

## **A Squirrel, a Moose, and Loss of Control in Helicopter Accidents**

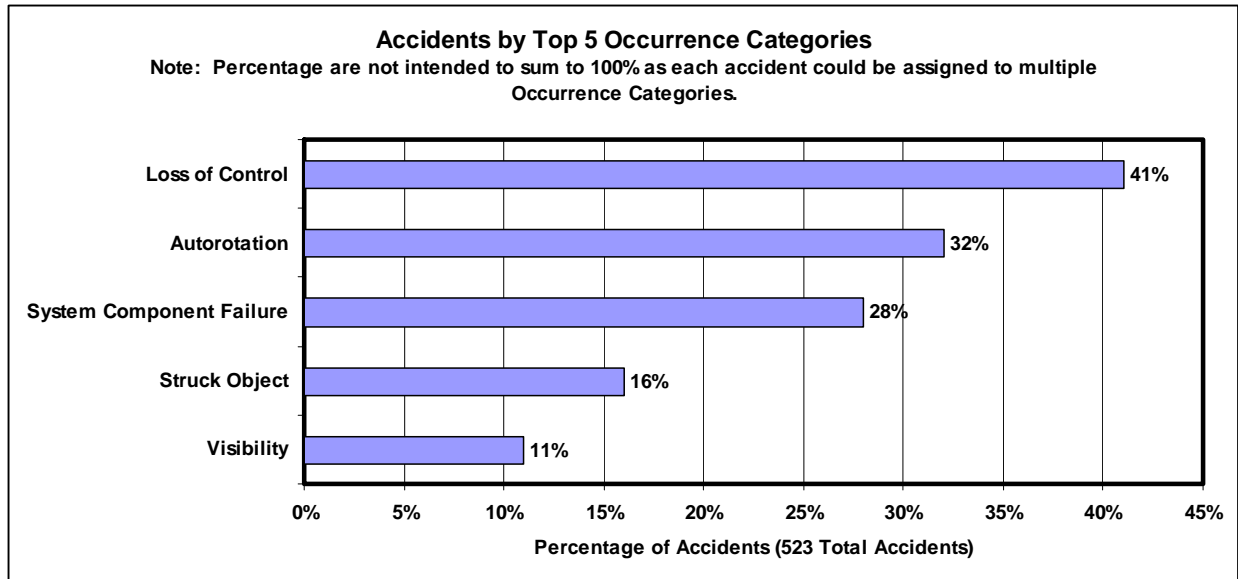
*By Lee Roskop (IHST team member)*

Years ago, many kids used to watch the TV cartoon Rocky and Bullwinkle. For those who have never heard of them, Rocky was a reasonable-minded squirrel and Bullwinkle a dim-witted moose. One of the running gags on the show was a scene where Bullwinkle would say, “Hey Rocky, watch me pull a rabbit out of a hat.” One of Rocky’s typical responses was “But that trick *never* works!” Bullwinkle was not deterred by Rocky’s comment and would respond, “Nothing up my sleeve...Presto!” as he proceeded to try the trick anyway. Inevitably, Rocky was always right. The trick never worked. Every time, Bullwinkle would end up pulling a lion, bear, or something he hadn’t planned on out of the hat instead of a rabbit. However, the unsuccessful outcome never stopped him from trying the same trick again and again.

What do Rocky and Bullwinkle have to do with helicopters? The repetition of Bullwinkle’s failed magic act reflects the data involving Loss of Control helicopter accidents due to Performance Management. The International Helicopter Safety Team (IHST) defines these accidents as events precipitated by either insufficient engine power or main rotor rpm that were NOT attributable to a mechanical failure. In each accident, the situation deteriorated as the performance demands that were required progressed beyond what the helicopter could provide. The resulting condition exceeded the pilot’s ability to control the aircraft. By that point, it would have taken nothing short of magic to stop the accident. Case after case of these accidents progressed in a similar manner, just like Bullwinkle’s act. Unfortunately, also just like his act, in the end, it never worked.

This accident data was analyzed by the Joint Helicopter Safety Analysis Team, a sub-committee of the IHST. The IHST was formed in 2005 to lead a government and industry cooperative effort to address factors that were affecting an unacceptable helicopter accident rate. The group’s mission is to reduce the international civil helicopter accident rate by 80 percent by 2016. From 2006 to 2011, the analysis team completed an analytical review of three years of U.S. helicopter accident data from 523 different accidents.

The IHST’s analysis team cited Loss of Control as an accident occurrence more frequently than any other category. The team noted Loss of Control was evident in 217 (41%) of the 523 accidents they analyzed and the following chart shows how Loss of Control compared to other occurrence categories. (Note that percentages in the chart do not add up to 100% because the team’s methodology allowed for any accident to be categorized in multiple occurrence categories. One accident may be included simultaneously in Loss of Control, Autorotation, and Abrupt Maneuver categories if each category was applicable.)



