



**The**

**Safety**

**Wire**

***December 2022***

### **As we move**

into the holiday season and into a new year, I wanted to take the time to thank every one of our members. Without you all, we would not be able to do what we do here at APSA. So, thank you for your continued support. I look forward to continuing to grow and providing outstanding training in the new year to you all that do the job day in and day out.

I want to personally wish everyone happy and healthy holidays. If you happen to be on

one of the crews working over the holidays, we appreciate you for the sacrifices you make and ask that you please continue to be safe during this time.

If you were not aware, last week, APSA hosted an Airborne Thermographer Certification Course in beautiful Tampa, FL. This was a great course with an outstanding turnout. We would like to thank our presenters from Tactical Flying and, as always, a big thank you to our sponsors for the event: Teledyne FLIR, Dallas Avionics, and MD Helicopters. Thank you for our members that attended the course.



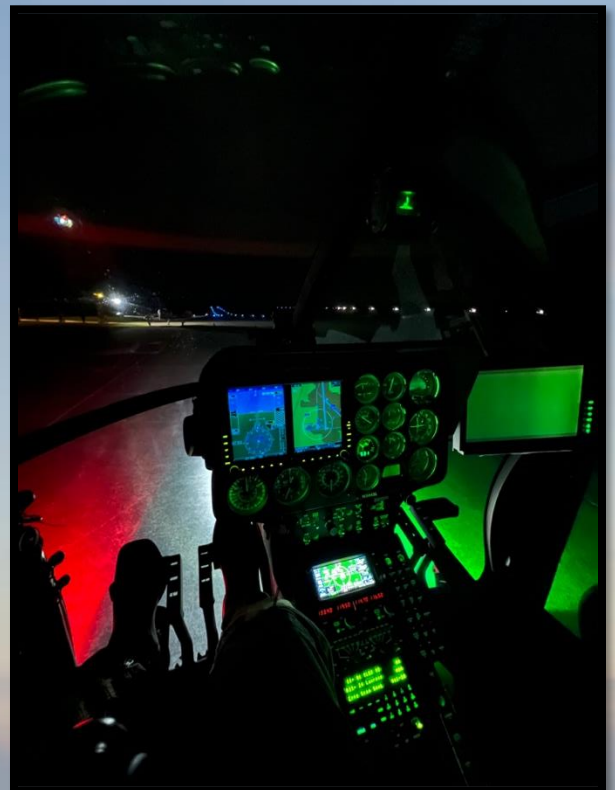
We hope you enjoyed it and took back home valuable information. APSA was back in full swing this year with lots of great events that I was proud to be a part of. Lots of valuable training was provided, many new friends gained, and resources were provided to individuals from all over. We couldn't have done it without our members, presenters, sponsors, and the work of our staff. So, to everyone from the bottom of my heart, I thank each one of y'all for a fantastic year. THANK YOU!



Moving into 2023, I am very excited to get to work and look forward to our already scheduled events. In case you are unaware, the APSA Rescue Summit conducted in conjunction with HELI-EXPO, will be on March 6, 2023.

Our first Safety Seminar of the year is scheduled for March 22-23 in Fort Lauderdale, FL. There are some Safety Stand-Tos in the works and we are continuing our Webinar Series for 2023, so keep checking our website for the latest on these and other APSA training events. I am very excited for the safety program for 2023 and our planned events.

The theme for the new year is Leveraging Tactics and Technology for Safer Operations. I plan to incorporate everything that has been learned over the years about flying the aircraft safely with updated tactics and technology to not only provide a safer operation for the air unit but also our brothers and sisters on the ground. I think 2023 is going to be a great year for the public safety sector of aviation and I can't wait to be a part of it.



In closing, thank y'all for a great year in 2022. Let's enjoy the holidays. I look forward to growing together and having a safe year in 2023. If you want to bring some training into your area, not only for yourself but surrounding agencies, reach out to APSA to help facilitate a Safety Stand-To. These provide great training at no cost to the host.

## ONLINE MEETINGS

APSA conducts regularly scheduled online meetings for safety officers, maintenance technicians, SAR and Natural Resources personnel, and UAS operators that you can join using your computer, mobile device or phone. Online meetings are open to any APSA member. Contract maintenance providers to APSA members are welcome to participate in the maintenance meeting as well. If you would like to join, send an email to:

[safety@publicsafetyaviation.org](mailto:safety@publicsafetyaviation.org)

The schedule for upcoming APSA online meetings is as follows:



### UAS:

Wednesday, January 11, 2023  
1:00 PM - 2:00 PM EST (1800 UTC)

### Safety

Friday, January 20, 2023  
1:00 PM - 2:00 PM EST (1800 UTC)

### SAR

Wednesday, February 8, 2023 1:00  
PM – 2:00 PM EST (1800 UTC)

### Maintenance:

Wednesday, February 22, 2023  
1:00 PM - 2:00 PM EST (1800 UTC)

### Natural Resources:

Wednesday, March 29, 2023  
1:00 PM - 2:00 PM EDT (1700 UTC)

