

CALLBACK

From NASA's Aviation Safety Reporting System



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Checklist Checkup

Checklists are used by pilots to assure that the aircraft is properly configured for each phase of flight. Checklists are also used to provide appropriate response to abnormal or emergency situations. While checklists do provide a means of guiding a pilot or flight crew through complex procedures, they are not impervious to human error. Reports submitted to ASRS indicate that errors related to checklist usage generally fall into one of these five categories:

1. Checklist interrupted
2. Checklist item overlooked
3. Use of the wrong checklist
4. Failure to use a checklist
5. Checklist confusion

Examples of these errors are found in the following ASRS reports.

1. Checklist Interrupted

Distractions and interruptions are the factors most often cited in ASRS reports involving checklist errors. This B737-300 Captain's report shows that the distractions inherent in last minute preparations prior to pushback can easily lead to checklist omissions.

■ *During the accomplishment of the Before Pushback checklist, the Flight Attendant brought in the passenger count documentation at exactly the moment the First Officer read the "Takeoff Trim" item. I responded to the Flight Attendant interruption and subsequent verbal exchange and then the First Officer and I proceeded to the next item, "Cockpit Door," without actually having reset the takeoff trim to the correct setting. During the takeoff, we received a Takeoff Warning horn as I advanced the throttles for takeoff. At approximately 10 knots, I rejected the takeoff and accomplished the immediate action items while the First Officer notified the Tower of the rejected takeoff. After clearing the runway and finishing the checklist items, I discovered the takeoff trim was not set in the proper position and was out of the green band area.*

This event reminded me to be extra vigilant of the impact of distractions during checklist accomplishment. In fact, it took several errors in procedure to arrive at the runway without the trim set properly.

2. Checklist Item Overlooked

An MD11 Captain allowed a habit pattern to affect the proper completion of the Shutdown checklist. Fortunately, the First Officer returned to the cockpit and noticed that one more item needed to be "shut off."

■ *Pulled into the gate, set the parking brake, and shut down the Number 3 engine. We waited a short time for external power and when we got it, I connected to it then shut down the Number 1 engine. I did the Shutdown checklist, debriefed, discussed the strange taxi routing, and left the aircraft. There was no crew bus so the First Officer went up to the cockpit to call for one and saw that the Number 2 fuel lever was still up. He shut off Number 2 and came back down to the ramp and informed me that the engine was still running when he went up to the cockpit.*

I rarely taxi in on three engines and in this case did just that. I went through my normal shutdown habit pattern which is just shutting down one and three. I missed it on the shutdown checklist because I didn't actually look at the levers because, in my mind, I was convinced I had shut them down.

Visually check everything on the checklist because it will help when your habit pattern is broken.

3. Use of the Wrong Checklist

By using the appropriate checklist, a crew can mitigate or eliminate the adverse effects of a system malfunction. But, as this B757 Crew learned, the wrong checklist can make the situation worse.

■ *On departure at approximately 300 feet AGL the First Officer's Primary Flight Display (PFD) and Nav Display (ND) went blank. I assumed control of the aircraft and after reaching a safe altitude called for the First Officer to open his QRH and find the appropriate abnormal checklist for our situation (loss of right PFD and ND). The First Officer said he was ready to proceed and he read the first item on the checklist. I do not recall whether the First Officer read the title of the checklist aloud before he read the first item on the checklist.*

The checklist called for us to check two circuit breakers supplying power to the Symbol Generator. Both circuit breakers were in. Next item on the list called for the Symbol Generator-1 Power circuit breaker to be pulled and then

reset. The circuit breaker was pulled and this resulted in the loss of the Captain's PFD and ND. At this point it was determined that the First Officer was reading the checklist for loss of left PFD and ND and we immediately attempted to reset the Symbol Generator-1 power circuit breaker with no success. We then completed the QRH procedure for loss of right PFD and ND, but we did not regain the First Officer's PFD or ND.

After consulting with Dispatch, Maintenance Control, and the First Officer, and considering the potential for developing weather along the route of flight to our scheduled destination we elected to divert and make an overweight landing. We declared an emergency, requested that Airport Rescue and Fire Fighting vehicles be standing by to check for potentially hot brakes on roll-out and proceeded to land uneventfully.

