Aviation Investigation Final Report

Location:	Avalon, California	**Accident Number:**	LAX04FA077
Date & Time:	December 24, 2003, 10:20 Local	**Registration:**	N3747U
Aircraft:	Piper PA-34-200T	**Aircraft Damage:**	Destroyed
Defining Event:		**Injuries:**	5 Fatal
Flight Conducted Under:	Part 91: General aviation - Instructional		

Analysis

The twin-engine airplane impacted mountainous terrain during a VOR-B approach in actual instrument weather conditions. The commercial pilot (first pilot) and airline transport pilot (owner/second pilot), were conducting an aircraft checkout flight. The VOR is located on top of a mountain at an elevation of 2,090 feet. The VOR/DME-B approach consists of tracking the 352-degree radial inbound to the VOR from the north descending from 3,200 feet down to the minimum descent altitude of 2,100 feet prior to the Initial Approach Fix (IAF). The IAF is 2.2 nm from the Missed Approach Point (MAP). The MAP is 1.0 nm north of the airport runway and 2.8 nm from the VOR. The published missed approach procedure consists of a climb from 2,100 feet to 3,200 feet direct to the VOR on the 352 radial, then hold at the VOR. Review of the recorded radar data disclosed that while executing the VOR-B approach, the airplane appeared to fly the published approach procedure normally with the exception of paralleling the final approach course (352-degree radial) about 1 mile to the east. The pilots had told the controllers that they were flying the approach with the intentions of executing the missed approach procedure. Once the airplane passed the missed approach point (MAP), the pilots failed to execute the climb portion of the missed approach procedures. The airplane continued to track towards the VOR at the minimum descent altitude until impacting the mountain just below the VOR.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: The failure of both pilots to properly execute the published missed approach procedure.

Findings

Occurrence #1: IN FLIGHT COLLISION WITH TERRAIN/WATER
Phase of Operation: MISSED APPROACH (IFR)

Findings
1. WEATHER CONDITION - CLOUDS
2. TERRAIN CONDITION - MOUNTAINOUS/HILLY
3. (C) MISSED APPROACH - NOT FOLLOWED - PILOT IN COMMAND

Factual Information

1.1 HISTORY OF FLIGHT

On December 24, 2003, about 1020 Pacific standard time, a Piper PA-34-200T, N3747U, impacted mountainous terrain while flying the missed approach portion of the (VOR/DME-B) approach to Catalina Airport (AVX), Avalon, California. Long Beach Flying Club was operating the airplane under the provisions of 14 CFR Part 91. The airline transport pilot/certified flight instructor (CFI), the commercial pilot under instruction (PUI), and three passengers sustained fatal injuries; the airplane was destroyed. The local instructional flight departed Long Beach (LGB), California, about 0954, en route to Avalon. Day instrument meteorological conditions prevailed, and an instrument flight rules (IFR) flight plan had been filed. The primary wreckage was at 33 degrees 22.35 minutes north latitude by 118 degrees 25.09 minutes west longitude.

Southern California Terminal Radar Approach Control (SCT) Approach control cleared the airplane for the very high frequency omni-directional range/ distance measuring equipment-BRAVO (VOR/NDB-B) approach to AVX, and told the pilots to contact AVX UNICOM. The pilots established radio contact with the UNICOM operator, who advised them that the weather was: wind from 120 degrees at 4 knots; ceiling 100 feet overcast; and visibility 1.25 statute miles. AVX UNICOM received no further radio communication from the accident airplane.

The National Transportation Safety Board investigator-in-charge (IIC) reviewed recorded radar data from the Los Angeles Air Route Traffic Control Center (ARTCC) and noted a target identified with the flight's assigned transponder beacon code 4711. Recorded radar data showed that after the radar target departed Long Beach, it gained in altitude on a southerly course until passing the shoreline south of LGB at a mode C reported altitude of 2,900 feet mean sea level (msl). The target continued to gain in altitude to a maximum reported altitude of 4,100 feet msl. The target continued south until passing the Santa Catalina VORTAC (SXC) (very high frequency omni-directional radio range, tactical air navigation). It then started to descend and turned northbound to start the VOR/DME-B approach. The radar track shows the target turning to the south and establishing the approach on a heading of 172 degrees. The airplane continued to descend to the published minimum descent altitude (MDA) of 2,100 feet msl and leveled off.

