



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Western Pacific Region

DATE March 17, 2019

AIRFRAME AND ENGINE EXAMINATION

WPR19LA097

This document contains 3 embedded photos.

A. ACCIDENT

Location: Newberg, OR.

Date: March 17, 2019

Aircraft: MD Helicopter 396HS, N119T

B. EXAMINATION PARTICIPANTS:

Name: Fabian Salazar
Duty Position IIC
National Transportation Safety Board
Federal Way, WA 98003

Name: Darren K. Vaughan
Duty Position: FAA Representative
Federal Aviation Administration
Hillsboro, OR.

Name: Joan Gregoire
Duty Position Chief Air Safety Inv.
Organization: MD Helicopters Inc.

Name: Jon Michael
Duty Position: Chief Air Safety
Organization: Rolls-Royce Engines

C. SUMMARY

On March 21, 2019, an examination of the airframe and engine was conducted at a secure hangar in Toledo, WA. No evidence of preimpact mechanical malfunction was noted during the examination of the airframe. An examination was conducted on the engine at the owner's hangar. The engine was then transported to Keystone Turbine Engine Services, Coatesville, PA. for an additional examination and test run. After the examination and engine test run was conducted on May 7, 2019, it was determined there were no preimpact mechanical malfunctions or failures on the airframe or engine that would have precluded normal operation.

D. DETAILS OF THE INVESTIGATION

The NTSB did not launch to the accident site.

WRECKAGE AND IMPACT INFORMATION

AIRFRAME

Right-Side Fuselage.

When first examined the helicopter was resting on its right side. The right-forward door remained attached the fuselage at the lower hinge and had separated from the fuselage at the top hinge. The door sustained crush damage. The right-rear door remained attached to the fuselage at both hinges and sustained some crush damage. The right-side fuselage sustained crush damage near the forward windshield frame. The lower windscreen or “chin bubble” separated and was found in the debris field. The upper wind shield remained intact and undamaged. The top-right windshield separated from the fuselage and was found in the debris field. The forward portion of the doghouse was undamaged. The rear portion of the doghouse sustained damage consistent with main rotor blade contact. The right-side engine access clamshell door was removed and displayed minor damage. The tail boom sustained damage consistent with multiple main rotor blade contacts. The fuel cell was opened via the access port at the top of the fuel cell. The fuel cell was empty. There were no breaches to the fuel cell.

Empennage

The empennage separated along with the tail rotor gearbox and tail rotor assembly and about four inches of the tail boom. The left side of the tail boom displayed dents consistent with contact from the main rotor blades. The left- rear of the fuselage displayed minor damage. The vertical fin and horizontal stabilizer displayed minor damage. The lower vertical fin displayed damage and evidence of contact with the ground.

Left-side Fuselage

The left-side clamshell engine access door was removed and displayed minor damage. The fuselage displayed minor damage along the left side. The lower forward portion of the left side of the fuselage, below and forward of the left-side forward door, sustained a large dent which crushed the fuselage upwards and inwards. Both the left-rear and left-forward doors remained attached at the hinges and sustained minor damage.

Main Rotor System

The main rotor system sustained damage to all four rotor blades, blade grips and the hub. All rotor blades sustained damage consistent with contact with terrain while rotating. Two main rotor blades demonstrated near identical upward bending and wrinkling along the entire length of the upper side. One blade displayed a bend of about 130° at about 24 inches from the root, along with wrinkles and dents along the entire length. One blade would not release from the hub, requiring it to be cut off at the root. This blade displayed upward bending and wrinkling along the entire length of the blade.

Tail Rotor Assembly

The tail rotor assembly remained attached to the 90° gearbox. The gearbox remained attached to the last 4 inches of the tail boom and contained oil. The oil appeared normal and did not contain evidence of metal chips. One tail rotor blade displayed minor damage and the other displayed damage at the tip consistent with contact with the ground.

Landing Gear (High Skids)

The left skid was found intact and had separated from the fuselage along with portions of the fore and aft struts. The aft-left strut separated from the fuselage at about 9.5 inches from the fuselage. The front-left strut had separated from the fuselage about 15 inches from the fuselage. The right skid remained attached to the helicopter. A portion of the right skid, from the tip to the right-front strut separated and was found in the debris field.

Flight Control Continuity.

Flight control continuity was established from the cyclic and collective control sticks to the swashplate. Tail rotor control continuity was established from the tail rotor pedals to the tail rotor. Throttle continuity was established from the left collective throttle to the fuel control.

Instrument panel.

The instrument panel was examined. The following instruments and their positions were documented.

Airspeed: 0 Knots

Attitude Indicator: 5° left bank.

Dual tachometer: Rotor: 0 RPM, Engine 0 RPM

IVSI: 200 feet per minute descent

Turbine Outlet Temperature: 0°

Torque: 0 pounds

Oil Pressure: 0 PSI

N1: 0%

Engine Out Light: Illuminated

GEN OUT Light: Illuminated

FUEL LOW: Illuminated

Key: OFF

Anti-COLL light: ON

Position Lights: ON

DC Amps: Unknown

Engine Oil Temp: 0°

Fuel: 0 pounds

Start Pump: OFF

RMI: °260

Engine.

The engine was examined at the secured hangar. During the examination, the engine deice control valve was found to be disconnected and disabled. The engine turned freely at the compressor, N1 and N2 turbine wheels 1 through 4. Liquid was found in the engine mounted fuel pump filter bowl and had the sight and smell of jet fuel. No air leaks were detected in the engine fuel lines. No contaminants were found in the engine oil filter. The oil bypass button was not extended. Based on the initial examination results, it was determined the engine would be a good candidate for further examination and potential engine test run.

On May 7, 2109, the engine was further examined at Keystone Turbine Engine Services, Coatesville, PA. The engine was removed from the shipping crate and placed in the engine run test cell. The engine started and ran normally with no mechanical malfunctions or failures that that would have precluded normal operation.

PHOTO ARRAY



Photo 1. N119T. Resting on its right side. Photo NTSB.



Photo 2. N119T Underside View. Photo NTSB.



Photo 3. Engine Top View. Photo NTSB.