

**NATIONAL TRANSPORTATION SAFETY BOARD
Office of Aviation Safety
Washington, DC 20594**

SUMMARY OF AIRFRAME AND ENGINE EXAMINATION

CEN20LA278

A. ACCIDENT

Location: Springfield, CO

Date: 7/10/2020

Time: 1102 MDT

Aircraft: [Schweizer Grumman G-164B (S/N 522B) N6917K]

B. PARTICIPANTS

David Bowling
Senior Air Safety Investigator
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Beegles Aircraft Services, LLC
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C. ACCIDENT SUMMARY

On July 10, 2020, about 1102 mountain daylight time, a Schweizer Grumman G-164B airplane, N6917K, was destroyed when it was involved in an accident near Springfield, Colorado. The commercial pilot sustained fatal injuries and succumbed from his injuries on July 14, 2020. The airplane was operated as a Title 14 *Code of Federal Regulations (CFR)* Part 137 aerial application flight.

The pilot was enroute to Two Buttes, Colorado to perform a low-level aerial application flight in a rural area after departing from the Springfield Municipal Airport (8V7), Springfield, Colorado. An employee who worked for the operator doing ground loading operations, reported

the airplane was loaded with 48.85 gallons of AgSaver Glyphosate herbicide, 15.62 gallons of Atarrus fertilizer, and 125 gallons of Kuglar KQ-XRN fertilizer. The airplane had about 85 gallons of fuel onboard. He reported the pilot was having trouble with the "top wing tank containing the fertilizer." The chemical would foam over onto the windshield of the airplane. The pilot had returned to the airport once already to add more de-foaming agent to the tank and had activated the circulating pump to correct the problem.

A witness reported observing white smoking coming from the cockpit prior to impact, however the smoke was "granular in nature" and "looked solid." After the accident, the pilot reported to his wife, that while in flight, excessive foam coated the airplane's windshield, and he was unable to see outside of the airplane. The airplane impacted a remote flat field while traveling to the southeast and a postimpact fire ensued. The airplane came to rest about 0.65 miles southeast of the departure end of runway 17 at 8V7. The airplane sustained fire damage and was fragmented from impacting terrain as shown in Figure 1. A Federal Aviation Administration (FAA) aviation safety inspector documented the accident site. The wreckage was recovered and transported to a secure location.



Figure 1 - View of the wreckage in the field (courtesy of the FAA).

According to the type certificate holder for the accident airplane, Allied AgCat Productions, the original hopper (which has a maximum capacity of 2,000 lbs) installed in the airplane during initial production has the venting system routed to exit on the underside of the fuselage. A review of FAA historical airworthiness records found no modifications for the hopper listed. The airplane was not manufactured or equipped with a windshield wiper system. The airplane was equipped with a Pratt & Whitney R- 1340-S3H1-G radial engine and a Hamilton Standard 23D40-311 propeller. Reid Aviation & Aerial Spraying, LLC is a 14 *CFR* Part 137 aerial application operator based in Springfield, Colorado, that solely utilized the accident airplane.

D. DETAILS OF AIRFRAME AND ENGINE EXAMINATION

Following the accident, the airplane was recovered to Beegles Aircraft Services, LLC, Greeley, Colorado for storage. On February 19, 2021, an examination of the airframe and engine was conducted. It was led by an NTSB senior air safety investigator, with assistance from an air safety inspector from the Federal Aviation Administration Flight Standards District Office, Denver, Colorado, and an airframe and powerplant mechanic from Beegles Aircraft Services.

E. SUMMARY OF AIRFRAME EXAMINATION

Grumman Schweizer G-164B, serial number 522B

The airplane was laid out in the salvage yard at Beegles' Aircraft. The top and bottom left and right wings and were separated from the fuselage along with the engine, propeller, horizontal stabilizers and elevators. The fuselage consisted of the charred and melted remains of the hopper, cockpit, aft fuselage, vertical stabilizer, rudder and tail wheel.



Figure 1, Fuselage

Fuselage, Vertical Stabilizer, Rudder and Tailwheel

The fuselage, including the hopper, cockpit, aft fuselage, vertical stabilizer and rudder, and tailwheel were charred melted and consumed. An examination of the push pull tube to the elevator showed several sections where the tube was fractured, melted and consumed. The portion of the tube connected to the elevator horn was manipulated and moved the elevator actuators in the tail cone. Control cables to the rudder were identified and traced to the remains

of the rudder pedals in the cockpit area. When the cables were manipulated the rudder and tailwheel moved freely.