The target crossed the missed approach point (MAFPI) at the MDA of 2,100 feet msl. The missed approach point is 2.8 nautical miles from the SXC VOR. The SXC VOR is located on top of Mount Orizaba at an altitude of 2,090 feet msl.

The radar track showed that the target maintained an altitude of 2,100 feet msl after the missed approach point before radar contact was lost.

1.2 PERSONNEL INFORMATION

1.2.1 First Pilot

For the purposes of this report the first pilot is identified as the pilot who was occupying the left front seat of the accident airplane.

A review of Federal Aviation Administration (FAA) airman records revealed the first pilot held a commercial pilot certificate with ratings for airplane single and multiengine land. He also held a certified flight instructor certificate with ratings for airplane single and multiengine land, and instrument airplane.

The first pilot held a second-class medical certificate issued on October 15, 2003. It had no limitations or waivers.

No personal flight records were located for the pilot, and the aeronautical experience listed in this report was obtained from a review of the FAA airmen records on file in the Airman and Medical Records Center located in Oklahoma City, Oklahoma. These records indicated a total time of 730 hours with 200 hours logged in the last 6 months.

1.2.2 Second Pilot

For the purposes of this report the second pilot is identified as the pilot who was occupying the right front seat of the accident airplane.

A review of FAA airman records revealed the second pilot held an airline transport pilot certificate with ratings for airplane multiengine land rating, and a commercial pilot certificate with an airplane single engine land rating. He also held a certified flight instructor certificate with ratings for airplane single and multiengine land, and instrument airplane.

The pilot held a first-class medical certificate issued on January 17, 2003. It had no limitations or waivers.

No personal flight records were located for the pilot, and the aeronautical experience listed in 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. These records indicated a total time of 4,500 hours with 300 hours logged in the last 6 months.

1.3 AIRCRAFT INFORMATION

The airplane was a Piper PA-34-200T, serial number 34-7570287. A review of the airplane's logbooks revealed a total airframe time of 3,320.1 hours at the last annual inspection. The annual inspection was completed on August 7, 2003. The last recorded maintenance indicated the total airframe time of 3,384.0 hours on December 12, 2003.

The airplane had a Teledyne Continental Motors TSIO-360-EB engine, serial number 265612-R, installed on the left side. Engine total time since major overhaul was 1,523.54 hours.

The airplane had a Teledyne Continental Motors TSIO-360-EB engine, serial number 266165-R, installed on the right side. Total time on the engine since major overhaul at the last 100-hour inspection was 1,523.54 hours.

The airplane was equipped with an inoperative Long Range Radio Aid to Navigation (LORAN) system. The airplane was not equipped with a Global Position System (GPS).

Examination of the maintenance and flight department records revealed no unresolved maintenance discrepancies against the airplane prior to departure.

1.4 METEOROLOGICAL INFORMATION

A staff meteorologist for the Safety Board prepared a factual report, which included the following weather for the departure area and destination.

1.4.1 Catalina Airport (KAVX), Avalon, California

The closest official weather observation station was a nonaugmented Automated Surface Observing System (ASOS) at, Catalina Airport, Avalon, located 3 miles north of the accident site. The elevation of the weather observation station was 1,610 feet msl. Reported weather at 1022, was winds from 120 degrees at 4 knots; visibility 1 1/4 miles; surface weather- light rain/mist; sky condition overcast 100 feet; temperature 52 degrees Fahrenheit; dew point 50 degrees Fahrenheit; altimeter 30.07; Remarks- rain began at 1015.

1.4.2 Long Beach Airport (KLGB), Long Beach, California

The next closest official weather observation station was Long Beach Airport (LGB), Long Beach, located 29 miles northeast of the accident site. The elevation of the weather observation station was 34 feet msl. Reported weather at 0956, was winds from 080-degrees at 4 knots; visibility 10 miles; sky condition overcast at 3,300 feet; temperature 59 degrees Fahrenheit; dew point 52 degrees Fahrenheit; altimeter 30.08 inHg.

