSSIBLE - PILOT IN COMMAND

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Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER

Phase of Operation: DESCENT - UNCONTROLLED

Findings

5. TERRAIN CONDITION - OPEN FIELD

## Factual Information

### HISTORY OF FLIGHT

On October 1, 2003, about 1541 Pacific daylight time, a Piper PA-32R-301T, N481CA, declared an in-flight fire emergency, and crashed shortly after takeoff in an unincorporated area of Corona, California. The pilot operated the airplane under the provisions of 14 CFR Part 91. The private pilot and a passenger were fatally injured. The airplane was destroyed in the post-impact fire. The cross-country flight departed the Corona Municipal Airport (AJO) about 1537, en route to Oakland, California. Visual meteorological conditions prevailed and an instrument flight rules (IFR) flight plan had been filed. The primary wreckage was located at 33 degrees 56.46 minutes north latitude and 117 degrees 34.41 minutes west longitude.

An airborne witness, who was practicing Instrument Landing System (ILS) approaches into the Chino Airport (CNO), Chino, California, overheard the radio transmission of the accident pilot declaring an emergency. He said someone contacted Southern California Terminal Radar Approach Control (SoCal TRACON) and had stated that they had a fire.

The airborne witness looked around for the aircraft and saw it off to his left side, and estimated its altitude was 3,000 feet. He saw the airplane flying level with trailing black smoke that did not have an area of concentration. The witness heard the accident pilot say that he had to get out of there, and then saw the airplane turn to the left. The witness watched the airplane make one spiraling turn and then impact the ground. He then saw a fireball. The witness orbited the area until a police helicopter arrived on scene.

Witnesses on the ground reported seeing the airplane in a nose down attitude with smoke and flames coming from the airplane.

### PERSONNEL INFORMATION

According to the Federal Aviation Administration (FAA) airman records, the pilot held a private pilot certificate with an airplane single engine land rating issued February 12, 2003, and instrument airplane rating issued June 26, 2003.

The pilot held a third-class medical certificate issued on January 30, 2003. It had no limitations or waivers.

A personal logbook was not obtained for the pilot. According to FAA form 8710-1 titled Airman Certificate and/or Rating Application dated June 26, 2003, the pilot reported a total flight time of 130 hours.

### AIRCRAFT INFORMATION

The airplane was a 1999 Piper PA-32R-301T, serial number 3257081. A review of the airplane's logbooks revealed a total airframe time of 772.8 hours at the last annual inspection completed on May 9, 2003. The Hobbs hour meter and tachometer were thermally destroyed the accident site.

The airplane was equipped with a Textron Lycoming TIO-540-AH1A engine, serial number L-10137-61A. Total time on the engine at the last annual inspection was 772.8 hours.

Penn Yan Aero, Penn Yan, New York, completed a logbook entry regarding Textron Lycoming Service Bulletin 553 on April 28, 2003, at a Hobbs hour meter of 772.6 hours. The entry recorded the following information:

"Disassembled, cleaned, inspected, and repaired engine as required to comply with Lycoming Service Bulletin 553. Installed new crankshaft S/N: V537930052, new cylinder kits, and oil sump housing. Reassembled engine using parts as listed on the supplied work order in accordance with data approved by or acceptable to the FAA. Test cell run satisfactory for return to service."

Shoreline Aviation, Inc., Marshfield, Massachusetts, reinstalled the engine on the airplane on May 9, 2003, and performed an annual inspection.

An invoice from High Performance Aircraft, Inc., El Cajon, California, dated August 19, 2003, reported that an adjustment to the manifold pressure for critical altitude was completed. The pilot reported that the pressurized intake system would not achieve critical and maximum pressure. Maintenance personnel noted that the pressurization issue started after Textron Lycoming Service Bulletin 553 - crankshaft replacement had been completed in April 2003. Maintenance personnel indicated that the corrective action was: "Pressurized intake system, found no excessive manifold air leaks, adjusted [variance] to achieve redline [manifold pressure], adjusted waste gate actuator to close, manifold pressure holds to critical altitude at this time." Maintenance personnel completed a logbook entry for the work, and entered the Hobbs hour meter time as 850.6 hours.

