National Transportation Safety Board
Aviation Accident Final Report

Location:	TRINITY CENTER, CA	**Accident Number:**	LAX94LA233
Date & Time:	06/01/1994, 0640 PDT	**Registration:**	N36025
Aircraft:	PIPER PA-28R-201T	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	1 Minor, 1 None
Flight Conducted Under:	Part 91: General Aviation - Personal		

Analysis

The pilot said that he heard a grinding noise in the engine followed by a prop overspeed. Then the engine suddenly lost all power. ARTCC provided radar vectors to nearest airport and the pilot set up for a dead stick approach; however, he was unable to make the runway. The aircraft touched down gear up in a ditch, bounced out and onto parking lot, then crashed into a parked aircraft. Disassembly of the engine revealed fretting on the parting surfaces of the number 1 main bearing saddle. The crankshaft was found fatigue fractured across the number 1 crankpin at the interface with the number 2 long cheek. One rod end cap nut was found without a cotter pin installed. The second rod end cap nut was found with a shorter than normal cotter pin installed. The number 1 connecting rod bearing was found partially swaged out of the rod, with fretting observed on the bearing surfaces. The side faces of connecting rod number 1 were scored. The engine records revealed that cylinders number 1 and 4 were replaced on May 9, 1994, 29 hours prior to the accident.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: the fatigue fracture of the crankshaft due to improper maintenance installation of the number 1 cylinder and the inadequate torquing of the case through bolts at that location.

Findings

Occurrence #1: LOSS OF ENGINE POWER(TOTAL) - MECH FAILURE/MALF
Phase of Operation: CRUISE - NORMAL

Findings
1. (C) ENGINE ASSEMBLY,CRANKSHAFT - FATIGUE
2. (C) MAINTENANCE,INSTALLATION - IMPROPER - COMPANY MAINTENANCE PERSONNEL
3. (C) ENGINE ASSEMBLY,CRANKSHAFT - FAILURE,TOTAL

Occurrence #2: FORCED LANDING
Phase of Operation: DESCENT - EMERGENCY

Occurrence #3: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: LANDING - FLARE/TOUCHDOWN

Findings
4. TERRAIN CONDITION - DITCH
5. OBJECT - AIRCRAFT PARKED/STANDING

Factual Information

On June 1, 1994, at 0640 Pacific daylight time, a Piper PA-28R- 201T, N36025, collided with ground obstructions while attempting a forced landing at the Trinity Center, California, airport. The forced landing was precipitated by a total loss of engine power while in cruise flight. The aircraft was operated by Rainbow Air of Long Beach, California, and was rented by the pilot for a personal cross-country flight. Visual meteorological conditions prevailed at the time and an IFR flight plan was filed for the operation. The aircraft incurred substantial damage. The certificated private pilot incurred minor injuries and the passenger was not injured. The flight originated at the Medford, Oregon, airport on the morning of the accident at 0550 as an IFR cross-country flight to Long Beach, California.

The pilot said in his statement that while en route at 11,000 feet, he heard a "grinding noise" in the engine followed by a propeller overspeed. A few seconds later, the engine suddenly lost all power. The pilot said he informed Oakland ARTCC (ZOA) of his problem within 30 seconds of the event and they provided vector to nearest airport, which was Trinity Center. The pilot said he set up for a dead stick approach to the airport; however, he was unable to make the runway. The aircraft touched down gear-up in a ditch, bounced out and onto the parking lot, then crashed into a parked aircraft.

The engine was removed from the airframe for a detailed examination, which was conducted on June 9, 1994, at Hillside Aviation in Redding, California. The examination was conducted by a Federal Aviation Administration (FAA) airworthiness inspector from the Sacramento, California, Flight Standards District Office, with assistance provided by a technical representative from Teledyne Continental Motors. The reports from both the FAA inspector and the Teledyne Continental Motors representative are attached as an exhibit to this report.

Disassembly of the engine revealed fretting on the parting surfaces of the number 1 main bearing saddle. The crankshaft was found fractured across the number 1 crankpin at the interface with the number 2 long cheek.

