

Cockpit Control Confusion



Inadvertent use of the wrong cockpit control instead of the intended control is a potential situation that pilots may encounter on any aircraft type. This kind of error can occur with even the most experienced pilots and this article explores what factors can influence and lead to this type of occurrence.

The resilience of the aircraft systems to cope with such an error provides effective safety barriers to prevent serious events. The aim of this article is also to raise awareness of the potential causes and effects of cockpit control confusion incidents and provide information about best practices, which can help pilots to reduce the risks that may lead to operational and safety consequences.

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CASE STUDY

Event Description

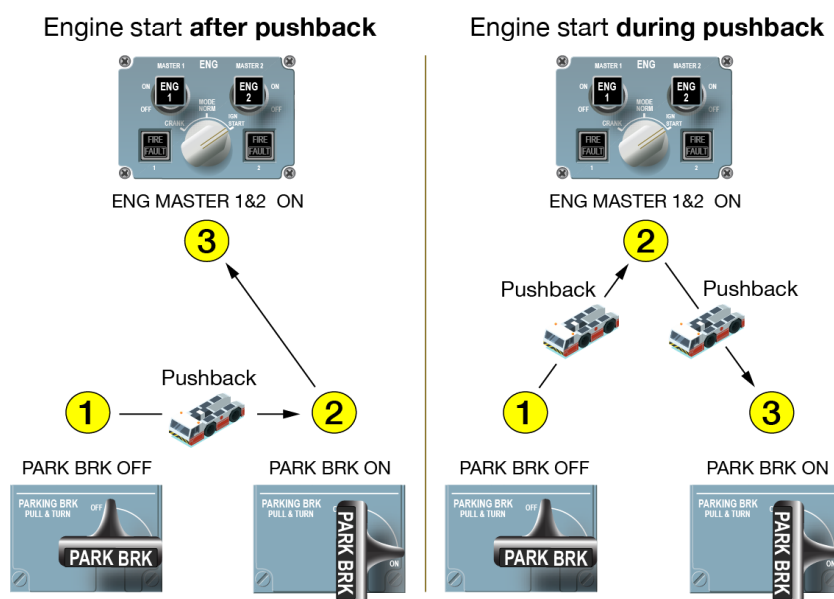
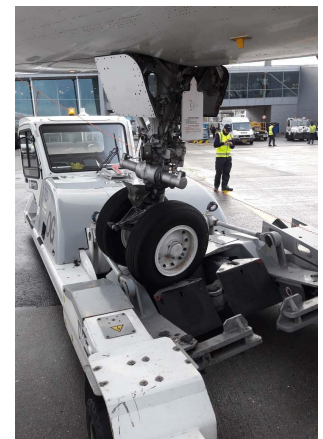
The First Officer, who was Pilot Flying (PF), called the ground crew operating the towbarless pushback vehicle connected to the A319, to state that they were cleared for pushback and engine start. The ground crew called to release the brakes and the First Officer set the PARKING BRK handle to OFF. The flight crew completed the "Before Start" checklist and a few moments after the aircraft began to move, the First Officer called out "starting engine one". The Captain acknowledged the First Officer's call. The First Officer then inadvertently set the PARKING BRK handle to ON causing the aircraft to abruptly stop. The sudden stop caused the nose landing gear to jump out of the tow clamp of the towbarless pushback vehicle and it became lodged on top of the vehicle platform with the nosewheel deflected at more than 90 degrees (**fig.1**). Two cabin crew members, who were performing the safety demonstration at the time of the incident, received minor injuries. The passengers and crew exited the aircraft using steps positioned at the rear cabin door, with no further injuries.

Event Analysis

Parking Brake Handle vs. Engine Mode Selector

During the engine start sequence, the PF inadvertently set the PARKING BRK handle to ON instead of setting the ENG MODE selector to IGN/START. Both controls are located on the pedestal. The PARKING BRK handle needs to be pulled, turned in the clockwise direction to ON, and released. The ENG MODE selector also needs to be turned in the clockwise direction to IGN/START. Both controls are used in the pushback and start sequence by either: (**fig.2**):

- Setting the PARKING BRK handle to OFF before pushback, and setting it back to ON when pushback is complete, and then setting the ENG MODE selector to IGN/START to start the engine, or
- Setting the PARKING BRK handle to OFF before pushback, then setting the ENG MODE selector to IGN/START to start the engine during pushback, and setting the PARKING BRK handle back to ON when pushback is complete.



(fig.1) Picture of the event
(Source: Operator)

(fig.2) The pushback/engine start sequence may vary depending on the situation

Many pilots position their hand on the PARKING BRK handle without making any visual check before moving it as they know very well the specific shape of the PARKING BRK handle on the pedestal and the specific action of pulling and turning to move it. ■

CAUSES OF COCKPIT CONTROL CONFUSION

Situations and Context

The cockpit control confusion situation described in this article occurred in normal operational conditions. Situations that cause high workload, additional stress, and cognitive overload for flight crews can lead to human errors. This is, however, not necessarily the case for cockpit control confusion incidents. In these cases, it is not due to a lack of knowledge and skills of the flight crews. In fact, even the most experienced pilots on current type can experience cockpit control confusion and so there are other contributing factors.

