



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

Date: May 21, 2021

SUMMARY OF AIRCRAFT EXAMINATION

(WPR19LA101)

This document contains 4 embedded photos.

A. ACCIDENT

Location:	Deming, New Mexico
Date:	March 23, 2019
Aircraft:	Dennis L. Zumwalt Sky Bolt
NTSB Investigator-in-Charge	Thomas M. Little

B. EXAMINATION PARTICIPANTS

Thomas M Little
Senior Aviation Accident Investigator
National Transportation Safety Board
Western Pacific Region
Federal Way, Washington

Mark Platt
Senior Air Safety Investigator
Lycoming Engines
Williamsport, Pennsylvania

C. SUMMARY

On March 23, 2019, about 1130 mountain daylight time, N254PM, a Sky Bolt experimental amateur-built airplane, was substantially damaged when it was involved in an accident near Deming, New Mexico. The commercial pilot was seriously injured. The airplane was being operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight.

According to the pilot, he departed Bennet Field, an airstrip located about 15 nautical miles southwest of Deming, from runway 28 for the local flight. He reported that he traveled about 4,000 ft at an altitude of about 400 ft above ground level, and when he was at the end of the runway the engine quit. Being too low to attempt to restart the engine, the pilot opined that he turned left, lowered the nose to build up airspeed to prevent a stall/spin, then spotted an open space to his right. Unable to make it back to the runway, he made a sharp right turn and touched down in an open area. He mentioned that the airplane traveled about 50 ft before it collided with a sand dune, then came to a complete stop. As a result of the landing sequence, the airplane sustained structural damage to both upper and lower wing panels, and to the majority of the fuselage.

The airplane's wreckage was recovered to Air Transport's salvage facility in Phoenix, Arizona, where a detailed examination of the airplane and engine would be performed at a later date.

D. DETAILS OF THE EXAMINATION

1.0.1 Airframe examination notes

The forward section of the airframe, from the aft cockpit to the front of the airplane was substantially damaged. Both lower wing panels and support struts were impact damaged, with the right lower wing panel being destroyed during the accident sequence. Only minor damage was observed from the back of the rear cockpit to the rudder; the empennage was not damaged. The pilot reported no issues with controllability during the emergency descent and off-field landing. All components necessary for flight were accounted for at the accident site.



Figure 1 - photo of damage to airplane as received

1.0.2 Engine examination notes

Fuel System

All engine compartment fuel lines were found to be in place and secure at their respective fitting of each fuel system component. The gascolator bowl contained

fluid consistent with the appearance and odor of automotive fuel (Mogas) and sediment.

The carburetor was displaced from the engine due to the forces of impact. The portion that remained attached at the mounting pad was secure. The fracture surface signatures were consistent with overload. The throttle/mixture controls were found securely attached at their respective control arms of the carburetor.

The carburetor was opened for examination. The fuel bowl remained free of visible contaminants. The float assembly remained secure at the mounting and free of damage. The float pontoons exhibited no evidence of rubbing against the wall of the bowl. All internal locking tabs and safety devices of the carburetor were in place and properly secured. The fuel inlet screen was found properly installed and free of contamination. No external fuel staining was observed. There was no fuel observed within the carburetor bowl or accelerator pump well. The fuel accelerator pump plunger seal remained pliable and intact.

The fuel pump was attached to the engine at the mounting pad. The fuel lines remained secure at their respective fittings. The fitting on the output side of the fuel pump had been displaced due to the absorption of impact energy. The fuel pump was removed for examination. The fuel pump remained free of internal mechanical malfunction and obstruction to flow. The diaphragm remained pliable and intact.

The foam air filter had been crushed and exhibited no evidence of pre-impact obstruction to flow.

Spark Plugs

The spark plugs were secure at each position with their respective spark plug lead attached. The spark plugs were removed, examined and photographed. The spark plugs electrodes remained mechanically undamaged, and according to the Champion Spark Plugs "Check-A-Plug" chart AV-27, the spark plug electrodes displayed coloration consistent with normal operation. The static oil soaking of the spark plugs (as noted) was attributed to the engine positioning at the mishap site and post recovery.



Figure 2 - top spark plugs



Figure 3 - bottom spark plugs

Ignition Harness

The ignition harness was attached at the respective magnetos and appeared to have been attached at each spark plug lead. The T3 spark plug wire exhibited

minor chaffing where it had been rubbing on the inside surface of the engine cowl.

Starter and Alternator

The starter and alternator were securely attached to their mounting pads, with the electrical connections secure at their post.

Oil System

The oil pressure screen and suction screen were secure at their respective mountings. The oil pressure screen and suction screen were removed. The suction screen was not present when the plug was removed. There was no evidence of pre-mishap metal contamination observed at the oil pressure screen.

Conclusions

The top spark plugs were removed, examined and photographed. The crankshaft was rotated by hand utilizing the propeller. The crankshaft was free and easy to rotate in both directions. "Thumb" compression was observed in proper order on all six cylinders. The complete valve train was observed to operate in proper order and appeared to be free of any pre-mishap mechanical malfunction. Normal "lift action" was observed at each rocker assembly. Clean, uncontaminated oil was observed at all six rockerbox areas. Mechanical continuity was established throughout the rotating group, valve train and accessory section during hand rotation of the crankshaft. The bottom spark plugs were removed, examined and photographed. The combustion chamber of each cylinder was examined through the spark plug holes utilizing a lighted borescope. The combustion chambers and bottom spark plug electrodes remained mechanically undamaged, and there was no evidence of foreign object ingestion or detonation. The valves were intact and undamaged. There was no evidence of valve to piston face contact observed. The gas path and combustion signatures observed at the spark plugs, combustion chambers and exhaust system components displayed coloration consistent with normal operation. There was no oil residue observed in the exhaust system gas path. There was significant ductile bending of the exhaust system components.

The exhaust system was found free of obstructions.

The left and right magnetos remained securely clamped at their respective mounting pads. The ignition harness was secure at each magneto.

The "P" lead at each magneto was secure at the electrical post. Electrical continuity was established to the cockpit mounted ignition switch. The switch operated normally at each of the detents during hand actuation of the switch.

The left magneto was found securely clamped at the mounting pad. The impulse coupling was heard clicking during rotation of the crankshaft. The magneto to engine timing was observed at 26° BTDC of the cylinder #1. The magneto was removed for further examination. The magneto was observed to produce spark at all six plug leads during hand rotation. The drive was observed to be intact and properly safetied.

The right magneto was found securely clamped at the mounting pad. The magneto to engine timing was observed at 25° BTDC of the cylinder #1. The magneto was removed and the drive was found intact and properly safe tied. The magneto was observed to produce spark at all six plug leads during hand rotation.

There was no evidence of pre-impact mechanical malfunctions observed during the examination of the engine.

1.0.3 Propeller examination notes

The wooden two bladed fixed pitch propeller remained attached at the crankshaft flange. The spinner was attached to the propeller. One of the propeller blades was splintered and liberated near the hub. The opposing blade remained intact.



Figure 4 - photo of propeller and spinner as received