

# NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety  
1515 West 190th Street  
Gardena, California 90248



March 22, 2009

## FACTUAL REPORT

### A. ACCIDENT

Place	: Weaverville, California
Date	: August 05, 2008
Vehicle	: Sikorsky S-61N, N612AZ
NTSB Accident Number	: LAX08PA259
Investigator-in-Charge	: James F. Struhsaker

### B. SUMMARY

On August 5, 2008, about 1941 Pacific daylight time,<sup>1</sup> a Sikorsky S-61N helicopter, N612AZ, impacted trees and terrain during the initial climb after takeoff from Helispot 44, located at an elevation of about 6,000 feet in mountainous terrain near Weaverville, California. The airline transport pilot, the safety crewmember and seven firefighters were killed; the commercial copilot and three firefighters were seriously injured.<sup>2</sup> Impact forces and a postcrash fire destroyed the helicopter. The helicopter was being operated by the United States Forest Service (USFS) as a public use flight to transport the firefighters from Helispot 44 to another location. The helicopter was registered to Carson Helicopters, Inc. (CHI) of Grants Pass, Oregon, and leased to Carson Helicopter Services, Inc. (CHSI) of Grants Pass. The USFS had contracted with CHI for the services of the helicopter.<sup>3</sup> Visual meteorological conditions prevailed at the time of the accident, and a company visual flight rules flight plan had been filed.

### C. ATTENDEES

Elliott Simpson, Air Safety Investigator  
National Transportation Safety Board  
310-380-5658

William Miller, Pilot  
Carson Helicopters  
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Aaron Lighter, Pilot  
Carson Helicopters  
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<sup>1</sup> All times in this report are expressed in terms of a 24-hour clock and Pacific daylight time unless otherwise noted.

<sup>2</sup> The safety crewmember was a USFS Inspector Pilot.

<sup>3</sup> Initially, the NTSB was informed that the contract was between the USFS and CHSI. For further information refer to the Operations Factual Report.

Kirk Deal, Crew Chief  
Carson Helicopters

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**D. COMPONENTS EXAMINED**

The collective bungee cord locks for two Carson S-61 helicopters , N61NH and N7011M, were examined on August 12 and 13, 2008. Both helicopters were equipped with bungee collective locks, the only difference being the type of bungee material used.

The Carson Helicopter representatives who attended the examination stated that all of the S-61 helicopters in the Carson fleet, including the accident helicopter, employed a collective bungee lock of similar design.

## E. DETAILS OF THE EXAMINATION

### 1. Description/Operation:

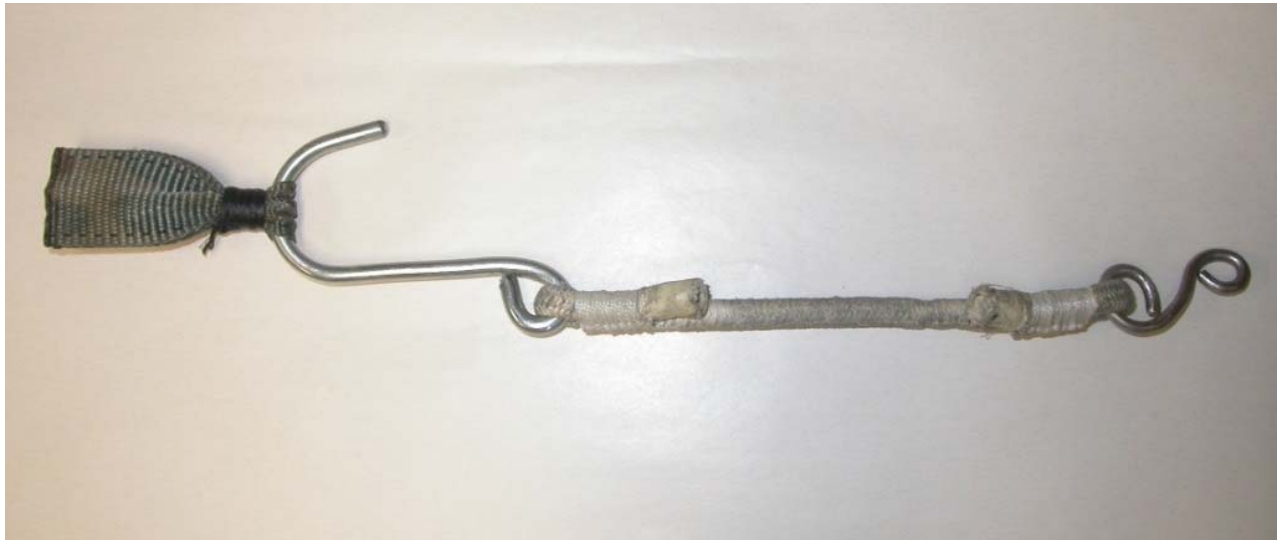
The collective bungee lock for N61NH was installed as shown in figure 1. The system consisted of a bungee cord bound at either end to a steel hook and eyelet. The eyelet was permanently attached to the lower center console with a 1/4" bolt.

