Aviation Investigation Final Report

Location:	Santa Maria, California	**Accident Number:**	LAX02LA050
Date & Time:	December 16, 2001, 18:15 Local	**Registration:**	N7317X
Aircraft:	Cessna R182	**Aircraft Damage:**	Substantial
Defining Event:		**Injuries:**	1 None
Flight Conducted Under:	Part 91: General aviation - Personal		

Analysis

The airplane came to rest inverted after colliding with the airport perimeter fence. While on approach to the airport, the airplane lost engine power and the pilot made a forced landing. Initial inspection revealed that the P-Lead for the dual magneto was not connected to the system properly. The inspection also revealed that the left side magneto timing was 10 degrees after top dead center. The right side magneto timing was within manufacturer's specifications. Further examination revealed that the points on the left side of the magneto were closed rendering the left side inoperative. A functional check of the ignition harness capacitors was conducted. When the ignition harness cover was secured to the magneto the left capacitor was intermittent. With the cover loosened, the left magneto functioned properly. It was noted that TCM SB 662A, replacement of date code affected capacitors, and TCM SB 651, capacitor grounding wire and attaching wire routing, had not been complied with. The magneto was sent to the manufacturer for further examination. The examination revealed that the primary ignition lead wire coil was misrouted from the terminal post to the distributor block. This allowed the wire to become trapped between the case halves when the cover was secured. When the wire was routed properly and bench tested it was found to operate within manufacturer's specifications. Engine logbook entries indicated that 2 weeks prior to the accident the engine would not run on the right magneto. The repair shop work order indicated that the left side points were grounded, rendering the left side of the magneto inoperative. The points were readjusted and the magneto was retimed on both sides. The magneto was returned as serviceable and reinstalled on the engine; however, the problem persisted. The ignition switch and magneto capacitor were replaced, and the right magneto postion P-Lead was repaired. The airplane was returned to service after a ground run revealed no mechancial anomalies.

Probable Cause and Findings

The National Transportation Safety Board determines the probable cause(s) of this accident to be: Inadequate maintenance and inspection of the engine dual magneto that resulted in a loss of engine power during a critical phase of flight, and the subsequent undershoot forced landing in soft terrain.

Findings

Occurrence #1: LOSS OF ENGINE POWER
Phase of Operation: APPROACH - VFR PATTERN - FINAL APPROACH

Findings
1. (C) IGNITION SYSTEM,IGNITION POINTS - CLOSED
2. (C) IGNITION SYSTEM,IGNITION COIL - RESTRICTED
3. (C) IGNITION SYSTEM,MAGNETO GROUNDING LEAD (P-LEAD) - NOT CONNECTED
4. (C) MAINTENANCE,INSPECTION - IMPROPER - OTHER MAINTENANCE PERSONNEL
5. (C) MAINTENANCE,ADJUSTMENT - INADEQUATE - OTHER MAINTENANCE PERSONNEL
6. (C) MAINTENANCE,RECORDKEEPING - NOT COMPLIED WITH - OTHER MAINTENANCE PERSONNEL

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

Occurrence #3: ON GROUND/WATER COLLISION WITH OBJECT
Phase of Operation: LANDING - ROLL

Findings
7. OBJECT - FENCE

Occurrence #4: NOSE OVER
Phase of Operation: EMERGENCY LANDING

Findings
8. TERRAIN CONDITION - SOFT
9. TERRAIN CONDITION - GROUND

Factual Information

On December 16, 2001, about 1815 hours Pacific standard time, a Cessna R182, N7317X, lost engine power on final approach for runway 30 at the Santa Maria Public/Capt G. Allan Hancock Field Airport (SMX), Santa Maria, California. The airplane landed short of the approach end of the runway and came to rest inverted. The airplane was operated by the pilot/owner under the provisions of 14 CFR Part 91, and sustained substantial damage. The private pilot, the sole occupant, was not injured. Visual meteorological conditions prevailed for the cross-country flight, and no flight plan had been filed. The flight made a stop at the Hanford Municipal Airport, Hanford, California, and was returning to SMX.

The Safety Board investigator interviewed the pilot. The pilot stated that he had departed SMX about 1530 for Hanford. About 1700, he departed for the return trip to SMX. He stated that he had fueled the airplane at SMX, and estimated the trip to Hanford was about 50 minutes. No discrepancies were noted with the flight to Hanford or the return trip. He indicated that about 2 weeks prior to the accident he had work done on the dual magneto.