1.5 COMMUNICATIONS

1.5.1 Long Beach Airport (Daugherty Field) (LGB)- Airport Traffic Control Tower (ATCT)

The IIC reviewed recorded radio communications and official transcripts between LGB tower controllers and the pilot. All communications were read back correctly or acknowledged unless noted otherwise.

At 0933, the pilot contacted LGB clearance delivery with information UNIFORM and requested an IFR clearance to AVX.

Between the times of 0936 and 0937, the pilot was instructed to contact ground control for taxi instructions, and received taxi instructions to runway 25L at Delta.

Between the times of 0950 and 0954, the pilot was issued his IFR clearance, and then cleared for takeoff.

At 0956, LGB local control instructed the pilot to contact departure (SCT).

1.5.2 Southern California Terminal Radar Approach Control (SCT)

The IIC reviewed recorded radio communications and official transcripts between SCT and the pilot. All communications were read back correctly or acknowledged unless noted otherwise.

At 0957, the pilot contacted Beach Radar Sector (BCHR) and advised he was climbing out of 1,200 feet for 3,000 feet. BCHR cleared N3747U to 4,000 feet, and assigned a heading of 180 degrees.

At 1001, BCHR cleared N3747U to fly direct to Catalina VOR (SXC), and to contact approach on 127.4. The pilot then contacted Catalina Radar Sector (KATR) and reported level at 4,000 feet, which KATR acknowledged.

At 1004, the pilot was asked by KATR if he wanted a vector to the final approach. He replied that he would do the procedure turn. The pilot was cleared to cross SXC at 3,200 feet, and then cleared for the VOR/DME-B approach.

At 1013, KATR advised the pilot that he was left of the approach course approximately 1.5 miles and suggested a correction to the right.

At 1015, KATR asked the pilot if he was making a full stop landing or a missed approach. The pilot advised that he would make a missed approach. KATR advised the pilot that radar service was terminated, and to "return to his frequency on the missed approach." KATR also issued a traffic alert.

At 1016, KATR advised the pilot to stop his descent due to traffic below him at 1,600 feet, which the pilot acknowledged. KATR advised the pilot that the traffic was passing underneath him, and the pilot reported traffic in sight. KATR advised the pilot to continue on the approach and to contact AVX Unicom.

There were no further communications between KATR and the pilot

1.6 AERODROME INFORMATION

1.6.1 Approach Information

The VOR/DME-B approach consists of an approach from the north descending from 3,200 feet down to 2,100 feet prior to the Initial Approach Fix (IAF). The IAF is 2.2 nm from the Missed Approach Point (MAP), the MAFPI intersection. The MAP is 1.0 nm north of the airport runway and 2.8 nm from the SXC VOR. The SXC VOR is located on top of Mount Orizaba at an elevation of 2,100 feet msl.

The published missed approach procedures were:
Upon reaching the MAFPI intersection (MAP) climb from 2,100 feet to 3,200 feet maintain a 172-degree heading towards SXC VORTAC and then hold at SXC.

1.6.2 Airborne VOR flight check report

The IIC contacted the Flight Inspection Technical Support Branch of the FAA, and requested an after accident flight inspection of the VOR/DME-B approach for Catalina Airport (AVX), Avalon.

On December 31, 2003, the FAA Aviation Standards Office conducted an airborne inspection of the VOR/DME-B approach for AVX. The flight test evaluated the final approach segment for the VOR/DME-B, amendment 2A and the VOR-A, amendment 4. The facility operations were found to be satisfactory and no abnormalities were found.

1.7 WRECKAGE AND IMPACT INFORMATION

Investigators from the Safety Board, the FAA, New Piper Aircraft, and Teledyne Continental Motors examined the wreckage at the accident scene. The debris path was on a 190-degree magnetic heading and 350 feet in length. The first identified point of contact (FIPC) was 870 feet northeast of the SXC VOR on a magnetic heading of 170 degrees. The FIPC was 15 feet below the mountain ridgeline.

The wreckage sustained extensive post impact fire damage and was destroyed. The cabin and forward cockpit section were mostly consumed by fire. All major flight control surfaces and aircraft structure were present at the main wreckage site. Flight control continuity was established from the cockpit T-bar assembly to the flaps, ailerons, horizontal stabilizer, and rudder.

