

National Transportation Safety Board

Office of Aviation Safety

Washington, DC 20594



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EXAMINATION SUMMARY

July 7, 2024

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A. ACCIDENT

Location: Andale, Kansas
Date: July 5, 2024
Time: 0801 CDT
1301 UTC
Helicopter: Faber Vincent L, Scorpion 133, S/N: F883417

B. EXAMINATION SUMMARY

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C. SUMMARY

On July 05, 2024, about 0801 central daylight time, an experimental amateur built Rotorway Scorpion 133 helicopter, N51017, was substantially damaged when it was involved in an accident near Andale, Kansas. The pilot was fatally injured. There was a postimpact fire. The helicopter was operated as a Title 14 *Code of Federal Regulations* Part 91 personal flight. A witness, who was traveling in a motor vehicle in the area, heard a loud "bang" and observed debris separating from the helicopter as it descended to the ground.

Examination of the airframe and engine were conducted at the accident site by the NTSB and FAA. Following the examination, the wreckage was recovered to the helicopter owner's residential property.

D. DETAILS OF THE INVESTIGATION

1.0 Accident Site

The helicopter impacted a ravine adjacent to a cultivated field on a northeasterly heading and came to rest inverted on northerly heading. The postimpact fire damaged several trees near the main wreckage. The accident site was

about 1.6 miles northeast of the owner's address and point of departure. The tail rotor and tubular structure of the tailboom were located about 150 yards southwest of the main wreckage. The debris path was on a northeasterly heading and about 300 ft in length.



Google Earth image of accident site.



Photograph of main wreckage.

2.0 Airframe Examination

All major components of the helicopter were observed at the accident site. The composite fuselage was consumed by the postimpact fire. The fuselage tubular structure exhibited impact and thermal damage. The pilot and copilot seats and their respective restraints were destroyed. About 2 ft of the forward tubular structure that contained the antitorque pedals was impact separated. The flight and engine instruments were thermally destroyed.

The antitorque pedal linkages remained attached and the control cable was impact separated from the rod end bearing. The pilot and copilot cyclic controls remained attached to their respective attach points. The cyclic interconnect push-pull tube was impact separated about mid-span. The cyclic control cables remained attached to their respective attach points. The pilot and copilot collective controls remained attached. The collective control push-pull tube was separated from the cockpit controls and separated midspan to the main rotor scissor.

The main rotor drive belt was mostly consumed by fire. The tensioner rotated freely when facilitated by hand. The tensioner control cable remained attached to the cockpit control and was continuous to the tensioner assembly. The pitch change links were intact, and the scissor was fractured from the non-rotating swash plate; the fracture surface exhibited a dull gray appearance consistent with overload separation. The pitch-change horns remained intact.

Main rotor drive continuity was confirmed from the rotor head to the lower drive pulley. The freewheeling unit functioned normally during field testing. Both

main rotor blades remained attached and exhibited downward droop. An impact mark was observed on the main rotor mast beneath blade **W**. Blade **S** displayed thermal discoloration, and a mid-chord skin separation was present about 2 ft inboard of the tip.

Blade **W** exhibited aft bending about 3 ft from the tip, and a mid-chord upper-skin separation was noted approximately 4 in from the tip. Gouging and an impression consistent to that of impact with a threaded fastener were noted to the outboard leading-edge area of the blade. A leading-edge impression consistent with contact from a steel ballast weight was identified on the blade. The ballast weight showed deformation and material transfer consistent with impact from a main rotor blade. Leading-edge abrasions consistent with contact from the tail rotor control cable were noted approximately 8 in from the blade tip.

The tail rotor assembly and about 3 ft of the tail boom's tubular structure were separated from the helicopter. The remaining structure exhibited leftward deformation at the separation area. The tail rotor drive belts were fractured and separated from their respective pulleys. Deformation was observed on the tail rotor drive pulley and its supporting structure. The tailrotor control cable rod end remained attached, and the cable housing was impact separated at its tail rotor attachment point. Both tail rotor blades and pitch change links remained attached to their mounts. One blade exhibited deformation at the tip. The other blade displayed a semicircular impression on the leading-edge near mid-span, with black transfer marks consistent with the paint from the tail boom's tubular structure. White transfer marks were present on the tail rotor drive belt pulley. The tail rotor drive pulleys rotated freely when facilitated by hand.

The horizontal stabilizers and their supporting tubular support structure were separated from the helicopter. The right horizontal stabilizer was fractured into two sections and exhibited leading-edge damage.



Photograph of main rotor mast impact under blade **W**.



Photograph of separated tailboom section.



Photograph of tailrotor control cable abrasion noted to leading-edge of blade **W**.



Photograph of threaded fastener impression noted to leading-edge of blade **W**.



Photograph of ballast weight impact with blade **W**.



Photograph of separated tailboom structure threaded fastener and blade **W** impact impression.

3.0 Engine Examination

Make: Rotorway
Model: RW 152
Serial Number: RW152-1882

The engine remained attached to the airframe and exhibited impact and thermal damage. The radiator and oil cooler were destroyed. The water pump rotated freely during hand rotation; its V-belt was destroyed. The exhaust system remained attached to the engine and displayed impact damage.

Majority of the ignition system was destroyed. No anomalies were noted to the spark plug electrodes. Oil was present within the engine, and the valvetrain showed no anomalies. Impact damage prevented rotation of the crankshaft by hand.

The fuel tank and fuel lines were mostly destroyed by fire. The fuel valve was in the "on" position and continuity was established during a field test with low-pressure air. The carburetor remained attached to its mount and exhibited thermal damage. It was observed in the idle position, and the fuel inlet port was unobstructed. The air filter and induction tubes were destroyed. The carburetor control cable was thermally separated from the collective control and the snap out ball joint was separated from the carburetor. The ball joint's safety sleeve was out of position and firmly attached to the barrel.



Photograph of snap out ball joint separated from the carburetor.



Photograph of ball joint safety not in position.

4.0 Pilot Information

On March 28, 2013, the pilot was issued a private pilot certificate with an airplane single-engine land rating. He was issued a Third-Class Medical Certificate on December 19, 2022, with the following limitation: "Not valid for night flying or by color signal control." At the time of the exam the pilot reported a total of 128 hours of flight experience.

A review of the pilot's logbook revealed he had accrued a total of 32.6 hours of dual instruction, 28.8 hours of solo, and a total of 61.4 hours in the accident helicopter. The last entry was dated May 17, 2024.

Additionally, he completed a pre-solo written examination for the Rotorway Scorpion on October 22, 2020. He received pre-solo flight training on September 28, 2021, and a solo endorsement was issued on October 07, 2022. There were no other solo endorsements noted.

5.0 Additional Information

The helicopter's airworthiness date was issued on April 26, 1988. There were no maintenance logbooks observed during the investigation; however, a notepad was provided which showed dates with brief descriptions of maintenance performed. There were no hours recorded, and no record of the last condition inspection.

The recovered ballast weights consisted of a steel plate, dumbbell, and barbell plate which totaled about 65 pounds. The ballast was not secured in the helicopter and their location in the helicopter was unknown.

There was no ATC communications, data recording devices, ADS-B data or radar for the accident flight.

Submitted by:
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