In the pilot's written statement to the Safety Board, he stated that he was cleared to land number two behind another airplane. He acknowledged that he was number two and that he had the landing traffic in sight. About 1 nm from the turn to final he started to lower the flaps. He noted that he was at 1,500 feet and descending about 300 feet per minute. The landing gear was down, the propeller control was in, mixture rich, and the carburetor heat was out. He stated that the engine started to run rough. He retracted the flaps and scanned the propeller lever, fuel selector, and instruments. The pilot cycled the ignition and pushed the carburetor heat back in. He also advanced and retracted the throttle. During this time the engine went from partial power to no power.

The pilot contacted tower personnel and informed them that he had lost engine power, but believed he would be able to make the runway. He retarded the carburetor heat and maintained 80 mph during the approach. On final he attempted to restart the engine again. At this point it became clear that he would not be able to land on the runway.

The airplane landed about 300 yards short of runway 30. The pilot maintained full back pressure on the landing rollout to keep the nose wheel from catching on the surrounding terrain. The airplane came to rest inverted after it went through the airport perimeter fence.

AIRCRAFT INFORMATION

The Safety Board investigator reviewed the aircraft and engine logbooks. The aircraft logbook revealed that on June 1, 2001, an annual inspection was conducted. The engine logbook revealed that the engine was factory overhauled in accordance with the Textron Lycoming

Overhaul Manual on December 8, 1999.

On December 1, 2001, an entry was made into the engine logbook stating that the engine would not run on the right magneto. The magneto, without the cover, was sent to MagTime in Mariposa, California, for inspection. The logbook entry further stated that the magneto was returned as serviceable. The magneto was reinstalled with the same problem persisting. The ignition switch was replaced, and the right magneto position P-Lead was repaired. The magneto capacitor was also replaced on the right side. The airplane was ground run with no discrepancies noted.

The work order for MagTime indicated that they performed an inspection and functional test to determine the inoperative condition of the left side. Maintenance personnel noted that the left side contacts were grounded. The contacts were readjusted, and the magneto was retimed on both sides. The functional check revealed no further discrepancies.

TESTS AND RESEARCH

A Federal Aviation Administration (FAA) inspector examined the airplane. During the initial visual examination of the engine he noted that the P-leads from the dual magneto were not connected properly. The right magneto was timed to the engine at 10 degrees after top dead center (retarded), and the left magneto was found inoperative. The magneto, with the capacitor and ignition harness, was retained for further examination.

Pacific Continental Engines, Inc., conducted a field test of the dual magneto on January 2, 2002, in Van Nuys, California. The visual examination and bench test were under the supervision of the FAA with assistance from a Textron Lycoming representative, who was a party to the investigation.

The internal timing check (e-gap) revealed that the left side was inoperative, and the right side was found within manufacturer's specifications. Removal of the magneto cap revealed no visual evidence of internal mechanical malfunction or electrical arching. The points were found undamaged and were observed to actuate normally upon manual rotation of the drive.

The test run verified that the left magneto was inoperative. The left magneto capacitor was intermittent when the customer's ignition harness cover was secured to the magneto. When the cover was not torqued down, the left magneto would function properly. When the cover was torqued down the left capacitor and points were grounded.

An ignition test on the harness capacitors was conducted. Both capacitors were found to be within manufacturer's specifications. The dual magneto functioned in accordance with the Teledyne Continental Motors (TCM) maintenance manual. The ignition harness was removed. It was noted that TCM Service Bulletin (SB) 662A, "TCM D2000 and D3000 Series Magneto Capacitors," as well as TCM SB 651 "Capacitor Information and Installation for D2000 and D3000 Series Magnetos," had not been complied with. TCM SB 662A addressed the

replacement of date code affected capacitors. TCM SB 651 addressed the proper capacitor grounding wire and attaching wire routing.

According to TCM, the ignition system is sold to the customer as a kit requiring assembly by the customer. The kit is comprised of the ignition harness and capacitors for the magneto.

The dual magneto was sent to TCM in Mobile, Alabama, for further inspection on January 15, 2002, under the supervision of a Safety Board investigator. Visual examination of the dual magneto revealed that the primary ignition lead wire from the (left side) coil, winding to the terminal post, was misrouted in proximity of the distributor block. This allowed the wire to become trapped between the case halves when the cover was secured. The primary wire was routed inside a piece of clear plastic tubing and contained visible damage at one location adjacent to the case edge. The damage exhibited pinching and extended to the center of the conductor.