1.7.1 Fuselage

A section of the cabin roof separated and was located downslope of the main wreckage. All flight instruments and avionics were destroyed. Examination of the cockpit flight control system T-Bar assembly revealed that all flight control cables remained attached to their respective attach fittings. Seven seat frames were located within the cabin area. All seat material and restraint webbing had been consumed by fire. The nose landing gear remained

partially attached to the forward structure. According to the aircraft manufacture's representative, the landing gear was in a position consistent with the gear in the retracted position.

1.7.2 Empenage

The tail surfaces remained mostly free of fire damage. The vertical fin and rudder surfaces sustained impact damage but were otherwise intact and attached. The horizontal stabilizer remained attached at its attach hinges. The left horizontal stabilizer tip area sustained ground impact damage and was bent upwards.

1.7.3 Left Wing

The left wing came to rest perpendicular to the fuselage, and was bent upward midspan. The wing structure outboard of the flap surface was fragmented. The outboard section rotated around with the leading edge facing aft. The aileron separated at its attach fittings and was located underneath the wing. The flap remained partially attached to the wing by its center attach hinge. The main landing gear remained attached and was partially extended.

1.7.4 Right Wing

The right wing came to rest perpendicular to the fuselage. The wing attach fittings were thermally destroyed by fire. The wing came to rest flat on the ground. The aileron and flap remained partially attached to the wing. The flap surface experienced heat damage and was thermally distorted. The wing was partially consumed by fire especially in the area immediately adjacent to the fuel tanks.

1.8 MEDICAL AND PATHOLOGICAL INFORMATION

1.8.1 First Pilot

The Los Angeles County Coroner completed an autopsy. The FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, performed toxicological testing of specimens of the second pilot. The results of analysis of the specimens were negative for carbon monoxide, cyanide, volatiles, and tested drugs.

1.8.2 Second Pilot

The Los Angeles County Coroner completed an autopsy. The FAA Bioaeronautical Sciences Research Laboratory, Oklahoma City, performed toxicological testing of specimens of the first pilot. The results of analysis of the specimens were negative for carbon monoxide, volatiles, and tested drugs.

The report contained the following positive result of 0.44 (ug/ml) cyanide detected in blood.

1.9 TESTS AND RESEARCH

Investigators from the Safety Board, New Piper Aircraft, and Teledyne Continental Motors examined the wreckage at Aircraft Recovery Service, Littlerock, California, on February 12, 2005.

1.9.1 Left Engine

The left engine assembly was visually inspected. The crankshaft had fractured aft of the propeller flange. The propeller governor and fuel pump had broken off of the engine.

A borescope inspection revealed no mechanical deformation on the valves, cylinder walls, or internal cylinder heads. The piston domes were intact and light gray in color.

Investigators removed the left engine. They slung it from a hoist, and removed the top spark plugs. All spark plugs were clean with no mechanical deformation. The spark plug electrodes were gray in color, which corresponded to normal operation according to the Champion Aviation Check-A-Plug AV-27 chart.

Investigators removed the vacuum pump and noted that the drive gear remained unbroken. The vacuum pump was manually turned with no binding, and pumped air. An adapter tool was inserted in the vacuum pump drive to manually rotate the engine. The engine rotated freely and the valves moved approximately the same amount of lift in firing order. The fuel pump plunger moved up and down, and the gears in the accessory case turned freely. Investigators obtained thumb compression on all cylinders in firing order.

Investigators manually rotated the magnetos, and both magnetos produced spark at all posts for all cylinders. The oil sump screen was clean and open. The governor screen was clean. The oil screen filter was clean. The plunger in the fuel distribution valve moved freely, the rubber diaphragm was unbroken, and investigators did not observe any contamination.

1.9.2 Right Engine

The right engine assembly was visually inspected. The crankshaft had fractured aft of the propeller flange.

Investigators removed the right engine. They slung it from a hoist, and removed the top spark plugs. All spark plugs were clean with no mechanical deformation. The spark plug electrodes were gray in color, which corresponded to normal operation according to the Champion Aviation Check-A-Plug AV-27 chart.