An invoice from Procraft Aviation, Inc., Corona, dated September 26, 2003, reported the following work as being completed: "change oil, filter and inspect element, degrease engine, check all engine controls, repair left front baffle as required, fabricate and install doublers." The Hobbs hour meter was recorded as 905 hours. However, there was no corresponding logbook entry.

#### Logbook Review

Engine logbook entries recorded the fuel pump as an "AN" rotary engine driven fuel pump, part number LW13909, (Lear-Romec part number RG-9080-J4A), serial number D9679, and had been installed on the airplane prior to the accident. The engine manufacturer reported that an Airworthiness Directive (AD) 98-18-12 dated September 11, 1998, and Lycoming Mandatory Service Bulletin (SB) SB529B, dated June 10, 2002, were applicable to the engine driven fuel pump installed on the accident airplane. Both the AD and SB were issued to prevent rotary fuel pump leaks, which could result in an engine failure or engine fire.

The New Piper Aircraft Company issued a mandatory Service Bulletin number 1035 dated September 3, 1999, in response to AD 98-18-12, and Textron Lycoming SB 529A, with instructions to follow the AD and engine manufacturer's SB.

According to the AD under Note 1b, if the fuel pump part number did not have the "/M" suffix, such as the accident fuel pump, it required the performance of an initial and then follow-up torque check inspections of the pump relief valve attaching screws.

The AD and SB required a torque check at 50-hour intervals until two consecutive checks indicated that there was no change in the torque. Then a visual check was to take place every 50 hours. There were two engine logbook entries that showed compliance with the torque check inspection as required AD 98-18-12. There was an engine logbook entry dated February 17, 1999, at 5 hours time in service (TIS). Another logbook entry dated October 21, 1999, showed compliance with the AD at a total time of 174.2 hours TIS.

The AD compliance checklist in the engine logbook indicated under the method of compliance

section that the screw torque was checked per AD 98-18-12, and found okay (second check), and that no further action was required. There were no further visual inspections recorded as required per the AD in the engine or airframe logbooks pertaining to the recurring visual checks of the fuel pump.

On August 14, 2004, AD 2003-14-03 was issued superseding AD 98-18-12; however, it still required the screw torque inspection cycle. There were no entries concerning AD 2003-14-03 in either the airframe or engine logbooks.

#### COMMUNICATIONS

The pilot was in contact with air traffic personnel from Empire Riverside Radar (RALR - Southern California Terminal Radar Control - SoCal TRACON). At 1539, RALR amended the assigned altitude for the accident airplane to 5,000 feet, which the pilot acknowledged. At 1540, while RALR was issuing directions, the accident pilot declared an emergency due to an onboard fire.

Radio communications between the pilot and the controller indicated that the pilot received his IFR release from AJO at 1536. The airplane was airborne at 1537. At 1538, the pilot contacted SoCal TRACON climbing through 1,300 feet. At 1540:32, the pilot declared an emergency saying he thought he had a fire. The airplane crashed at 1541.

#### WRECKAGE AND IMPACT INFORMATION

Investigators from the National Transportation Safety Board, the FAA, and Textron Lycoming, a party representative to the accident investigation, examined the wreckage at the accident scene.

The airplane came to rest in an open field. The accident site was located on a horse farm about 4 miles southwest of AJO on a magnetic bearing of 192 degrees in flat terrain, surrounded by bamboo and small trees. All of the airplane's major components were at the accident site. The first identified point of contact (FIPC) was the 3-foot-deep crater where the engine came to rest. The engine was at an 85-degree nose down angle. Fire damage consumed most of the accessory section. The crankshaft had separated forward of the number one rod journal. The forward portion of the engine case was extensively fractured. One of the propeller blades had fractured near the hub, and the other two were loose at their respective hub sockets. All three of the propeller blades showed varying degrees of leading and trailing edge gouging, chordwise scratching, and S-bending.

The airplane had been largely consumed by fire. The fuselage was in line with the debris path, and located just forward of the engine. The wing spars, with partial wing skin, were parallel to the longitudinal axis of the fuselage. The tail section was lying over the right side of the fuselage.

