

National Transportation Safety Board

Office of Research and Engineering

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SOUND SPECTRUM

Specialist's Factual Report

January 16, 2026

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A. ACCIDENT

Location: Jersey City, NJ
Date: April 10, 2025
Time: 1515 eastern daylight time (EDT)
1915 Coordinated Universal Time (UTC)
Helicopter: Bell 206L-4, New York Helicopter Charter Inc, N216MH

B. SOUND SPECTRUM SPECIALIST

Specialist Kyle Garner
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National Transportation Safety Board (NTSB)

C. DETAILS OF THE INVESTIGATION

A sound spectrum group was not convened. Two video files were provided to the NTSB from a residence located near the accident site on the west bank of the Hudson River, listed in table 1. Both cameras were oriented east and captured the helicopter's impact with the river.

Table 1. Video report designations and filenames.

Report Designation	Video Filename
Video 1	RingVideo_20250412_092418.mov
Video 2	2CAA8EEFA70F20250411131652_album_local_cache.mov

Video 1 was captured by a Ring camera mounted on the residence's balcony, providing a partial view of the Hudson River. The timestamp shows the recording began at 15:14:16 EDT on April 10, 2025, and the video had a duration of approximately 2 minutes and 45 seconds. It was recorded at a resolution of 568 × 320, 24 fps, with audio sampled at 48 kHz.

Video 2 was recorded by a second camera at the same residence, positioned to capture a panoramic view of the Hudson River. Its timestamp indicates the recording began at 15:14:17 EDT on April 10, 2025, with a duration of about 1 minute and 15 seconds. This video was recorded at 1280 × 720 resolution, 20 fps, with audio sampled at 8 kHz.

Audio from both videos was analyzed to estimate the operating speed of the main rotor and the tail rotor prior to the accident.

D. SOUND SPECTRUM STUDY

The accident helicopter was equipped with a Rolls-Royce 250C-30P turboshaft engine. The main and tail rotors each had two blades. For this configuration, the strongest tonal component in the recorded sound is typically the fundamental blade passage frequency (BPF). For a two-bladed propeller, the relationship between engine speed in RPM and BPF is given in equation 1:

$$RPM = BPF \left(\frac{\text{blades}}{\text{sec}} \right) * \frac{1}{2} \left(\frac{\text{rev}}{\text{blades}} \right) * 60 \left(\frac{\text{sec}}{\text{min}} \right) \quad \text{eq. 1}$$

The nominal rated speeds of the main and tail rotors are approximately 394 RPM and 2,550 RPM, respectively. Using equation 1, the corresponding nominal BPFs are 13.1 Hertz (Hz) for the main rotor and 85 Hz for the tail rotor.

1.0 Video 1 - Spectrogram Analysis

Figure 1 shows a spectrogram of the audio extracted from Video 1 for the first minute of the recording (15:14:16 to 15:15:16 EDT). The horizontal axis represents time in seconds, the vertical axis represents frequency in hertz, and brighter colors indicate higher spectral amplitude.

A region of broadband noise, associated with the helicopter's inflight breakup, appears at approximately 31 seconds (15:14:47 EDT). A second, short-duration burst of broadband noise corresponding to the helicopter's impact with the river is visible around 40 seconds (15:14:56 EDT).¹

Before the inflight breakup, the audio contains multiple discrete, nearly evenly spaced frequency components ranging from roughly 15 Hz to 1000 Hz. These components are generally spaced about 15 Hz apart, and this spacing remains consistent up to the breakup event. The downward slope of these components reflects Doppler shift caused by the helicopter moving toward the camera.

During the inflight breakup, the spectrogram shows a sudden rise in broadband noise across a wide frequency range. At the same time, many of the previously observed evenly spaced frequency components become disrupted or disappear for the duration of the recording. Several frequency bands between 80 and 100 Hz at relatively high spectral amplitude persisted after the breakup and subsequent water

¹ Note that these times are approximate, sourced from the on-screen timestamp, and do not include the travel time of the sound from the helicopter to the camera. At the closest point of passage, the helicopter was about 1,500 feet from the camera's microphone.

impact, which could not be definitively attributed, and may have included another aircraft or helicopter operating in the area.

1.1 Video 1 - Conclusions

Comparison of the pre-breakup, inflight breakup, and post-impact intervals indicates that the evenly spaced frequency components observed before the breakup were likely associated with the accident helicopter.

Although the observed frequency spacing is consistent with a rotating mechanical source, it does not directly correspond to the expected rotor operating frequency for this engine and rotor configuration. Environmental factors, including sound reflections from nearby buildings and potential contributions from other aircraft in the area, limit the extent of the analysis. Thus, the audio did not allow a precise determination of rotor or engine operating speed.