Humans create routines

Humans evolved by optimizing capabilities, and when a skill is acquired and frequently used in the same environment, the human brain creates routines. This human ability for pattern seeking and automatically performing actions allows us to preserve our brain's cognitive resources, making it possible to focus on something else when performing routine actions. For example, flight crews can often perform instantaneous monitoring of the aircraft in normal flight conditions whilst communicating with air traffic control.

Skill-Based Errors

Behaviors based on routines, or so-called “skill-based behaviors”, are when humans perform automatic actions with low conscious control on how they are performing them. According to aviation human factors expert, James Reason*, there are two types of skill-based errors:

- Lapses: when an action is missed
- **Slips: when an action is performed incorrectly**

*Reason, James. *Human error*. Cambridge university press, 1990.

Inadvertently using a cockpit control instead of another in normal situations is a “slip”. Although performed incorrectly, the intention of the action was correct. The momentary absence of attentional control and active thinking when performing the action caused the error and it is not related to a lack of skills or knowledge.



KEYPOINT

Cockpit control confusion incidents are skill-based errors or, “slips”, where the intention is correct, but there is a failure of execution. These incidents happen when a pilot is acting without conscious control over their actions.

Contributing Factors

Routines

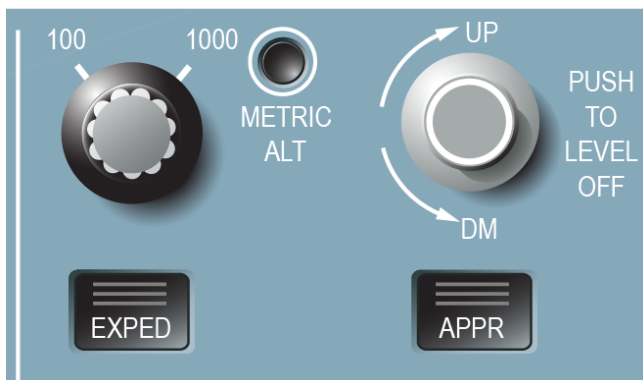
Cockpit control confusion situations are often encountered on the **most frequently used controls**, because routines are more developed on those controls. This is why cockpit control confusion is more often observed with **experienced pilots** performing **well-known procedures**.

Human Factors

Other contributing factors for slips are **fatigue**, **overconfidence**, and **momentary distractions** such as pilot preoccupation or an unexpected interruption when performing a well-known sequence of actions or a flow pattern. **Anticipation** of the action is also a contributing factor. For example, when a pilot habitually rests their hand on the control before activating it, this indicates that the pilot's mind is already committed to performing the next action with that control even if a different control action is called for. This can result in the inadvertent use of that cockpit control.

Shape & Position of the Controls

There are reported cases of confusion between the expedite (EXPED) pushbutton and the approach (APPR) pushbutton (**fig.3**). The EXPED and APPR pushbuttons are located next to each other on the FCU panel, and they have a similar shape and action to select.



(fig.3) EXPED and APPR pushbutton on the FCU of an A320 aircraft

Similarly on the A220 aircraft, there are reported cases of control confusion between the autopilot (AP) pushbutton-switch and the autothrottle (AT) pushbutton-switch. For more information about this example, refer to the Safety first article on [“Inadvertent Autopilot Engagement During Takeoff on A220 aircraft”](#).

In the case of cockpit control confusion, a pilot performs a skill without conscious control over their action, therefore, even controls with different shapes and locations in the cockpit can still be confused. For example, there are reported cases of control confusion between the landing gear lever (located on the main instrument panel) and the flaps lever (located on the pedestal).

Proximity Factors

When a control is positioned closer for the pilot to reach, then it is more likely to be subject to cockpit control confusion. For example, when PFs are in the left seat they are more likely to experience a skill-based error or slip, related to the EXPED pushbutton, because it is located on the left side of the FCU panel. When Pilots Monitoring (PMs) are in the right seat they are more likely to experience cockpit

control confusion related to the flaps lever because it is located on the right of the pedestal.

Challenges

The lack of attentional control and active thinking when performing the action that caused the error is not due to the lack of skills or knowledge, and therefore, cockpit control confusion or slips, cannot be mitigated by conventional training.

Changing the design of a cockpit control that is very familiar to many thousands of pilots can be counterintuitive, and it is not possible to cover all cockpit control confusion cases.

The Importance of Reporting

The aircraft systems are very resilient to inadvertent use of cockpit controls, pilots will react quickly to correct their error, and there is often no operational consequence. It may not seem necessary for the flight crew to report the cockpit control confusion incident, but it is important to better understand the contributing factors and identify the possible mitigations. That is why it is so important for airlines to foster a speak-up culture and just and fair policy, that encourages pilots to report such events. ■



KEYPOINT

Given the challenges faced to reduce the number of cockpit control confusion incidents, it is important for flight crews to report such events. The more cases that are reported, the more accurate the analysis and identification of trends will be, allowing for the most effective mitigations.