Investigators found a portion of wing skin about 150 feet west of the main wreckage site with no fire damage present. The top engine cowling was about 100 feet from the main wreckage with soot present on the outside; however, there was no soot on the inside. A burned aft cargo door (the smaller one) was about 95 feet from the main wreckage.

#### MEDICAL AND PATHOLOGICAL INFORMATION

The Riverside County Sheriff-Coroner's Department conducted an autopsy on the pilot on October 3, 2003. The cause of death was listed as multiple blunt force trauma.

The FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, Oklahoma, performed a toxicological analysis from samples obtained from the pilot during the autopsy. The results of the analysis of the specimens were negative for volatiles and tested drugs. Carbon monoxide and cyanide testing were not performed.

#### Survival Factors

During the on-scene examination, physical evidence from the cockpit found lying in the wreckage debris path 114 feet from the main wreckage showed exposure to fire. There was no evidence of fire damage under or around the area where the physical evidence was found.

#### TESTS AND RESEARCH

##### Tests

Investigators examined the airframe and powerplant at Eastman Aircraft, Corona, on October 2, 2003. A party representative from New Piper Aircraft Company was also in attendance for the airframe and powerplant examination.

There were no mechanical anomalies noted with the airframe examination.

The Lycoming representative reported that due to the extensive damage to the engine, manual rotation of the crankshaft could not be accomplished. Mechanical continuity of the rotating group and internal mechanisms was visually established, and there were no observed signatures or conditions that were identified as being a pre-mishap catastrophic mechanical failure.

The "AN" rotary engine driven fuel pump was consumed by the fire; however, the steel rotor portion, internal to the fuel pump remained.

Investigators noted that the turbocharger sustained varying degrees of impact damage. The turbine and compressor blades showed no evidence of foreign object ingestion. The exhaust system clamps appeared secure and in place at their respective locations. The Aeroquip turbocharger exhaust clamp part number 55677-340M, that retains the exhaust duct to the turbine side of the turbocharger had broken across the band. However, the turbocharger exhaust clamp bolt remained intact and properly secured with safety wire. The remaining turbocharger components were thermally damaged during the post-impact fire.

During the examination at Corona, the Safety Board's fire and explosion specialist noted that the nose landing gear strut showed evidence of broomstrawing, and was bent off center. The nose landing gear when in the retracted position is located underneath the engine.

##### Research

The turbocharger, turbocharger exhaust clamp, and nose landing gear were sent to the Safety Board's materials laboratory in Washington, D.C., for further examination. A Safety Board's materials engineer reported that due to the thermal and impact damage to the turbocharger a functional check could not be performed. The turbine housing showed severe rubbing from the turbine blades, which indicated that the turbocharger was operational at the time of impact.

During the examination of the turbocharger exhaust clamp, the materials engineer noted that the tension ring of the clamp had fractured at the 11 o'clock position and was bent at the 4 o'clock position (as viewed from the turbocharger to the piping). Closer examination revealed that the fracture occurred adjacent to one of the resistance welds used to join the outer tension

ring to the clamp's V-band retainer. A black oxide was visible at the tension ring fracture surface in the vicinity of the weld, and a lighter brown color was noted over much of the remainder of the fracture. Chevron patterns were located that indicated the fracture propagated from the weld outwards.

The materials engineer reported that the tension ring fracture surface was examined using a scanning electron microscope (SEM). At the weld location the fracture features were smeared and could not be interpreted. However, on both sides of the weld fracture, the materials engineer reported those areas were entirely intergranular except for relatively small regions of ductile dimples adjacent to the edge of the tension ring. An energy dispersive spectroscopy (EDS) analysis of the fracture surface of the tension ring showed that both the resistance weld and sheet metal had a composition consistent with Inconel 718.

#### ADDITIONAL INFORMATION

The IIC released the wreckage to the owner's representative.

