"I wonder what will happen when I…"

Press (and hold down) the Pusher Interrupt Switch

By John Morris

The continuing saga of when we get bored and think we have it all figured out.

Either while enroute or on short final, we might try the "I wonder what will happen when I…" SPT [Special Pilot Trick] procedures. The procedure in question for this article is use of the Pusher Interrupt Switch.

The answer to the question is easy, it ***will*** interrupt the Stick Shaker-Pusher if the system activates-inadvertently! It will also activate the CAWS/CAS amber PUSHER annunciator after a 3-second delay. So what else is there to know since we are smart? End of short story-see ya.

Of course, this is not the end of the story. Some drivers like to use the Pusher Interrupt Switch while on short final to avoid the possibility of an inadvertent Stick Shaker-Pusher activation. The Stick Shaker-Pusher activation can cause a rather "firm" landing/bounce, or worse. And since we are smarter than the engineers, it must be a system abnormality/fault, right? We will correct for it by use of the Pusher Interrupt Switch as a normal procedure – not approved but used by some as a SPT.

I will first describe the reason for, and the components of, the Stick Shaker-Pusher system. During early development of the PC12, Pilatus discovered that under certain Flap/High Power settings the PC12 was exhibiting unfavorable stall characteristics that would not comply with FAR Part 23.201"Wing Level Stall" [problem was excessive wing drop and altitude loss]. So it was decided to develop an artificial stall (Stick Shaker-Pusher system) well above the actual aerodynamic stall (for any configuration) that not only satisfied the FAR requirement but also included, as a result of the tested system, additional labeling as spin-resistant.

The Stick Shaker-Pusher System consists of a Stick Shaker actuator, Stick Pusher servo/capstan and the Stick Pusher computer. The Stick Pusher computer receives input signals from two Angle-Of-Attack (AOA)

transmitters, an engine torque transducer (different from the EIS torque signal), Flap System, PUSHER Test Switch, PCL switch and PUSHER INTR switch (either control yoke).

- The Stick Shaker Actuator is attached to the central control column to "shake" the pilot/copilot yoke when activated (approaching stall)
- The Stick Pusher servo/capstan is attached to the down elevator cable. When activated (stall) will "pull" the elevator downward and is designed to be overcome with a control column force equivalent to ¾ yoke travel or 70-90 foot pounds via a mechanical slip clutch
- The PUSHER INTR Switch is for inadvertent activation of the Stick Pusher (system). The Pilot's PUSHER INTR Switch will disable the entire PUSHER function (total release while held down) while the Copilots PUSHER INTR Switch will disable the pushing function only (while held down) but the clutch will remain engaged.

The Stick Shaker-Pusher System "stall" is defined as Pusher Activation, nothing else. The System stall, by design, is several knots above actual aerodynamic stall for all configurations. As we should know as PC12 drivers the Stick Shaker *will* activate >10 Kts above the System stall speed for a given configuration. The Shaker only requires one of the AOA inputs reaching its activation point (based on configuration) while the Pusher requires both AOA's reaching their activation points (again based on configuration), and in agreement, to activate.

Normally, when the Stick Shaker activates this can be defined as an approaching stall and we should have sufficient time to react, as in reduce angle-of- attack/add airspeed. Are we supposed to land, or approach to land, while having the Stick Shaker active?

So, back to the use of the Pusher Interrupt Switch before landing. What will happen if you hold it down? First of all the Stick Shaker will still work-luckily. And we might assume that the Stick Shaker is active while you are disabling the Stick Pusher, since it will <u>only</u> stop the "Push" *if* you reach the System "stall" right before touchdown. Sounds like a plan-eh? Have you seen the Pilatus video of a mid-power, aerodynamic stall?

I believe the greatest problem of thinking about using the Pusher Interrupt Switch is not understanding that when I mention configuration it is not just the flaps but the torque as well. Ever wondered why you must advance the torque above 5 PSI when doing the pre-flight Stick Shaker-Pusher System test? Engine torque is used as an input to help define activation points along with Flap settings and Angle-Of-Attack. The easiest way to think of it is: Less torque/more sensitive to Stick Shaker-Pusher activation vs. More torque/less sensitive to Stick Shaker-Pusher activation. If you get the picture you should then get the idea the engineers had developing an "artificial stall" system.

It is possible to approach a landing within normal angles and suddenly have a combined Stick Shaker-Pusher event just above the runway-been there, done that – both planned and unplanned. The best way to avoid this is to be aware of wind shifting causing "inadvertent –pilot induced- yoke movement" and rapid, reduced power adjustment, causing a sudden "PUSH". Why do you suppose that there is a slip clutch as a part of the Stick Pusher servo/capstan? It is not just for 3 feet above the runway but it will suffice if you are holding the control yoke normally. Fabulous landing gear for not so fabulous landings.

Finally, while on the subject of the slip clutch and the Stick Pusher. The procedure for Inadvertent Pusher, POH - Section 3.13.1 is:

1.	Control wheel	HOLD against pusher action
2.	PUSHER INTR switch	PRESS and HOLD
3.	PUSHER SYS circuit breaker	Pull

NOT Hold the PUSHER INTR switch in anticipation of something that should not happen if operating the PC12 correctly.

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