Upon reaching the gate, Maintenance met the aircraft and upon opening the E&E Compartment they discovered a great deal of water had accumulated in that compartment from an unknown source. It would appear that the accumulated moisture/water caused the loss of the First Officer's PFD and ND and prevented the successful reset of the Symbol Generator-1 Power circuit breaker. We obviously made our situation worse by starting the wrong checklist; however, absent the water in the E&E bay the Symbol Generator-1 circuit breaker should have reset. Additionally, from a systems point of view I should have questioned the First Officer as to why we were pulling the Symbol Generator-1 power circuit breaker for a loss of the right PFD and ND.

In the future I will always confirm that the appropriate checklist for the situation at hand is being utilized by referring to my QRH or the First Officer's prior to accomplishment of any individual steps in that checklist. I will also attempt to ascertain that from a systems point of view the steps of the checklist make sense for the abnormal situation encountered.

4. Failure to Use a Checklist

We have already seen how interruptions can lead to missing items on a checklist. This BE36 Pilot learned what can happen when an interruption results in missing the whole checklist.

■ Upon reducing power over the numbers, I heard the gear warning horn. I began to apply power for a go-around, but saw the propeller stop. At this point, I continued the flare, focused on flying the airplane, landed the aircraft gear-up, and quickly exited the aircraft with two passengers. We proceeded a safe distance to the west into the runway grass and notified Emergency Personnel.

This was the third of three takeoffs and landings for night currency. The other two landings were uneventful. Upon

turning base, I noted another aircraft nearing the vicinity. I made another radio call announcing turning base to be certain it was not a faster aircraft on final approach for our destination. This transmission interrupted my habit pattern and I failed to do the BCGUMP (Boost pump, Carb heat, Gas, Undercarriage [landing gear], Mixture and Prop) landing checklist. I believed that the gear was down and that I had three green lights until the prop stopped.

5. Checklist Confusion

Checklists, especially those dealing with emergency or abnormal procedures have to present a clear, unambiguous sequence of actions that will provide the safest and most efficient method of handling a given problem. However, the logic branches in complex procedures can sometimes be problematic. This CRJ900 Flight Crew misread one of the checklist items and the checklist itself may have also contributed to their confusion.

■ While descending for arrival, the "R FADEC" caution illuminated. We followed the Quick Reference Handbook (QRH) procedures which included shutting down the Number 2 engine, but only after reviewing the procedure and agreeing that it did indeed require shutting the engine down....

The QRH procedure for a L/R FADEC caution message is somewhat confusing. We had to read the procedure several times just to make sure that we were required to shut the engine down. The procedure calls for shutting down the engine "prior to landing" if all other indications are "normal," but that is poorly defined. Doing the shutdown right away obviously isn't required, but should you wait until short final or do it further out? In the end we elected to shut the engine down as we made our descent and were probably still 20 miles or more from the field. This gave us time to review the procedure for single engine landing, make our PA announcement, talk to the flight attendants, coordinate with Approach, etc. Also, while the "NO" side of the checklist leads you to the Single Engine Approach and Landing Abnormal checklist, the "YES" side does not. And yet the "YES" side still requires that the engine be shut down. It would seem only logical that the Single Engine checklist be performed in that case as well.

Upon further review of the QRH, it has come to my attention that the procedure for a FADEC caution, when all other engine indications are normal, was not completed correctly. I misread one of the steps in the procedure that called for the Thrust Reverser to be turned off and instead read it as though the Thrust Lever should be shut off. In the end, having the engine shut off instead of at idle as the QRH called for, made little difference in the outcome.

ASRS Alerts Issued in 2013	
Subject of Alert	No. of Alerts
Aircraft or Aircraft Equipment	76
Airport Facility or Procedure	49
ATC Equipment or Procedure	37
Company Policy	6
Maintenance Procedure	2
Other	2
Hazard to Flight	1
TOTAL	173

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Moffett Field, CA
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January 2014 Report Intake	
Air Carrier/Air Taxi Pilots	5,369
General Aviation Pilots	974
Controllers	520
Flight Attendants	354
Mechanics	201
Dispatchers	155
Military/Other	135
TOTAL	7,708