Figure 2, Aft Fuselage and Tail Cone, Elevator Horn and Rudder Cables

The rudder pedals and control stick were consumed; however the aileron horns at the base of the control stick and the rudder pedal connectors at the ends of the rudder cables were identified. The throttle, propeller, and mixture levers were located and found charred and melted. Control rods from the quadrant to where the engine mounts fractured were intact. The rods were separated near the front of the hopper.



Figure 3, Throttle, Propeller and Mixture Levers

Hopper

The hopper was charred and consumed. The top of the hopper and hopper door was separated. Examination of the hopper door showed the door closed. The door was bent and broken and the seal around the door was charred and consumed. Vent tubes and lines to the spray applicator tubes were traced from the hopper to an area beneath the airplane fuselage.



Figure 4, Hopper



Figure 5, Top of Hopper and Hopper Door

Left and Right Horizontal Stabilizers and Elevators

The remains of the left horizontal stabilizer was examined. The fabric had been melted and consumed. The remaining frame was charred. The elevator remained connected. It was also charred and the fabric had been consumed. The elevator and elevator tube moved freely. The elevator trim tab was intact and at the neutral position in relation to the elevator. The actuator arm was broken and melted.



Figure 6, Left Horizontal Stabilizer and Elevator

The right horizontal stabilizer was crushed aft and bent upward slightly. The inboard third of the stabilizer had been melted and consumed. The remaining frame in that area was charred. The outboard portion of the stabilizer was crushed and bent. The elevator remained connected. It was bent upward slightly. A portion of the inboard fabric was melted and consumed. The elevator and elevator tube moved freely. The elevator trim tab was intact and up slightly in relation to the elevator. The actuator tube was broken and melted.



Figure 7, Right Horizontal Stabilizer and Elevator

Top Wing and Ailerons

The airplane's top wing was broken in several places and was charred and consumed. The fuel tank near the center portion was intact but broken open. The left outboard wing was crushed melted and consumed. The aileron and aileron push-pull tube that connects to the bottom wing aileron was mostly consumed.

The right outboard section of the top wing was crushed and broken aft, charred, and consumed by fire. The right aileron was broken out and charred, and the connector at the push-pull tube was broken.



Figure 8, Left and Center Portions of the Top Wing and Top Left Aileron



Figure 9, Right and Center Portions of the Top Wing and Top Right Aileron

Bottom Left Wing

The airplane's left bottom wing was broken aft, charred and melted. The inboard portion of the wing was consumed by fire. The outboard portion of the wing and aileron were charred and melted. The aileron remained connected to the wing. The push-pull rod to the upper wing aileron was melted and consumed. The support strut to the top wing, forward of the aileron was cut. Cables to the aileron were located coming out of the wing section. The cable ends were

separated at two connectors. When pulled, the cables moved the push-pull rod, bellcrank and aileron surface.



Figure 10, Left Bottom Wing and Aileron



Figure 11, Left Bottom Wing Aileron Cables

Bottom Right Wing

The airplane's right bottom wing was crushed aft along the leading edge to the front spar, from the wing tip to the root. The leading edge, approximately 1/3 rd the distance outboard of the wing root was charred and melted. The bottom surface near the wing tip and bottom right aileron was charred. The bottom right aileron was intact, bent slightly downward near the outboard edge, and remained connected to the wing. The actuator arm to the aileron was connected. The aileron cables were located at the wing root and showed fraying indicative of an overload fracture. Pulling on the cables moved the push-pull rod, bellcrank and aileron surface.



Figure 12, Right Bottom Wing and Aileron Cables

Airframe Summary

Flight control continuity was established. All structural damage to the airplane was consistent with ground impact and a post impact fire.

F. SUMMARY OF ENGINE EXAMINATION

Pratt & Whitney R- 1340-S3H1-G [Mfrs. No. ZP 104632]

The engine was separated from the airframe at the mounts. It was lifted by forklift and the exterior was photographed. Half of the reduction gear housing was broken out. One fourth of the reduction drive gear was broken out and several of the gear teeth, opposite the gear fracture were mashed and broken. Several of the push rods in the area where the reduction gear housing was broken out, were broken out, and the three cylinders in that area, Cylinders number 4, 5, and 6, and the sump between cylinders 5 and 6, showed impact and fire damage. An attempt to rotate the reduction drive gear was made with no success. The engine data plate was located on the reduction gear housing by the bottom fracture.