PREVENTIVE ACTIONS

Reporting cockpit control confusion events, analyzing trends, developing best practices, and raising awareness among pilots is the most effective means of prevention. Some operators have reinforced this by creating additional callouts for their flight crews when carrying out routine tasks in the cockpit.

Recognized best practices are described in the Flight Crew Techniques Manual (FCTM) of all Airbus aircraft (A300-600, A310, A320 Family, A330/A340 Family, A380, A350, A220) in the “Cockpit Philosophy” chapter.

The main recommendations for flight crews are:

- Do not rest your hands on controls.
- Do not anticipate actions by putting your hands on the controls before you need to.
- Perform a visual check on the control before using it. Even if you are focused on the PFD you should look at the controls before using them.
- Check the result of the action, which is essential.
- Break the automated loop and raise the level of active thinking and attention. Use the standard callouts and use additional callouts, if necessary.

Examples of additional callouts from an Operator:

- During the Engine Start procedure, the PF points to the ENG MODE selector and calls “ENG MODE SELECTOR” before using it.
- Before using the flaps, the PM puts their hand on the lever and calls out “Flaps” before moving the lever and calling out the flap position.
- Before using the landing gear, the PM puts their hand on the lever and calls out “Gear” before moving the lever and calling out “Up” or “Down”.

These additional callouts reduced the number of inadvertent uses of the parking brake handle instead of the ENG MODE selector, and the inadvertent flaps selection or landing gear selection, by increasing the attentional focus of the flight crew. However, the risk remains that such “attention-getters” can also become routine.



BEST PRACTICE

During training sessions, instructors should be vigilant to identify cockpit control confusion and debrief the flight crew to raise their awareness of this behavior. This is more likely to occur during recurrent training and is less often seen during initial training sessions.



INFORMATION

For more information on cockpit control confusion, the video “[Understanding and Managing Cockpit Control Confusion in Operations](#)” is available on the Airbus Worldwide Instructor News (WIN) website.

The banner has a dark blue background with a subtle pattern of small white dots. At the top left, the text 'WORLDWIDE INSTRUCTOR NEWS' is in white, with 'FLIGHT OPERATIONS SUPPORT AND TRAINING STANDARDS' in smaller white text below it. A horizontal white line separates this header from the main content. In the center, there is a yellow rectangular box containing a yellow hand icon with the index finger pointing up, followed by the text 'Mind your Hand!' in bold black font. Below this box, the title 'Understanding and Managing Cockpit Control Confusion in Operations' is written in white. Underneath the title, the names and roles of the experts are listed in white: 'Captain Alexandre SAVOUREY (Flight Operations & Training Support Expert Pilot)', 'Captain Laurent ROBARDEY (Training & Flight Ops Pilot Instructor)', 'Tânia GIRÃO (Cabin Crew Instructor)', and 'Florence BURATTO (Human Factors Expert)'. The Airbus logo is in the bottom right corner.

WORLDWIDE INSTRUCTOR NEWS
FLIGHT OPERATIONS SUPPORT AND TRAINING STANDARDS

 **Mind your Hand!**

**Understanding and Managing
Cockpit Control Confusion in Operations**

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AIRBUS

Thank you to both easyJet and KLM for their contribution to this article. With effective speak-up cultures and just and fair policies, flight crews were empowered to report several incidents that were studied to better understand the circumstances that contributed to cockpit control confusion. This allowed for more precise and targeted recommendations to reduce the risk of cockpit control confusion for all flight crews. ■

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The human mind creates routines for acquired skills in an effort to save cognitive resources for other tasks. When pilots are performing routine tasks in the cockpit, they may occasionally lose attentional control over the actions they are performing. This can lead to a cockpit control confusion scenario.

Fatigue, overconfidence, distraction, and anticipation are some of the contributing factors to cockpit control confusion. A lack of attentional control and active thinking when performing the action causes the error, and not a lack of skills or knowledge. Cockpit control confusion can happen on any aircraft type and to any pilot, regardless of their experience. It can be the case that more experienced pilots are even more likely to have cockpit control confusion due to the longer time they have spent performing repetitive and routine tasks.

The most effective mitigation means are to always check the control before acting on it and to always check the result of the action. Reporting cockpit control confusion events, analyzing trends, raising awareness, and sharing best practices are other mitigation means to also take into account. Recommendations for pilots to prevent cockpit control confusion are available in the FCTM for all Airbus aircraft (A300-600, A310, A320 Family, A330/A340 Family, A380, A350, and A220). The key point for pilots is to consciously maintain their focus on each action they perform. Operators who have also developed additional callouts for their flight crews observed a reduction in the number of reported cockpit control confusion events.

The aircraft systems are resilient to many of the effects from cockpit control confusion. Their protections offer an effective safety barrier to prevent more serious situations from occurring. It is a timely reminder to apply the golden rules for pilots and always *“take action if things do not go as expected.”*

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