

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division

Washington, D.C. 20594

April 23, 2020

ADDENDUM – Sound Spectrum Study

Specialist's Factual Report

By Sean Payne

1. EVENT SUMMARY

Location: Zaleski, Ohio
Date: January 29, 2019
Helicopter: Bell 407
Registration: N191SF
Operator: Viking Aviation, LLC.
NTSB Number: CEN19FA072

On January 29, 2019, at 0650 Eastern standard time, a single-engine, turbine-powered, Bell 407 helicopter, N191SF, collided with forested, rising terrain about 4 miles northeast of Zaleski, Ohio. The helicopter was registered to and operated by Viking Aviation, LLC, doing business as Survival Flight, Inc., as a visual flight rules helicopter air ambulance flight under the provisions of *14 Code of Federal Regulations* Part 135 when the accident occurred. The certificated commercial pilot, flight nurse, and flight paramedic were fatally injured, and the helicopter was destroyed. Visual meteorological conditions existed at the departure location, and company flight following procedures were in effect. The flight departed Mt. Carmel Hospital, Grove City, Ohio at 0628, destined for Holzer Meigs Hospital, Pomeroy, Ohio, about 69 miles southeast.

2. ADDENDUM

The scope of the sound spectrum study has been expanded to compare the sound of a bird, as recorded by a cockpit voice recorder (CVR), impacting a rotorcraft in flight.

One sound event from CEN09MA117 was found in the NTSB laboratory library containing a verified bird strike. For the event, which occurred in the vicinity of Morgan City, Louisiana, the probable cause was determined to be as follows:

(1) the sudden loss of power to both engines that resulted from impact with a bird (red-tailed hawk), which fractured the windshield and interfered with engine fuel controls, and (2) the subsequent disorientation of the flight crewmembers, which left them unable to recover from the loss of power.

Referencing the CVR transcript for CEN09MA117, at 14:09:41.8 the transcript¹ describes: [sound of loud bang and air noise]. One tenth of second later at 14:09:41.9, the transcript describes: [sound of decreasing rotor and engine rpm].

Figure 1 is a screenshot of the spectrograph for the audio from CEN09MA117 around the time of impact.

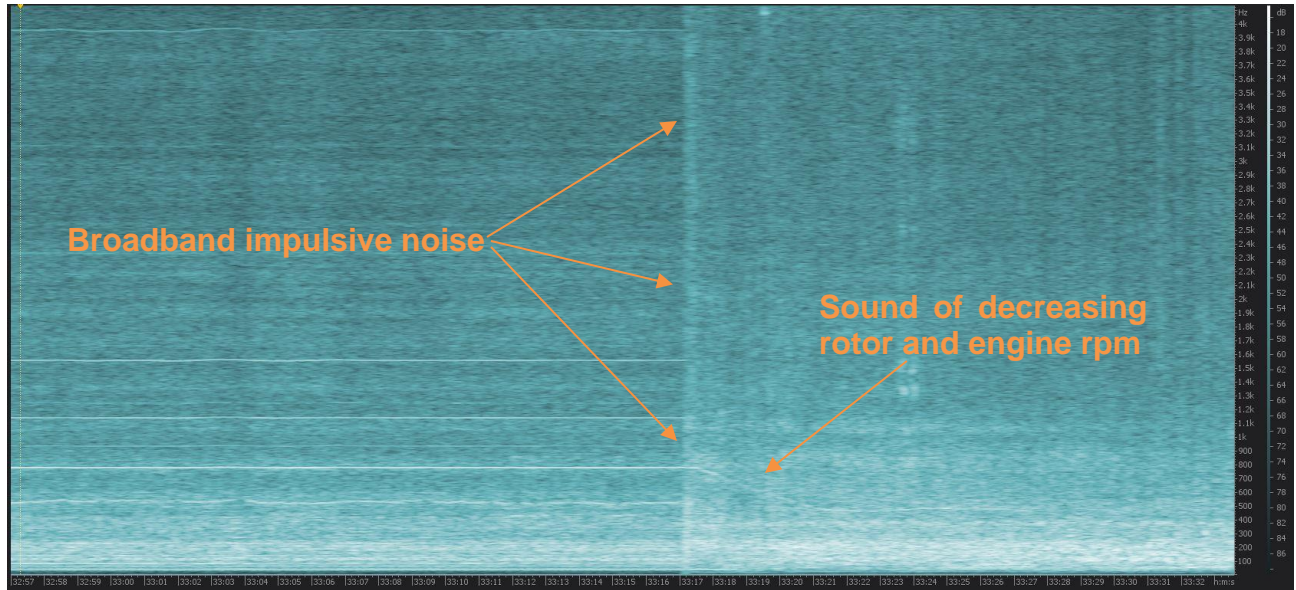


Figure 1. The spectrograph of the audio recording from CEN09MA117 at the time of “[sound of bang and loud air noise].”