The audio data used in this analysis for Video 1 are provided as Attachment 1 to this report.

2.0 Video 2 - Spectrogram Analysis

Figure 2 is a spectrogram of the audio extracted from Video 2 for the full duration of the video (15:14:17 to 15:15:30 EDT). The horizontal axis represents time in seconds, the vertical axis shows frequency in Hz, and brighter colors indicate higher spectral amplitude.

The audio from Video 2 exhibited a substantially lower overall signal level than the audio from Video 1. In addition, the lower sampling rate of 8 kHz limited the frequency bandwidth of the recording. Despite the reduced amplitude, the spectrogram shows similar frequency patterns occurring at the same points in time. A region of broadband noise associated with the helicopter's inflight breakup appears at approximately 32 seconds (15:14:49 EDT). A short-duration burst of broadband noise corresponding to the helicopter's impact with the river is visible at about 41 seconds (15:14:58 EDT).²

2.1 Video 2 - Conclusions

Similar to Video 1, this recording supported the presence of helicopter-generated acoustic signatures prior to the breakup; however, the low spectral

² Note that these times are approximate, sourced from the on-screen timestamp, and do not include the travel time of the sound from the helicopter to the camera. At the closest point of passage, the helicopter was about 1,500 feet from the camera's microphone.

amplitude limited further analysis, and the data did not allow determination of rotor or engine operating speed.

The audio data used in this analysis for Video 2 are provided as Attachment 2 to this report.

Submitted by:

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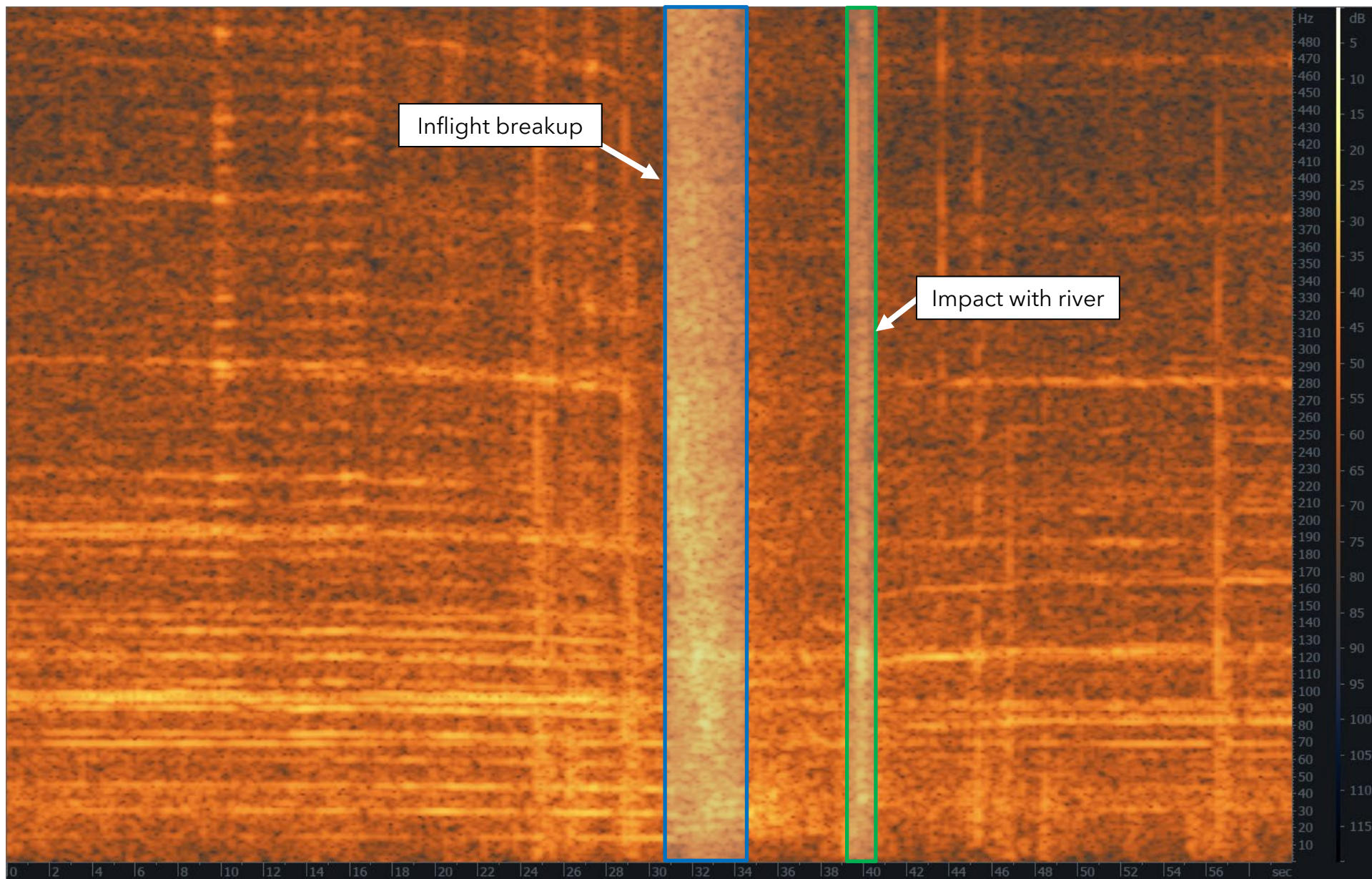