The magneto was bench tested with the wire pinched between the two case halves. In this scenario the left side of the magneto was inoperative. When the wire was routed properly and bench tested, the dual magneto was found to operate within manufacturer's specifications.

Pilot Information

Certificate:	Private	**Age:**	34,Male
Airplane Rating(s):	Single-engine land	**Seat Occupied:**	Left
Other Aircraft Rating(s):	None	**Restraint Used:**	
Instrument Rating(s):	None	**Second Pilot Present:**	No
Instructor Rating(s):	None	**Toxicology Performed:**	No
Medical Certification:	Class 3 Valid Medical--no waivers/lim.	**Last FAA Medical Exam:**	July 17, 2000
Occupational Pilot:	UNK	**Last Flight Review or Equivalent:**	July 9, 2000
Flight Time:	450 hours (Total, all aircraft), 15 hours (Total, this make and model), 450 hours (Pilot In Command, all aircraft), 25 hours (Last 90 days, all aircraft), 10 hours (Last 30 days, all aircraft), 2 hours (Last 24 hours, all aircraft)		

Aircraft and Owner/Operator Information

Aircraft Make:	Cessna	**Registration:**	N7317X
Model/Series:	R182	**Aircraft Category:**	Airplane
Year of Manufacture:		**Amateur Built:**	
Airworthiness Certificate:	Normal	**Serial Number:**	R18200073
Landing Gear Type:	Retractable - Tricycle	**Seats:**	4
Date/Type of Last Inspection:	June 1, 2001 Annual	**Certified Max Gross Wt.:**	3100 lbs
Time Since Last Inspection:	11 Hrs	**Engines:**	1 Reciprocating
Airframe Total Time:	1625 Hrs as of last inspection	**Engine Manufacturer:**	Lycoming
ELT:	Installed, not activated	**Engine Model/Series:**	O-540-J3C5D
Registered Owner:	LYNN AND BETTY MAHIN	**Rated Power:**	235 Horsepower
Operator:	JAMES WYATT	**Operating Certificate(s) Held:**	None

Meteorological Information and Flight Plan

Conditions at Accident Site:	Visual (VMC)	**Condition of Light:**	Day
Observation Facility, Elevation:	SMX,242 ft msl	**Distance from Accident Site:**	0 Nautical Miles
Observation Time:	17:51 Local	**Direction from Accident Site:**	0°
Lowest Cloud Condition:	Clear	**Visibility**	10 miles
Lowest Ceiling:	Broken / 20000 ft AGL	**Visibility (RVR):**	
Wind Speed/Gusts:	/	**Turbulence Type Forecast/Actual:**	/
Wind Direction:	0°	**Turbulence Severity Forecast/Actual:**	/
Altimeter Setting:	30.29 inches Hg	**Temperature/Dew Point:**	9°C / 7°C
Precipitation and Obscuration:	No Obscuration; No Precipitation		
Departure Point:	Hanford, CA (HJO)	**Type of Flight Plan Filed:**	None
Destination:	Santa Maria, CA (SMX)	**Type of Clearance:**	None
Departure Time:	17:00 Local	**Type of Airspace:**	Class D

Airport Information

Airport:	SANTA MARIA PUB/CAPT G ALLAN H SMX	**Runway Surface Type:**	Asphalt;Gravel
Airport Elevation:	261 ft msl	**Runway Surface Condition:**	Dry
Runway Used:	30	**IFR Approach:**	None
Runway Length/Width:	6304 ft / 150 ft	**VFR Approach/Landing:**	Forced landing

Wreckage and Impact Information

Crew Injuries:	1 None	**Aircraft Damage:**	Substantial
Passenger Injuries:		**Aircraft Fire:**	None
Ground Injuries:	N/A	**Aircraft Explosion:**	None
Total Injuries:	1 None	**Latitude, Longitude:**	34.883335,-120.462776

Administrative Information

Investigator In Charge (IIC):	Cornejo, Tealeye
Additional Participating Persons:	SAM BELKNAP; FEDERAL AVIATION ADMINISTRATION; VAN NUYS, CA
Original Publish Date:	June 25, 2003
Last Revision Date:	
Investigation Class:	Class
Note:	
Investigation Docket:	https://data.ntsb.gov/Docket?ProjectID=53924