The spectrograph in figure 1 shows an impulsive broadband signal throughout the plotted frequency range that appears at the time of “[sound of bang and loud air noise.]”

Figure 2 is a spectrograph using the same display settings of the accident case, CEN19FA072. The Flight Data Monitor (FDM) – Audio Report describes the sound as the following: “[Whining sound, potentially aerodynamic in nature. Lasts until the end of the recording.]”

¹ The transcript can be found in the public docket for the accident CEN09MA117, *Cockpit Voice Recorder 12 - Factual Report of Group Chairman.*

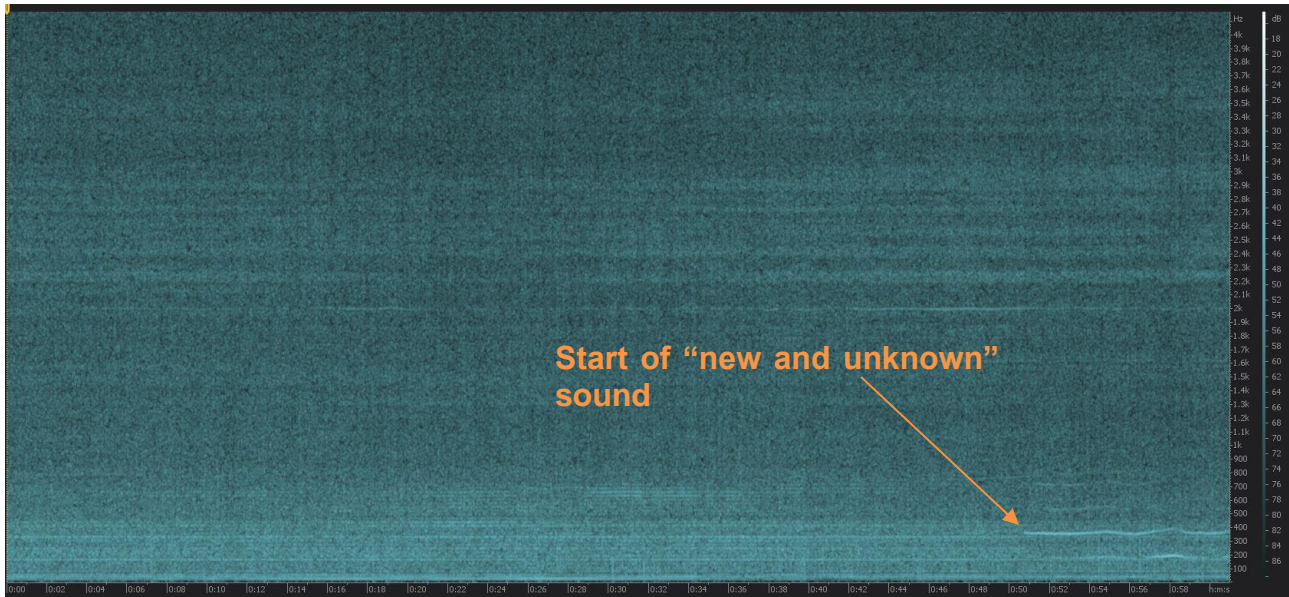


Figure 2. The spectrograph of the audio recording from CEN19FA072 showing the final portion of the accident audio recording.

The sound spectrum study for CEN19FA072 shows the value of this “new and unknown sound” was measured at approximately 180 Hz, with a strong harmonic at 356 Hz. The sound spectrum group continued to describe audio descriptions of this portion of the recording. The transcription group noted the following possibilities:

- Air being rammed into a plenum
- A horn sound, such as air across the top of a bottle. A “blue note.”
- Possibility of air blowing into a window opening