



Helicopter Crash in California

On August 5, 2008, a Sikorsky helicopter operated by the U.S. Forest Service crashed into trees and terrain while transporting firefighters near Weaverville, California. Nine people were killed in the crash, including seven firefighters, and four others were seriously injured. The U.S. National Transportation Safety Board (NTSB) report stated that the pilots had significantly overestimated the helicopter's load-carrying capacity and therefore did not have an adequate performance margin for a successful take-off, leading to the crash.

The NTSB report also stated that the overestimation of the performance capability was the result of improper inputs to the load capacity model. The manufacturer had provided an incorrect empty weight to the pilot in command, resulting in his overestimating the helicopter's load-carrying capacity. Also, the helicopter's available power chart, provided by the manufacturer, overestimated the emergency reserve power available, reducing the aircraft's load safety margin. In addition, the pilot in command followed an unapproved calculation procedure, provided by the manufacturer, that used an above-minimum specification torque. This procedure increased the error in the load-capacity estimations. These errors, taken together, led the pilots to believe that they could carry a larger load than they actually could. The NTSB report also faulted the oversight provided by the U.S. Forest Service, stating that "effective oversight would likely have identified that Carson Helicopters was using improper weight and performance charts for contract bidding and actual load calculations and required these contractual breaches to be corrected."

Lesson learned: Analytical models and simulations are used in many different aspects of engineering complex space systems. However, the risks associated with



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analysis and modeling are often underestimated, and the hazards are often misunderstood. The failure to understand and address the risks of analysis and models can lead to poor risk decision-making that may result in accidents and mishaps. It is imperative that models be validated, that analyses be independently verified, and that assumptions, limits and uncertainties be explicitly stated. As this accident shows, good models are not enough. Care must be taken with model inputs and results must be verified. 🚫

References

U.S. National Transportation Safety Board, "Crash During Takeoff of Carson Helicopters, Inc., Firefighting Helicopter Under Contract to the U.S. Forest Service, Sikorsky S-61N, N612AZ, Near Weaverville, California, August 5, 2008," NTSB/AAR-10/06, December 7, 2010.