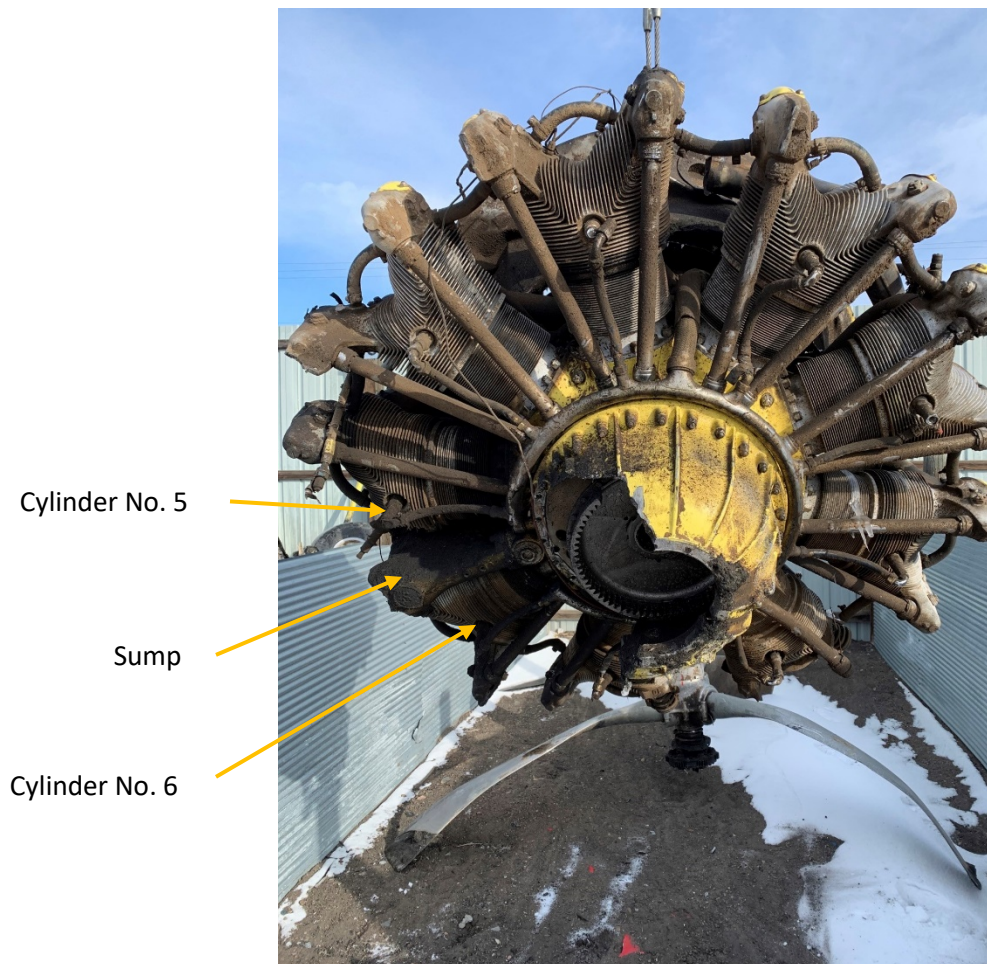


Figure 13, Engine



Figure 14, Engine Data Plate



Figure 15, Reduction Drive Gear

Engine Examination Summary

Engine continuity was confirmed. All physical damage to the engine was consistent with ground impact.

G. SUMMARY OF PROPELLER EXAMINATION

Hamilton Standard 23D40-311 Propeller [Mfg. No. N216163]

The three-bladed Hamilton Standard 23D40-311 propeller was broken out at the reduction gears and gear housing. The propeller hub was intact and all three blades remained in the hub. All three propeller blades showed S-bending and chordwise scratches, and leading edge gouges. The reduction gears were attached to the hub of the propeller. The teeth in several of the gears were mashed and broken.



Figure 16, Propeller



Figure 17, Reduction Gears



Figure 18, Propeller Blade 1



Figure 19, Propeller Blade 2



Figure 20, Propeller Blade 3

Propeller Examination Summary

All physical damage to the propeller was consistent with the propeller turning at high rpm when it struck the ground.

H. ADDITIONAL INFORMATION

On completion of the examination, all airplane wreckage was released to Beegles Aircraft Services, LLC.