



## **NATIONAL TRANSPORTATION SAFETY BOARD**

Office of Aviation Safety  
Western Pacific Region

DATE December 21, 2020

# **AIRFRAME AND ENGINE EXAMINATION**

**WPR20LA189**

This document contains 10 embedded photos.

## **A. ACCIDENT**

Location: Minden, Nevada  
Date: June 21, 2020  
Aircraft: N342J / Aerospatiale SA-342J  
NTSB IIC: Fabian Salazar

## **B. EXAMINATION PARTICIPANTS:**

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

Name: Seth Butner  
Technical Advisor  
Air Bus Helicopters  
Fort Worth, Texas

Name: Bryan Larimore  
Technical Advisor  
Safran Helicopter Engines  
Fort Worth, Texas

## **C. SUMMARY**

The IIC did not travel to this accident site. The engine and transmission were examined in the owner's hangar. The was then shipped to Fort Worth, Texas for further examination. Due to tooling needs, the engine components were shipped to France where they were examined by employees of Air Bus Helicopters. Post-accident examination of the transmission, fuel control and the compressor bleed valve revealed no preaccident mechanical malfunctions or anomalies that would have precluded normal operation.

## **D. DETAILS OF THE INVESTIGATION**

**Airframe Examination.** The airframe was consumed by a post-accident fire and was then subsequently transported to a landfill prior to any agency getting the opportunity to examine it.

Fuselage. Unless identified differently, all components were thermally damaged and reduced to ash. The fuselage was oriented on a heading of about 160° magnetic, consistent with rotating away from the ingress direction. A small section of the windshield frame was resting at the nose of the wreckage. The instrument panel was consumed by fire. The seats and seat belts were consumed by fire.

Tailboom. The aft section of the tailboom, housing the fenestron, was not thermally damaged and located away from the fuselage about 50 feet. This section came to rest upright. The vertical stabilizer, above the fenestron, separated and was located close by. The right vertical stabilizer, located on the outboard end of the right elevator (horizontal stabilizer) was partially separated and exhibited damage. The right elevator exhibited damage to the leading edge and top side sheet metal. The left vertical stabilizer, located on the outboard end of the left elevator remained attached to the left elevator, and exhibited damage to the upper half. The left elevator remained attached to the tailboom and exhibited minor damage to the top side sheet metal.

The forward end of the separated tailboom exhibited a jagged cut, with the sheet metal oriented to the left, consistent with contact from the clockwise rotation of the main rotor system.

Anti-Torque Assembly (Fenestron): The fenestron assembly remained attached to the end of the tailboom. The drive shaft remained attached to the fenestron. The fenestron gearbox did not exhibit damage. The fan blades remained attached to the hub and exhibited no damage to the any of the blades.

Main Rotor System. The three-bladed main rotor system remained attached to the transmission and was within the area consumed by fire. With reference to the nose of the helicopter, the blades came to rest in this order. The A blade came to rest at the 2 O'clock, the B blade came to rest at the 5 O'clock, and the C blade came to rest at the 9 O'clock position.

The A blade remained attached at the hub, was thermally damaged at the root but the tip, inboard to about 6 feet exhibited minor thermal damage. The tip of the blade exhibited dents and minor deformity, consistent with low energy impact. There was evidence of minor chord-wise scoring inboard of the tip about 4 feet. Inboard of the tip about 6 feet the blade exhibited major thermal damage to the root of the blade. There was no chord-wise bending and no span-wise bending of the blade.

The B blade remained attached to the hub and exhibited thermal damage from the root outboard to about 5 feet from the root. The trailing edge exhibited a span-wise opening outboard to the blade trim tab. The tip of the blade remained buried in the soil and was not examined. There was no chord-wise bending and minor span-wise bending of the blade.

The C blade remained attached to the hub and exhibited major thermal damage throughout the span of the blade. There was no chord-wise bending and minor span-wise bending of the blade.

The entire main rotor system, while thermally damaged, remained intact and exhibited minor impact damage. There was evidence of ground contact, and tailboom contact by one or all the main rotor blades, but the visible tips of two of the blades, and the leading edge of all of the blades did not show major deformity and was consistent with low energy rotation.

Main Landing Gear (MLG). The main landing gear consisted of skids and cross tubes. The right-side landing gear appeared to have remained attached to the fuselage and exhibited thermal damage but remained mostly intact. The cross tubes appeared separated from the fuselage by thermal consumption of the fuselage. The cross tubes did not appear to have been spread or deformed. The skid retained its shape and appeared to be aligned correctly with the fuselage debris.

The left cross tubes appeared to have remained attached to the fuselage. The front cross tube appeared collapsed at the area where it met the fuselage, although this could be the result of thermal energy melting the cross tube. The skid exhibited major thermal damage but appeared to align with the fuselage.