The pilot operated the bungee lock by pulling the steel hook into place over the collective control. The force exerted by the stretched bungee material maintained the collective control in the down position.



Figure 1: Bungee Installed on N61NH

Figure 2 shows the collective cord from N61NH. Figure 3 shows the collective lock from N7011M. The strap cord from N7011M operates on the same principal as the bungee cord, but was constructed of solid rubber material.



**Figure 2: Bungee Cord**



**Figure 3: Strap Cord**

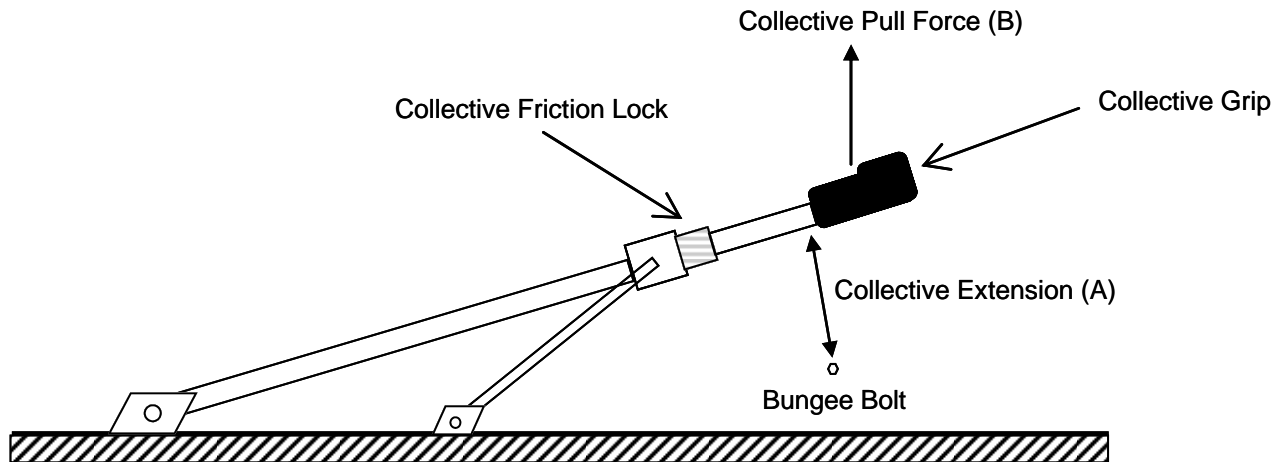


**Figure 4: Comparison of Cord Types**

## 2. Examination/Testing:

The following tests were conducted on N61NH using the bungee cord lock.

The collective control travel was measured relative to the bungee bolt hole in the center console. At full down collective, the dimension (Collective Extension (A), shown in figure 3) was 11.5 inches. The full collective up position corresponded to an extension of 18 inches.



**Figure 3: Collective Reference**

For the following test, the hydraulic system of the helicopter was activated, and the bungee lock was engaged. A spring gauge was affixed to the collective grip, and the force required to raise the collective in one inch increments was measured<sup>4</sup>. The results are displayed in table 1.

**Table 1:**

<b>Collective Extension A (Inches)</b>	<b>Collective Pull Force B (Pounds)</b>
11.5	0
12.5	12
13.5	17
14.5	53

<sup>4</sup> With the bungee attached, the collective could not be raised beyond an extension of 14.5 inches.

The bungee was then removed and the helicopter was flown<sup>5</sup> in order to determine the amount of collective extension required for various flight modes. The results are displayed in table 2.

**Table 2:**

<b>Flight Mode</b>	<b>Collective Extension A (Inches)</b>
Hover to 1 feet agl	15.00
Hover to 70 feet agl	15.25
Transition to forward flight from 70 foot agl hover	15.25

Based on the tests conducted, the collective travel required to bring the helicopter to a hover in ground effect exceeded the range of collective motion possible with the bungee lock installed.

Elliott Simpson  
Air Safety Investigator  
National Transportation Safety Board

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<sup>5</sup> Flight Test Conditions: Winds 360 degrees at 14 knots, Temperature 30 degrees Celsius, Pressure 30.00 inches of Mercury. Helicopter gross weight: 17,150 pounds. Field elevation: 3,701 feet msl.