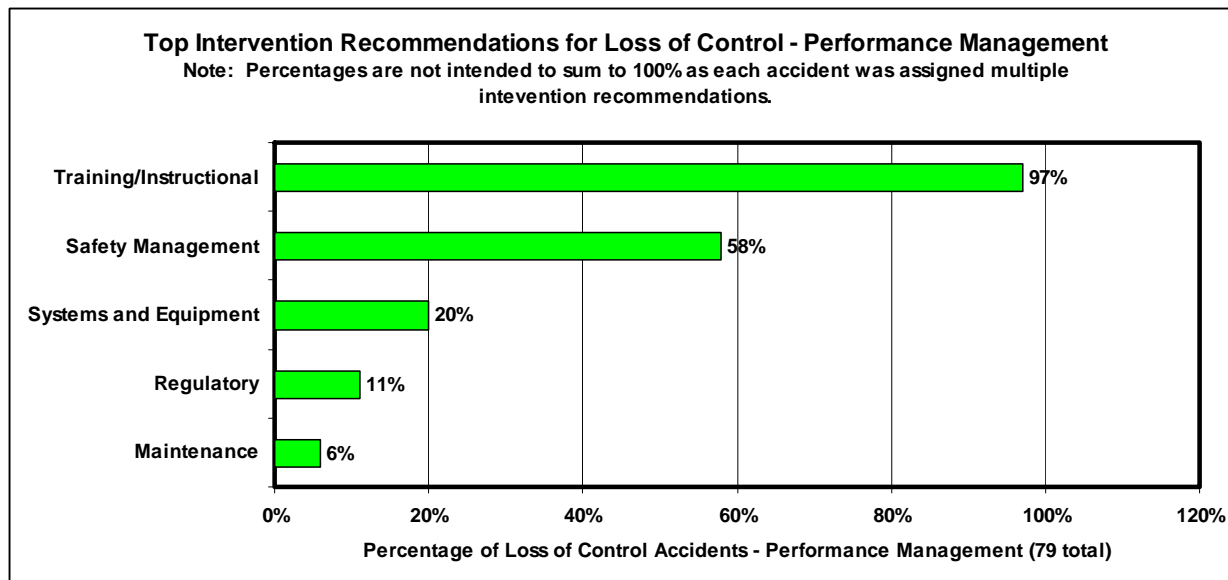
There were a number of more detailed sub-occurrence categories encompassed under Loss of Control. However, Performance Management was selected more than twice as often as any other (79 out of 217 Loss of Control accidents). From the NTSB investigations for each of these cases, many of the performance management problems in the accidents involved one of three scenarios:

- Low main rotor rpm during practice autorotation
- Tailwind during hovering, takeoff, or landing
- High density altitude operations

The analysis team assessed the series of problems that were evident in each event and determined that pilot judgment and actions were contributory to 99% of the accidents where Loss of Control from Performance Management occurred. For the three scenarios previously listed, a lapse in pilot judgment and actions manifested itself in the following ways:

- Practice Autorotation
  - The instructor allowed low main rotor rpm during their demonstration of the maneuver. A power recovery was necessary, but either was not attempted or delayed until it was too late.
  - The student allowed low main rotor rpm during the maneuver and the instructor either chose not to intervene or intervened too late.
- Tailwind
  - The pilot either underestimated or did not consider the increased power demands of hovering, taking off, or landing with a tailwind.
- High density altitude
  - The pilot underestimated the effect of density altitude on power required during an approach and was unable to arrest descent rate with power available.

In perhaps the most important part of the IHST work, a number of interventions have been suggested that could have prevented the accidents. The chart shows the intervention recommendations as they applied to the 79 accidents categorized as Loss of Control from Performance Management.



The analysis team has more detailed and specific intervention recommendations that expand upon the broader, high-level recommendations shown in the chart. For the 97% of Loss of Control accidents from Performance Management where Training/Instructional methods is cited as an intervention, some of the more specific recommendations the team highlighted were:

- Inflight Power/Energy Management Training
- Simulator Training - Advanced Maneuvers
- Enhanced Aircraft Performance & Limitations Training
- CFI Training and Refresher on Advanced Handling, Cues, and Procedures
- Emphasis for Maintaining Cues Critical to Safe Flight

The IHST is leading an effort to get members of the helicopter community from trying the same tricks over and over again even when they don't work. If we can take some of the insight from the accident analysis and apply it to how we go about our day to day business, we can be part of a change for the better. The outcome we are pursuing doesn't involve a reasonable-minded squirrel, or a dim-witted moose, and hopefully, no attempts at bad magic - - just safer flying.