Training for complex stall warning recovery events

Qantas has incorporated more complex stall warning recovery events in recurrent lesson plans for its Boeing 747 flight crews

These improvements follow an Australian Transport Safety Bureau (ATSB) investigation into an in-flight upset involving a Boeing 747-438 110 km SE of Hong Kong International Airport on 7 April 2017. This is the subject a report by the ATSB, Investigation number AO-2017-044.

While descending toward Hong Kong, air traffic control instructed the flight crew to hold at a waypoint. When entering the holding pattern, the aircraft’s aerodynamic stall warning stick shaker activated a number of times and the aircraft experienced multiple oscillations of pitch angle and vertical acceleration.

During the upset, some passengers and cabin crewmembers struck the cabin ceiling and furnishings, sustaining minor injuries.

The ATSB found that while planning for the descent, the flight crew overwrote the flight management computer-provided hold speed. After receiving a higher than expected hold level, the flight crew did not identify the need to re-evaluate the hold speed. This was likely because they were not aware of a need to do so, nor were they aware that there was a higher hold speed requirement above flight level 200 (20,000ft).

Prior to entering the hold, the speed reduced below both the selected and minimum manoeuvring speeds. The crew did not identify the low speed as their focus was on other operational matters. The ATSB also found that due to a desire to remain within the holding pattern, and a concern regarding the pitch-up moment of a large engine power increase, the pilot flying attempted to arrest the rate of descent prior to completing the approach to stall actions.

In addition, the pilot monitoring did not identify and call out the incomplete actions. This led to further stall warning stick shaker activations and pilot induced oscillations, which resulted in minor injuries to four cabin crewmembers and two passengers.

The ATSB found the flight crew had limited training and guidance for stall warning recovery techniques at high altitude or with engine power above idle. Inconsistencies were also found in flight crew training of the awareness of the need to re-evaluate holding speed when there are changes in altitude, especially above flight level 200.
In the words of ATSB Executive Director Transport Safety Nat Nagy: ‘Balancing competing attention or decision demands can interrupt trained flight crew responses leading to procedures not being completed in full, particularly so if flight crews are not receiving comprehensive and regular training in the application of these skills.

‘Comprehensive theory and practical training can ensure that flight crews have a complete understanding of aircraft systems and maintain effective manual handling skills. This training should provide the knowledge to correctly configure the aircraft’s automatic flight systems and manual handling skills to respond adequately to in-flight upsets.’

Subsequent to the incident, Qantas provided retraining for all Boeing 747 flight crews in stall warning recovery scenarios and amended ground school lesson plans to ensure flight crews were adequately prepared to recover from stall warning activations at high altitudes or with engine power above idle.

Qantas also amended flight crew training manuals relating to hold speed selection and updated ground school lesson plans and information to ensure standardised training and holding pattern training.

In addition, Qantas proactively applied these measures across its Boeing 737 and 787 fleets.

For more information readers are invited to read the report: In-flight upset involving Boeing 747-438, VH-OJU 110 km SE of Hong Kong Airport, on 7 April 2017 to be found here:  

Picture caption
The figure shows the BETTY holding pattern along with the recorded wind conditions, the approximate track of VH-OJU as it entered the holding pattern and the locations of the buffet/stick shaker occurrence and first smoke alarm.  
Source: Hong Kong Civil Aviation Department, annotated by ATSB

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