#### Pilot Information

<b>Certificate:</b>	Private	<b>Age:</b>	31, Male
<b>Airplane Rating(s):</b>	Single-engine Land	<b>Seat Occupied:</b>	Left
<b>Other Aircraft Rating(s):</b>	None	<b>Restraint Used:</b>	
<b>Instrument Rating(s):</b>	Airplane	<b>Second Pilot Present:</b>	No
<b>Instructor Rating(s):</b>	None	<b>Toxicology Performed:</b>	Yes
<b>Medical Certification:</b>	Class 3	<b>Last FAA Medical Exam:</b>	01/01/2003
<b>Occupational Pilot:</b>		<b>Last Flight Review or Equivalent:</b>	06/01/2003
<b>Flight Time:</b>	330 hours (Total, all aircraft)		

## Aircraft and Owner/Operator Information

<b>Aircraft Make:</b>	Piper	<b>Registration:</b>	N481CA
<b>Model/Series:</b>	PA-32R-301T	<b>Aircraft Category:</b>	Airplane
<b>Year of Manufacture:</b>		<b>Amateur Built:</b>	No
<b>Airworthiness Certificate:</b>	Normal	<b>Serial Number:</b>	3257081
<b>Landing Gear Type:</b>	Retractable - Tricycle	<b>Seats:</b>	6
<b>Date/Type of Last Inspection:</b>	05/01/2003, Annual	<b>Certified Max Gross Wt.:</b>	3600 lbs
<b>Time Since Last Inspection:</b>	772.8 Hours	<b>Engines:</b>	1 Reciprocating
<b>Airframe Total Time:</b>	772.8 Hours as of last inspection	<b>Engine Manufacturer:</b>	Textron Lycoming
<b>ELT:</b>	Installed, not activated	<b>Engine Model/Series:</b>	TIO-540-AH1A
<b>Registered Owner:</b>	Paul R. Mumford Sr/Jr	<b>Rated Power:</b>	300 hp
<b>Operator:</b>	Paul R. Mumford Sr/Jr	<b>Operating Certificate(s) Held:</b>	None
<b>Operator Does Business As:</b>	MACHO GRANDE AIR LLC	<b>Operator Designator Code:</b>	

## Meteorological Information and Flight Plan

<b>Conditions at Accident Site:</b>	Visual Conditions	<b>Condition of Light:</b>	Day
<b>Observation Facility, Elevation:</b>	CNO, 652 ft msl	<b>Distance from Accident Site:</b>	5 Nautical Miles
<b>Observation Time:</b>	1553 PDT	<b>Direction from Accident Site:</b>	340°
<b>Lowest Cloud Condition:</b>	Clear	<b>Visibility</b>	7 Miles
<b>Lowest Ceiling:</b>	Broken / 20000 ft agl	<b>Visibility (RVR):</b>	
<b>Wind Speed/Gusts:</b>	12 knots /	<b>Turbulence Type Forecast/Actual:</b>	/
<b>Wind Direction:</b>	260°	<b>Turbulence Severity Forecast/Actual:</b>	/
<b>Altimeter Setting:</b>	29.93 inches Hg	<b>Temperature/Dew Point:</b>	29° C / 14° C
<b>Precipitation and Obscuration:</b>	No Obscuration; No Precipitation		
<b>Departure Point:</b>	Corona, CA (AJO)	<b>Type of Flight Plan Filed:</b>	IFR
<b>Destination:</b>	Oakland, CA (OAK)	<b>Type of Clearance:</b>	IFR
<b>Departure Time:</b>	1530	<b>Type of Airspace:</b>	

## Wreckage and Impact Information

<b>Crew Injuries:</b>	1 Fatal	<b>Aircraft Damage:</b>	Destroyed
<b>Passenger Injuries:</b>	1 Fatal	<b>Aircraft Fire:</b>	In-Flight and On-Ground
<b>Ground Injuries:</b>	N/A	<b>Aircraft Explosion:</b>	None
<b>Total Injuries:</b>	2 Fatal	<b>Latitude, Longitude:</b>	33.946111, -117.578056

## Administrative Information

**Investigator In Charge (IIC):** Tealeye C Cornejo **Report Date:** 10/03/2006

**Additional Participating Persons:** Steve Groover; Federal Aviation Administration; Riverside, CA  
Mark Platt; Textron Lycoming; Williamsport, PA  
George Hollingsworth; New Piper Aircraft; Vero Beach, FL

**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](mailto:pubinq@ntsb.gov), or at 800-877-6799. Dockets released after this date are available at <http://dms.nts.gov/pubdms/>.

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