The number 1 connecting rod remained on the number 1 crankpin. One rod end cap nut was found without a cotter pin installed in the castlenated nut. The second rod end cap nut was found with a shorter than normal cotter pin installed. The number 1 connecting rod bearing was found partially swaged out of the rod big end, with fretting observed on the bearing surfaces. The side faces of connecting rod number 1 were scored.

The fractured crankshaft was sent to the FAA Manufacturing Satellite Inspection Office in Mobile, Alabama, for analysis by the Teledyne Continental materials laboratory under FAA supervision. The metallurgical analysis report completed by Teledyne Continental is attached as an exhibit to this report. In pertinent part, the materials laboratory found that the crankshaft fractured at the number 1 crankpin due to a sub- surface initiated fatigue crack.

The engine maintenance records were examined in detail. The Continental TSIO-360-FB1 engine, serial No. 281066-R was remanufactured by the Continental factory on June 24, 1991, and installed in the accident aircraft on July 4, 1991. At the time of the accident, the engine had accrued 1,015 operating hours since remanufacture. Engine cylinders number 1 and 4 were replaced on May 9, 1994, 29 hours prior to the accident.

Pilot Information

Certificate:	Private	**Age:**	31, Male
Airplane Rating(s):	Single-engine Land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	Seatbelt, Shoulder harness
Instrument Rating(s):	Airplane	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 1 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	04/30/1993
Occupational Pilot:		**Last Flight Review or Equivalent:**	
Flight Time:	159 hours (Total, all aircraft), 28 hours (Total, this make and model), 84 hours (Pilot In Command, all aircraft), 49 hours (Last 90 days, all aircraft), 9 hours (Last 30 days, all aircraft), 1 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	PIPER	**Registration:**	N36025
Model/Series:	PA-28R-201T PA-28R-201	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	No
Airworthiness Certificate:	Normal	**Serial Number:**	28R-7803308
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	04/06/1994, 100 Hour	**Certified Max Gross Wt.:**	2900 lbs
Time Since Last Inspection:	68 Hours	**Engines:**	1 Reciprocating
Airframe Total Time:	4362 Hours	**Engine Manufacturer:**	CONTINENTAL
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	TSIO-360-FB1
Registered Owner:	MARVIN R. GRIMMETT	**Rated Power:**	200 hp
Operator:	RAINBOW AIR	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual Conditions	**Condition of Light:**	Dawn
Observation Facility, Elevation:	, 0 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	0000	**Direction from Accident Site:**	0°
Lowest Cloud Condition:	Clear / 0 ft agl	**Visibility**	30 Miles
Lowest Ceiling:	None / 0 ft agl	**Visibility (RVR):**	0 ft
Wind Speed/Gusts:	Calm /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:		**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	29 inches Hg	**Temperature/Dew Point:**	20°C
Precipitation and Obscuration:			
Departure Point:	MEDFORD, OR (MFR)	**Type of Flight Plan Filed:**	IFR
Destination:	LONG BEACH, CA (LGB)	**Type of Clearance:**	IFR
Departure Time:	0550 PDT	**Type of Airspace:**	Class G

Airport Information

Airport:	TRINITY CENTER (O86)	**Runway Surface Type:**	Asphalt
Airport Elevation:	2390 ft	**Runway Surface Condition:**	Dry
Runway Used:	32	**IFR Approach:**	None
Runway Length/Width:	3200 ft / 50 ft	**VFR Approach/Landing:**	Forced Landing

Wreckage and Impact Information

Crew Injuries:	1 Minor	**Aircraft Damage:**	Substantial
Passenger Injuries:	1 None	**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 Minor, 1 None	**Latitude, Longitude:**	

Administrative Information

Investigator In Charge (IIC):	JEFF RICH,	**Report Date:**	12/07/1994
Additional Participating Persons:	PETE WILHELMSON; SACRAMENTO, CA MICHAEL GRIMES; MOBILE, AL		
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/.		