Mitigating Risk

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While we assume that flight instruction is always conducted safely, as we have seen over the years, it is not. Instructional accidents rates are among the highest in aviation. However, only a small percentage of these accidents are caused by mechanical malfunction, so we must look at ourselves for the solution.

The International Helicopter Safety Team (IHST) is an international organization that was developed to aid in the reduction of helicopter accidents. At a meeting of worldwide helicopter industry professionals held in 2005, IHST members agreed on a 10-year objective to reduce helicopter related accidents by 80 percent. The question everyone was asking is, how?

Earlier this year, IHST members convened for the second time to report on the progress of their work. The Joint Helicopter Safety Analysis Team (JHSAT), a team of IHST members chartered to analyze and find causal factors in helicopter accidents, released their official report. It contained mission-specific accident data that contributed to 197 helicopter accidents.

This data was turned over to the Joint Helicopter Safety Implementation Team (JHSIT), a group of IHST members chartered to make recommendations to the industry based on the recommendations supplied by the JHSAT. These recommendations must be logical, economical and acceptable to helicopter operators. The Federal Aviation Administration (FAA), as well as Canada's similar organization Transport Canada (TC), have truly embraced this process and actively participates at all levels of the organization.

With FAA and TC participation comes the mindset that regulations will be developed and implemented as a result of these findings. This should be done only as a matter of last resort. No one wants additional regulatory oversight, especially when most of the data does not support this as a solution.

The JHSAT's number one recommendation to the JHSIT was the development, utilization and adherence to a comprehensive safety management system. To develop a system around safety, you must first understand what safety is. By definition, safety is "the state of being safe: freedom from the occurrence or risk of injury, danger or loss." In light of that definition, what measures can we take in flight training to be safe?

There are several methods of increasing our level of safety, but none as effective as managing the level of risk itself. The most important component of driving down the cost of risk for an organization is a strategically designed risk mitigation program that proactively targets potential risk multipliers. Structured effectively, a risk mitigation program will prevent losses and reduce the cost of losses that occur while creating a safer operating environment.

In helicopter training, many accidents occur during autorotations. Are autorotations dangerous, or are the elements involved when conducting the maneuvers potential risk multipliers? Some of the increased risks in conducting autorotation training may be high-density altitude, high gross weight, high wind gust spread, direction and velocity, angle of descent and rate of descent.

Being aware of these elements allows the instructor to determine what level of risk is involved when multiplied with the proposed maneuver. In this case, the density altitude may be outside of a safe margin for a specific aircraft due to the characteristics of a low inertia rotor system. For another aircraft, it may be that the aircraft's gross weight is too high when compared to the density altitude. When a risk multiplier is identified, a review of the risk mitigation table is needed.

Often, risk mitigation tables are weighted with a numbering system. For example, 1 could equal low risk, 3 could represent moderate risk and 9 could be high risk. In this case, a condition of high gross weight versus density altitude would score a nine. This is a high-risk condition requiring action by the pilot. An action table will accompany a risk mitigation scoring system. This will provide for a standardized procedure for risk mitigation when confronted with this condition.

A risk mitigation scoring system might work as follows:

Autorotations: High Gross Weight vs. Density Altitude (9, High Risk)

The pilot must determine the aircraft weight appropriate for a particular density altitude. Weight reduction should be achieved by removing cargo or other items from the aircraft. If weight cannot be removed from the aircraft, determine how much flight time is needed to reduce fuel quantity to achieve appropriate weight as determined by a "High Gross Weight vs. Density Altitude Chart." Instructors must ensure no autorotation training is conducted until the aircraft is within limits.

In this example, the instructor would simply reduce the weight of the aircraft to reach the weight needed to fall within permissible limits to conduct this maneuver. By conducting this risk mitigation exercise, the instructor would be able to determine that there is high risk potential. However, even after reducing the weight as outlined in the action table, the risk mitigation number only goes down to a 3 because autorotations by nature have a higher risk potential. The action table when addressing a risk score of 3 should say something similar to "this maneuver requires a high degree of situational awareness at all times."

This method of identifying risk is easily duplicated for any maneuver or training evolution. It is recommended that risk mitigation be conducted on all flights regarding potential weather hazards. Although important, risk mitigation is only a part of a safety management system. Two other elements of a successful program are accurate and comprehensive reporting procedures for incidents or other events and an error-tolerant environment.

An accurate, comprehensive reporting system is the key to the development of policies, procedures and targeted training methodology, and the development of targeted training methods provides a transparent safety net to the overall operation. The more difficult of these two elements is providing an error-tolerant environment. It is normal in our society that someone should be accountable when things go wrong. The tolerance that a safety management system recommends does not remove accountability but acknowledges that human error is a fact of life. If an error occurs that is not intentional, does not occur because the person is operating outside of policies or procedures, and does not occur because the pilot is acting in a reckless or careless manner, then error tolerance may be appropriate.

Let's apply this to the above example. If an instructor were aware that a helicopter's weight exceeded the maximum gross weight for a particular density altitude to conduct autorotation training and did not conduct a risk mitigation evaluation, this would be appropriate ground for punitive action. But if it were determined that the pilot conducted all checks and procedures required, but a weight and balance calculation error caused the pilot to believe the aircraft was within permissible limits, error tolerance is appropriate.

A training program showing the importance of accurate weight and balance calculations and how this mistake contributes directly to an incident elevates the learning opportunity to a correlative level. This is the level of learning that all instructors should try to achieve within the instructional environment.