Stall Training Issue Addressed by FAA, Aviation Industry

Firefighters extinguish flames at the crash site of Continental Connection Flight 3407 operated by Colgan Air, near Buffalo, N.Y., on Feb. 13, 2009. Forty-nine people were killed when the Bombardier Q400 crashed into a house and burned.

At a time when aviation has achieved an extraordinarily high level of safety, regulators and safety organizations are pushing for more improvements in pilot training to preempt future accidents and ensure that new pilots entering the ranks start off with the right approach. One of the key areas receiving extensive examination is stall training, both in the early stages of ab initio training and how it is taught later to pilots who are flying sophisticated high-performance jets.

While accidents such as Air France 447 and Colgan Air 3407 drew attention to this subject, there are many examples of stall-related accidents in which two well trained professional pilots failed to recover from low- and high-altitude stalls.

In the U.S., politicians reacted to the Colgan accident by mandating that all new-hire airline pilots have logged a minimum of 1,500 hours, as if that would magically help prevent stall-related accidents. The FAA, while forced to accommodate the politicians' legislation by enacting new regulations, also made a major change to its advisory material to reflect changing attitudes about stall training.

That change is embodied in Advisory Circular 120-109, which was released in August this year. The changes are also reflected in the Ifalpa Pilot Training Standards, Guide for Best Practices, published by the International Federation of Airline Pilots Associations in September.

In the Ifalpa guide, the key factor related to stalls is figuring out how to incorporate the startle factor into training. It says, "Startle

helps explain why a pilot can demonstrate proficiency in a maneuver during simulator training yet fail to do the maneuver correctly when a similar situation is encountered during flight." As the guide notes, pilots brief the maneuver before training flights, but still may be surprised when the same maneuver is encountered during normal flight. "The response of a startled pilot might include confusion, wrong identification of the situation or possible over-aggressive flight control inputs that could further complicate the situation (such as a stall) or result in an unrecoverable aircraft state."

Ifalpa's recommendation is that more effective training and not just rote checklist procedure accomplishment is better preparation for the startle effect: "The crew must be trained to suppress the startle response, confirm the situation then apply measured and proportional corrective inputs during realistic training scenarios to help create an appropriate response to unexpected aircraft states encountered during flight."

This version of AC 120-109 is just the first part of an FAA effort to address full aerodynamic stall training, according to the FAA, and once developed, that information will be added to 120-109. The agency says that the purpose of the AC, for now, is to "provide best practices and guidance for training, testing, and checking for pilots, within existing regulations, to ensure correct and consistent responses to unexpected stall warnings and stick pusher activations."

The AC clearly and unequivocally summarizes what every pilot should know from the earliest training, knowledge that has been subsumed in procedures that have emphasized minimal loss of altitude rather than reducing angle of attack: "This AC emphasizes reducing the angle of attack (AOA) at the first indication of a stall as the primary means of approach-to-stall or stall recovery [AIN emphasis]. Additionally, this AC provides guidance for operators and training centers in the development of stall and stick-pusher event training."

According to the FAA, the way some pilots were being trained-minimal altitude loss during a stall-is no longer correct. The AC explains, "recovery profiles that emphasize zero or minimal altitude loss and the immediate advancement of maximum thrust have been eliminated. Emphasis is now placed on recognition and avoidance of those conditions that may lead to a stall event. Recovery procedures now emphasize:

* the immediate reduction of the airplane's angle of attack,

* management of thrust and

* returning the airplane to a safe flying condition.

The FAA is not only emphasizing this tried-and-true yet neglected method by disseminating it widely but is also requiring that training organizations adopt this technique immediately. "The primary goal of testing/checking should be to evaluate a pilot's immediate recognition and response to a stall warning and [his] timely, correct accomplishment of the stall recovery procedure," says the FAA. The evaluation criteria should be changed, too. According to the FAA, "Evaluation of the recovery from an approach-to-stall should no longer be based on altitude loss. Pilots should be evaluated on their timely response and effective use of available energy (that is, altitude and speed) during stall recovery."

The AC goes into much more detail on how training providers should update their stall training procedures, but two emphasized items are worth examining further. In one, the FAA discusses "abrupt pitch up and trim change commonly associated when the autopilot unexpectedly disconnects during a stall event. This dramatic pitch and trim change typically represents an unexpected physical challenge to the pilot when trying to reduce AOA. In some airplanes, this may be exacerbated by an additional pitch up when the pilot increases thrust during stall recovery." This is the conspiracy of factors for not only the Colgan accident but also the February 2005 Circuit City Cessna Citation 560 crash, in which pilots failed to add power after leveling off during an approach. (The NTSB seemed more concerned with icing in the Citation accident, but the level-off without power and the autopilot disconnect during the stall were factors in both accidents.)

The other interesting emphasized item is this one, and it is fundamental, critically important and should be underlined and printed in bold type: "Reducing AOA is the proper way to recover from a stall event. Pilots must accept that reducing the airplane's AOA may often result in altitude loss. The amount of altitude loss will be affected by the airplane's operational environment (entry altitude, airplane weight, density altitude, bank angle, airplane configuration and so on). At high altitudes, stall recovery may require thousands of feet."

The AC contains a lot of excellent advice, including training with stick pushers, startle factors, stall prevention and so on. But the essence, as emphasized above, is clearly and unambiguously

stated, an example of FAA material that is on target, important and clearly aligned with the FAA's goal of improving safety.
http://www.ainonline.com/aviation-news/aviation-international-news/2012-12-04/stall-training-issue-addressed-faa-aviation-industry