Don't Call It A
CALLBACK
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ASRS
The Error at Every Phase of the Maintenance Cycle

Wrong Way,
Every Step

Backwards Installations Across the Full Maintenance Cycle

An aircraft maintenance cycle has a predictable structure: a component is removed, a replacement is installed, an inspector signs off the work, an operational check is performed, and the aircraft is released for service. Each phase is a potential detection point for an installation error. Each phase is also, under the right conditions, a point where the error gets through.

This issue traces the backwards installation error through the full maintenance cycle. Each section corresponds to a distinct phase — from the moment the task is assigned through in-service discovery — and presents a report where the error either originated or could have been caught at that phase. Read these reports in sequence. The arc they trace is not a single event. It is the shape of a systemic problem.

Phase 1 — Task Assignment

(ACN: 2225305)

The error sometimes begins before a single fastener is touched. On an Embraer 170, a technician received a verbal task description that he interpreted — after consulting two coworkers — as an instruction to reverse the existing valve positions.

Technician:

On Day 0 I was tasked with another mechanic to repair the low pressure ground connection duct. The crew chief who assigned it explained that the valves were closed so I assumed they had been flipped. I went to two other mechanics who agreed that that's what it sounded like. So we reversed procedures and flipped the valves. Cause: The flight crew could not depressurize and had to use emergency procedures. Suggestions: The manual should have better pictures and mechanics should be better trained. Mechanics should also be more vigilant about asking for help on a new task even if they have no doubt that they are right.

Three mechanics reached the same wrong conclusion from the same ambiguous verbal instruction. No one consulted the maintenance manual before reversing the valves. The flight crew could not depressurize the aircraft and landed in an emergency condition. The error originated not at the wrench, but in the handoff.

Phase 2 — Installation

(ACN: 1954904)

Distraction during installation is one of the most frequently cited contributing factors in this dataset. On an A-check, a technician switched between tasks mid-shift and installed an engine-driven pump filter housing backwards while mentally still engaged with a different job card.

Technician:

I was assigned to work on the Right Engine on an A Check. I was waiting on other team members to complete their tasks so I could depressurize the hydraulic system. I started to work another card, the abradable shroud inspection. There was damage that concerned me. While looking up the limits, I noticed that I could depressurize the hydraulic system and complete the Engine Driven Pump Case Drain Filter inspection, in that I did mistakenly installed the module backwards.

Task-switching under workload is a well-documented source of installation errors. The technician was mentally split between two jobs when he made the installation decision. The filter housing was caught during a routine inspection before the aircraft flew. The error originated in the moment of divided attention.

Phase 3 — Inspection and Sign-off

(ACN: 743765)

The inspection step is designed to catch what the technician missed. On a B737-700 elevator tab hinge fitting replacement, the inspector checked the installation against the AMM — but the AMM did not show which side the bushings should be on, and neither inspector nor technician consulted the component maintenance manual that did.

Technician:

The next thing it says is to see component maintenance manual. That's the part I missed. It shows the proper fitting installation. The AMM shows the fitting R&R; but does not say which side bushings go on. I now see the error I made by not catching the note to go to the component maintenance manual.

Inspector:

I was asked to be bump up inspector on Aircraft X that had the elevator side of the inboard tab hinge fitting replaced. I accomplished the RII inspection of the hinge fitting and elevator tab. About a week later I was informed that the fitting was installed upside down which made the installation of the bolt backwards. As the RII inspector I did not reference the pictures of the maintenance manual. I only looked at the installation and check out. It all was installed OK. There was no way I would know it was backward without looking at a picture.

Both technician and inspector missed the same reference note. The AMM directed the reader to the component manual; neither followed that pointer. The fitting flew for a week before the error was discovered during a C-check. The inspection step failed not because it was skipped but because the reference chain was incomplete.

Phase 4 — Operational Check

(ACN: 1057981)

The operational check is the final gate before aircraft release. On a Beechjet 400A anti-skid control valve filter change, the hydraulic lines were installed to the wrong fittings. The subsequent brake bleed and anti-skid functional test both passed. The error was not detected until the aircraft was taxiing for departure.

Technician:

I performed the task in accordance with the Hawker 400/400A Maintenance Manual. When I was reinstalling the lines I mixed up the aft hydraulic pressure lines to the valve. The lines were not hard to install in this way and the installation seemed right to me. I had my Lead Mechanic buy-back the work. We ended up job stopping the task, with the Brake Bleeding and Anti-Skid Control Check still needing to be accomplished. The lines still got mixed up even though the lines were tagged.

Technician:

The Anti-Skid Brake System Check in the Maintenance Manual says to push both brakes at the same time during the Check. A revision to the manual that would require each brake to be checked individually and verify proper operation probably would have caught the problem in maintenance.

The anti-skid functional test passed because it tested both brakes simultaneously — which obscured the crossover. The flight crew discovered the error on taxi when the left pedal controlled the right brake and vice versa. The operational check was not designed to detect this failure mode. The check procedure itself was the systemic gap.

Phase 5 — In-Service Discovery

(ACN: 786215)

When every maintenance gate fails, the aircraft flies. On a B737-800, a cargo door pressure seal was installed backwards on a shift turnover job. The operational pressurization check was completed and the aircraft released. On the first flight, it could not pressurize and turned back.

Technician:

I picked up on a non routine card from the work center with a written turnover stating that the #1 cargo door seal needed completion of the remaining 24 inches at the top of the door. Installed remaining section and closed door to check for seal contact. Signed for installation of seal. Aircraft experienced air turnback on the first flight due to inability to pressurize. Upon investigation, found seal installed incorrectly. Ink stamp on seal led me to believe seal was installed correctly.

The seal's ink stamp was the misleading indicator — the technician trusted the marking over the geometry. The pressurization check was performed on the ground; a backwards seal can hold pressure under static ground conditions that it cannot sustain in flight. In-service discovery is not a detection system. It is a failure of every system that came before it.