*"Whenever I'm about to do something, I think, 'Would an idiot do that?' And if they would, I do not do that thing."*

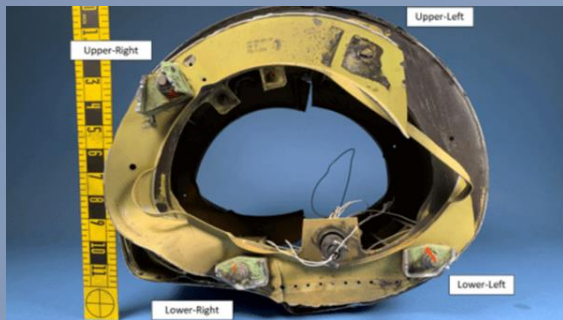
*~ Dwight K. Schrute*

## EMERGENCY PROCEDURE OF THE MONTH

In each monthly emergency situation, discuss what you would do, as a crew, to respond to the following emergency. If the EP does not apply to your specific aircraft, think of something similar.

### Reindeer Strike in Flight

## NTSB Urges FAA to Require Immediate Inspection of Bell 407 Tail Boom Attachment Hardware and Fittings



### Introduction

The National Transportation Safety Board (NTSB) is providing the following information to urge the Federal Aviation Administration (FAA) and Transport Canada to take immediate action on the safety recommendations in this report. We identified this issue during our ongoing investigation of the June 8, 2022, accident involving a Bell 407 helicopter, N402SH, which experienced an inflight separation of its tail boom during cruise flight near Kalea, Hawaii. The NTSB is issuing two urgent safety recommendations each to the FAA and Transport Canada.<sup>1</sup>

### Background and Analysis

On June 8, 2022, about 1726 Hawaii-Aleutian standard time, a Bell 407 helicopter, N402SH, impacted terrain near Kalea, Hawaii, following an inflight separation of the tail boom. The pilot and two passengers sustained serious injuries, and three passengers sustained minor injuries. The helicopter sustained substantial damage during the impact. The on-demand air

tour flight was operated by Paradise Helicopters under Title 14 *Code of Federal Regulations* Part 135.<sup>2</sup>

According to the pilot, about 30 minutes into the flight, the helicopter began an uncontrolled spin to the right. A passenger reported that, as the helicopter continued to spin, she observed something fall off the helicopter; however, she was not able to identify a specific part. The helicopter continued to spin uncontrollably while it descended and impacted an area of rough, uneven, lava-covered terrain.

The examination of the accident site revealed the tail boom came to rest about 762 ft northeast from the main wreckage, consistent with an inflight separation. Examination of the tail boom revealed it separated from the fuselage at the tail boom

attach point. Figure 1 shows the location of separation and the attachment fittings and hardware used to secure the tail boom to the fuselage.

The upper-left tail boom attachment hardware, consisting of a bolt, washers, and a nut, was not present at the accident site and was not found. The attachment fitting remained connected to the fuselage. Damage to the upper-left attachment bolt holes indicates the bolt had been installed at some point before the accident flight; it is unknown at this time when or why the bolt separated. Additionally, the lower-left, lower-right, and upper-right tail boom attachment fittings (connecting the tail boom to the aft fuselage) were fractured and found, along with their attachment hardware, with the tail boom wreckage. The lower-left fitting had multiple fatigue fractures, while the upper-right and lower-right attachment fittings had overload fractures. The initiation of fatigue cracks on the lower-left fitting indicates that the tail boom did not immediately separate from the helicopter upon the separation of the upper-left attachment hardware.

According to Bell (the helicopter manufacturer), the upper-left tail boom attachment fitting has the highest tension loading of the four attachment fittings and is considered the most important of the four attachment fittings between the tail boom and the aft fuselage. The upper-left tail boom attachment bolt separated first, resulting in the redistribution of the load normally carried by the upper-left attachment fitting to the remaining three attachment fittings and the subsequent initiation of fatigue fractures on the lower-left attachment fitting. Based on preliminary analysis of the fatigue crack growth on the lower-left attachment fitting, it is possible that the fatigue crack grew over multiple takeoffs and landings. However, this analysis is ongoing, and the results of the analysis, once completed, will be shared with the FAA and the Transportation Safety Board of Canada.

The Bell 407 maintenance manual requires a torque check of the tail boom attachment hardware and a visual inspection of the tail boom attachment fittings every 300 hours.<sup>3</sup> A review of the accident helicopter's maintenance records revealed that the most recent tail boom attachment hardware torque check and visual inspection of the attachment fittings was completed 114.2 hours before the accident

occurred with no anomalies noted during the visual inspection and no noted loss of torque of the attachment hardware (attachment hardware that is not installed properly, is cracked and/or is near an impending failure could exhibit a loss of installation torque and not pass a torque check). Furthermore, no additional maintenance had been conducted to the attachment hardware since the last torque check.