Engine. The engine separated from the fuselage and received minor thermal and impact damage. The engine was recovered and examined at the owner's hangar. Examination of the engine revealed that the starter/generator and the engine chip detector were absent from the engine and not recovered. The output shaft turned freely by hand, and proper freewheel operation was confirmed. The gas generator (compressor) would not turn by hand. There was a large dent in the turbine case by a main rotor blade that likely caused the interference with the compressor. Borescope inspection of the three turbines revealed no physical or thermal damage. The oil filter and oil inside was clean and with no metal particles. The bleed valve was closed, consistent with the fuel control set to flight at the time of the impact, and subsequent loss of electrical power. Due to the data received from the engine exam and the non-damaged condition of all three turbine assemblies, it was decided to not ship the engine to Tarnos, France for disassembly. Safran Helicopter Engines, Ft. Worth, Texas did not have the special tools required to disassemble the engine, and it would have been required to ship it to France for the disassembly. The fuel control and the bleed valve were shipped to Tarnos, France for further examination by Safran Helicopter Engines. Examination of the fuel control and bleed valve revealed no anomalies that would have precluded normal operation.

Transmission. The transmission remained in the fuselage and was thermally damaged but intact. The transmission came to rest on its side, facing aft. The rotor head remained attached. The transmission was recovered and examined at a secure facility by technicians of Air Bus Helicopters.

Examination of the transmission, also known as the main gear box (MGB), revealed the 1<sup>st</sup> stage planetary gear assembly rotated freely without binding. No anomalies were noted with the 1<sup>st</sup> stage assembly gears. The 2<sup>nd</sup> stage planetary gears rotated freely with no binding. The input

pinion rotated freely with no binding. The tail rotor output exhibited full rotational movement. The oil filter exhibited coked oil with no chips. Overall, there was no evidence of a seizure of the transmission.

Flight Control Continuity. Flight control continuity was not established due to the wreckage being discarded. The cyclic control sticks were visible in the fuselage area, as were the left-seat anti-torque pedals. The pilot did not report flight control anomalies.

#### PHOTO EXHIBIT

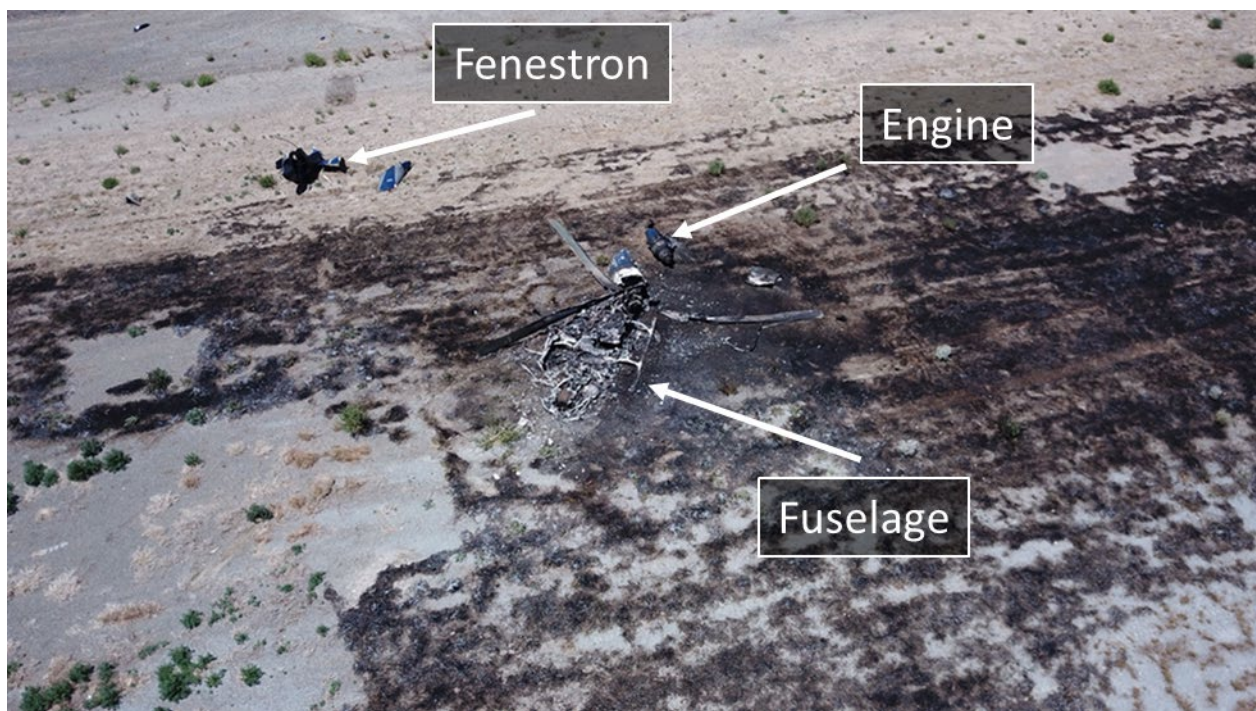


Figure 1. Overhead view, showing the layout of the wreckage. Photo courtesy of the airport manager.