A borescope inspection revealed no mechanical deformation on the valves, cylinder walls, or internal cylinder heads. The piston domes were intact and light gray in color.

Investigators used the drive gear for vacuum pump and inserted an adapter tool to manually rotate the engine. The engine rotated freely and the valves moved approximately the same amount of lift in firing order. The gears in the accessory case turned freely. Investigators obtained thumb compression on all cylinders in firing order.

The fire-damaged vacuum pump was removed from the engine. The post impact fire had melted the drive coupling.

Both magnetos received impact and thermal damage, which prevented testing. Investigators removed and inspected the manifold fuel distribution valve with no mechanical anomalies noted. The fuel pump had sustained impact damage, but the drive coupling remained intact. The turbocharger impeller/turbine was seized.

1.10 ADDITIONAL INFORMATION

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

Pilot Information

Certificate:	Commercial	**Age:**	34,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	Yes
Medical Certification:	Class 2 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	November 17, 2001
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	December 18, 2003
Flight Time:	609 hours (Total, all aircraft), 489 hours (Pilot In Command, all aircraft)		

Flight instructor Information

Certificate:	Airline transport; Flight instructor	**Age:**	35,Male
Airplane Rating(s):	Single-engine land; Multi-engine land	**Seat Occupied:**	Rear
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	Airplane	**Second Pilot Present:**	Yes
Instructor Rating(s):	Airplane multi-engine; Airplane single-engine; Instrument airplane	**Toxicology Performed:**	Yes
Medical Certification:	Class 1 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	January 1, 2003
Occupational Pilot:	Yes	**Last Flight Review or Equivalent:**	January 1, 2003
Flight Time:	4500 hours (Total, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Piper	**Registration:**	N3747U
Model/Series:	PA-34-200T	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	34-7570287
Landing Gear Type:	Retractable - Tricycle	**Seats:**	6
Date/Type of Last Inspection:	August 7, 2003 Annual	**Certified Max Gross Wt.:**	4773 lbs
Time Since Last Inspection:		**Engines:**	2 Reciprocating
Airframe Total Time:	3320.1 Hrs as of last inspection	**Engine Manufacturer:**	Continental
ELT:	Installed, activated, did not aid in locating accident	**Engine Model/Series:**	LTSIO-360-EB1
Registered Owner:	Golf Air Inc	**Rated Power:**	220 Horsepower
Operator:	Long Beach Flying Club	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Instrument (IMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	AVX,1602 ft msl	**Distance from Accident Site:**	2 Nautical Miles
Observation Time:	10:22 Local	**Direction from Accident Site:**	172°
Lowest Cloud Condition:		**Visibility**	1.25 miles
Lowest Ceiling:	Overcast / 100 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	4 knots /	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	120°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.06 inches Hg	**Temperature/Dew Point:**	11°C / 10°C
Precipitation and Obscuration:	Light - None - Rain		
Departure Point:	LONG BEACH, CA (LGB)	**Type of Flight Plan Filed:**	IFR
Destination:	LONG BEACH, CA (LGB)	**Type of Clearance:**	IFR
Departure Time:	09:54 Local	**Type of Airspace:**	Class E

Airport Information

Airport:	CATALINA AVX	**Runway Surface Type:**	
Airport Elevation:	1602 ft msl	**Runway Surface Condition:**	Unknown
Runway Used:		**IFR Approach:**	VOR/DME
Runway Length/Width:		**VFR Approach/Landing:**	None

Wreckage and Impact Information

Crew Injuries:	2 Fatal	**Aircraft Damage:**	Destroyed
Passenger Injuries:	3 Fatal	**Aircraft Fire:**	On-ground
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	5 Fatal	**Latitude, Longitude:**	33.376388,-118.419166

Administrative Information

Investigator In Charge (IIC):	Jones, Patrick
Additional Participating Persons:	Ron Frank; Federal Aviation Administration; Long Beach, CA Charles Little; New Piper Aircraft ; Vero Beach, CA Michael Grimes; Teledyne Continental Motors; Mobile, AL
Original Publish Date:	October 27, 2005
Last Revision Date:	
Investigation Class:	Class
Note:	The NTSB traveled to the scene of this accident.
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=58540