

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



WPR24LA160

ENGINE AND FUEL SYSTEM EXAM

July 17, 2024

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A. ACCIDENT

Location: Santa Maria, California
Date: May 25, 2024
Time: 1715 Pacific daylight time
0015 UTC
Airplane: FREEMAN STEEN SKYBOLT, N873X

B. ENGINE AND FUEL SYSTEM EXAM

IIC	Scott Johnson National Transportation Safety Board Federal Way, Washington
Aviation Safety Inspector	Jeffery Culligan (not present) Federal Aviation Administration Van Nuys, California
Airplane Mechanic	Raymond Maxon Ray's Aviation Santa Paula, California

C. SUMMARY

On May 25, 2024, about 1715 Pacific daylight time, an experimental amateur-built Steen Skybolt, N873X was substantially damaged when it was involved in an accident near Santa Maria, California. The pilot was not injured. The airplane was operated as a Title 14 *Code of Federal Regulations Part 91* personal flight.

The pilot reported that prior to the flight, the airplane was topped off with fuel for the 1.5 hour flight. While turning left base to runway 30, at Santa Maria Public Airport/Capt G Allan Hancock Field, Santa Maria, California, the engine sputtered two times and lost power. Unable to restart the engine while trouble shooting, he initiated a forced landing to an open area. As the airplane was about 300 ft above ground level (agl), he realized that the terrain was steeper than he originally thought. While maneuvering the airplane the pilot lowered the nose to gain airspeed to fly over a hill that was in the flight path, he observed a set of high-tension power lines. He attempted to fly over the power lines, however, the tailwheel "caught the wires" and the airplane subsequently impacted trees and nosed over before it came to rest inverted on a road.

Postaccident examination of the airplane revealed that the upper wing was substantially damaged. The airplane was recovered to the pilot's hanger for further examination.



Figure 1 View of airplane at accident scene (Courtesy of first responders)

D. DETAILS OF THE EXAMINATION

1.0 Fuel/Fuel System

The throttle and mixture engine controls were observed to move from "stop to stop" at the pressure carburetor. Fuel selector was selected to the "on" detent.

The fuel sump was actuated with no fuel being released. The gascolator bowl was removed and found dry with a minimal amount of contaminants and considered normal. The screen was clean.

The fuel flop tube was flexible laying in the bottom of tank and was not found rigid. The fuel stick manufactured by the previous owner measured $\frac{1}{2}$ way between the bottom of the stick and the two-gallon mark. No fuel was added to the airplane and the airplane was positioned in a level flight attitude. The fuel pump was switched on with no fuel pressure observed. After 15 seconds of operation the electric fuel pump sound changed consistent with fuel pump priming. Fuel was observed at the

pressure carburetor dripping and the fuel pressure was observed in the green arc in the cockpit mounted fuel pressure gauge.

A fuel sample was taken from the carburetor, the fuels odor and color was blue consistent with 100 low lead aviation type fuel. The sample was tested for water and tested negative.

2.0 Engine Examination

The engine was found with the two top engine mounts fractured. The engine was tilted and twisted towards the ground at approximately 20 degrees. The mechanical fuel pump was fracture separated from the accessory mount base. The left magneto was fracture separated from the mounting pad.

The upper spark plugs were removed from the engine, and they were the massive electrode type. The sparkplugs indicated normal and worn out normal with some black deposits within the electrode area when compared to the Champion Check-A-Plug comparison chart.



Figure 2: Top spark plugs removed.

The damaged propeller was removed, and the crankshaft was rotated by hand utilizing a hand tool. The crankshaft was free and easy to rotate in both directions. "Thumb" compression was observed in proper firing order on all six cylinders. Mechanical continuity was established throughout the rotating/reciprocating group and accessory section during hand rotation of the crankshaft. The rocker box covers were removed, and the valve train examined. The valve train was absent of any abnormal conditions and was observed to function normally during hand rotation of

the crankshaft. Normal lift action was observed at each rocker arm. The gas path and combustion signatures observed at the spark plugs and exhaust system components displayed coloration consistent with normal operation. There was no oil residue observed in the exhaust system gas path. Engine controls continuity was established. The fractured fuel pump actuator arm moved normally on its cam when the engine was rotated.

The right magneto remained securely clamped at to its respective mounting pad. The ignition harness was secure at each magneto. The right magneto to engine timing was observed at 25° BTDC of the cylinder #1. The left magneto was broken from its mounting pad and could not be observed. Electrical continuity was established to the cockpit mounted ignition switch. The switch operated normally at each of the detents except in the right mag position, which was found not grounded or "Hot", during hand actuation of the switch.

Exhaust manifolds were free of obstruction. The oil filter was opened with no particulates found.

3.0 Propeller Examination

The propeller had most of its damage from the nose down terrain contact. One blade had chord span striations and what appeared to be a possible electrical arc from high tension wire contact. The other propeller blade was bent but exhibited no markings associated with powered rotation at terrain contact.

4.0 Retained Items

The Bendix pressure carburetor was retained for further examination.
Model: PS-5B, S/N: 860723R, P/L: Special

Submitted by:

Scott Johnson
Air Safety Investigator