Our investigation into this accident is ongoing. However, given the findings thus far during the investigation, we are concerned that there may be additional Bell 407 helicopters with missing or fractured tail boom attachment hardware, and the potential for catastrophic failure warrants immediate and mandatory action. The NTSB concludes that any tail boom attachment hardware or fittings that is not installed properly or is fractured is a safety hazard because it can result in an inflight separation of the tail boom, which is catastrophic. Therefore, the NTSB recommends that the FAA and Transport Canada require operators of Bell 407 helicopters to conduct an immediate torque check of the tail boom attachment hardware, as well as a visual inspection of the tail boom attachment fittings for evidence of cracks and fractures, and report findings to their respective regulatory authority.

Our investigation has not yet determined why the upper-left tail boom attachment hardware separated on the accident helicopter. Because the tail boom separated only 114.2 hours after its last torque check and visual inspection, the NTSB is also concerned that instances of improperly installed or fractured attachment hardware or fittings may not be detected within the existing 300-hour recurrent torque check and visual inspection interval and that an in-flight separation of the tail boom could occur on other Bell 407 helicopters.

The separation of the upper-left attachment bolt may not result in an immediate separation of the tail boom but represents an impending catastrophic failure. For the accident helicopter, a shorter torque check and visual inspection interval of the tail boom attachment hardware and fittings, respectively, would have increased the number of opportunities to detect that the upper-left attachment hardware had separated or fractured and the resultant fatigue cracking of the lower-left attachment fitting on the accident helicopter before an inflight separation of the tail boom could occur. The NTSB believes that a shorter torque check and visual inspection interval for all Bell 407 helicopters would increase the likelihood of detecting fractured attachment hardware before a catastrophic failure can occur, and any reported findings from these torque checks and visual inspections can help in understanding when and why the tail boom attachment hardware may separate.

Until the causal factors that led to the separation of the upper-left attachment hardware can be determined and measures are enacted to ensure the continued integrity of the attachment hardware, the NTSB concludes that, as an interim action, a considerably more conservative torque check and visual inspection interval that is

less than 300 hours is warranted to identify any improperly installed or fractured tail boom attachment hardware or fittings to avoid potential separation of the tail boom.

Therefore, the NTSB recommends that the FAA and Transport Canada require operators of Bell 407 helicopters to conduct subsequent torque checks of the tail boom attachment hardware and visual inspection of the tail boom attachment fittings as referenced in Safety Recommendations A-22-28 and -30 at an interval significantly less than the currently required interval to provide multiple opportunities for detecting any improperly installed or fractured attachment hardware or fittings. Require operators to report findings to their respective regulatory authority.

The NTSB notes that determining a more conservative interval for the torque check and visual inspection can be challenging given the limited information available. The time since the last torque check of the accident helicopter (114.2 hours), as well as additional information from the initial torque check and inspection as recommended, could help the regulatory authorities establish an intermediate torque check and visual inspection interval that will provide multiple opportunities to detect potential failures. The data that are collected during the subsequent torque checks of the tail boom attachment hardware and visual inspections of the tail boom attachment fittings can then help regulatory authorities determine factors that could lead to the separation of tail boom attachment hardware and establish the appropriate torque check and visual inspection interval to detect potential fractured tail boom attachment hardware in the future.

The NTSB notes that the need for these actions is based on preliminary findings during our ongoing investigation. Additional actions may be recommended as the investigation proceeds.

## Findings

Any tail boom attachment hardware or fittings that is not installed properly or is fractured is a safety hazard because it can result in an inflight separation of the tail boom, which is catastrophic.

A considerably more conservative torque check and visual inspection interval that is less than 300 hours is warranted to identify any improperly installed or fractured tail boom attachment hardware or fittings to avoid potential separation of the tail boom.

## Recommendations

### **To the Federal Aviation Administration:**

Require operators of Bell 407 helicopters to conduct an immediate torque check of the tail boom attachment hardware, as well as a visual inspection of the tail boom attachment fittings for evidence of cracks and fractures, and report findings to the FAA. (A-22-28) (Urgent)

Require operators of Bell 407 helicopters to conduct subsequent torque checks of the tail boom attachment hardware and visual inspection of the tail boom attachment fittings as referenced in Safety Recommendation A-22-28 at an interval significantly less than the currently required interval to provide multiple opportunities for detecting any improperly

installed or fractured attachment hardware or fittings. Require operators to report findings to the FAA. (A-22-29) (Urgent)

**To Transport Canada:**

Require operators of Bell 407 helicopters to conduct an immediate torque check of the tail boom attachment hardware, as well as a visual inspection of the tail boom attachment fittings for evidence of cracks and fractures, and report findings to Transport Canada. (A-22-30) (Urgent)

Require operators of Bell 407 helicopters to conduct subsequent torque checks of the tail boom attachment hardware and visual inspection of the tail boom attachment fittings as referenced in Safety Recommendation A-22-30 at an interval significantly less than the currently required interval to provide multiple opportunities for detecting any improperly installed or fractured attachment hardware or fittings. Require operators to report findings to their respective regulatory authority. (A-22-31) (Urgent)

**BY THE NATIONAL TRANSPORTATION SAFETY BOARD**

**JENNIFER HOMENDY**

Chair

**BRUCE LANDSBERG**

Vice Chairman

**Report Date: December 1, 2022**