Figure 1. Spectrogram from Video 1.

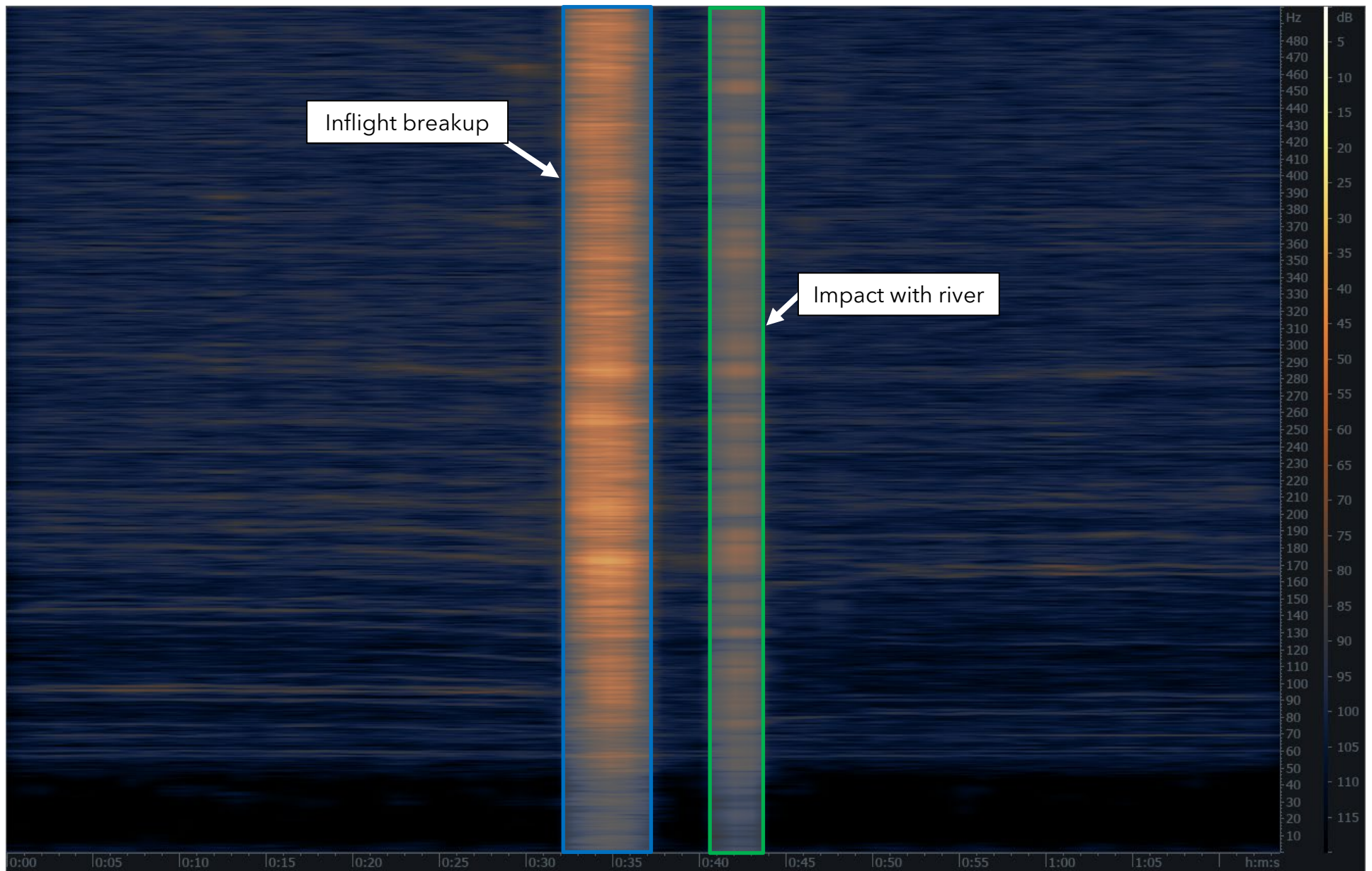


Figure 2. Spectrogram from Video 2.