Figure 2. Right-side view. Photo courtesy of the airport manager.



Figure 3. Photo of the fenestron and tailboom end. Photo courtesy of the airport manager.



Figure 4. Left-side view. Photo courtesy of the airport manager.



Figure 5, Right-front view. Photo courtesy of the airport manager.

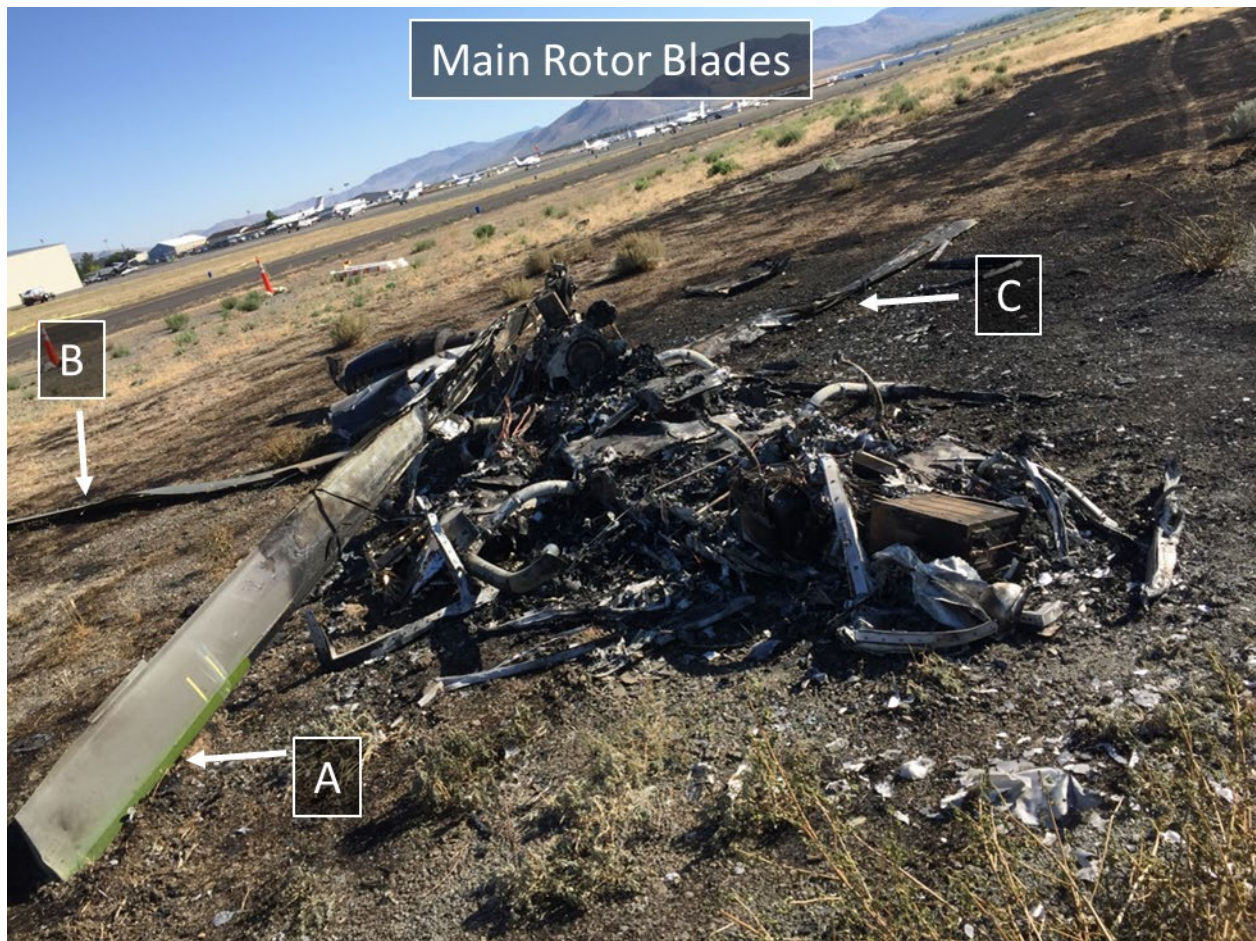


Figure 6. Front View. Photo courtesy of the airport manager.



Figure 7. Rear view. Photo courtesy of the airport manager.



Figure 8. Left-side view. Photo courtesy of the airport manager.



Figure 9. Cockpit view. Photo courtesy of the airport manager.



Figure 10, Left-rear view. Photo courtesy of the airport manager.