Lessons From Bedford, Part 2 True professionals do things the right way

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We are told that on May 31, 2014, the professional pilot world got a wake-up call when two pilots crashed their Gulfstream IV (N121JM) at Hanscom Field (BED), Bedford, Massachusetts, and killed all on board. The NTSB rightfully called their performance an act of "intentional, habitual noncompliance," but that was being charitable.

As the NTSB detailed, and as *BCA* Contributor Jim Cannon noted here last month ("Sticking With SOPs," March 2016, page 52), the pilots failed to disengage the gust lock prior to engine start, failed to perform a flight control check after engine start, failed to reject the takeoff when takeoff thrust wasn't achieved and failed to check elevator freedom of movement at 60 kt.

The NTSB report further noted that the pilots did not run a single checklist (of four) between engine start and takeoff, and in 98% of their previous 175 takeoffs, they neglected to do a flight control check.

This tragedy was, after all, a classic case of what David Huntzinger, Ph.D. in safety, labeled Procedural Intentional Noncompliance, which he detailed in his award-winning article, "In the PINC," also published by *BCA* in January 2006. At last, nearly a decade later, we finally have proof that PINC can be deadly. A wake-up call?

I have my doubts. If you are reading this page you probably get it. You follow your checklists, by the book. You have been doing your flight control checks, prior to every takeoff. You have been on guard against the forces of complacency that overtook this pilot team. You get it. I think about half of us — at most — get it.

The other half? They aren't reading this page or any professional journals. They might have read the title of Richard Aarons' Cause & Circumstance, "Gulfstream IV at BED," in *BCA*'s June 2015 edition (page 48) but not bothered with the contents. They may have even attended a safety stand-down and heard about the dangers of PINC and complacency, but they weren't paying attention. They don't believe they are at risk. Why is that?

N121JM wreckage, aerial photograph, from NTSB Accident Docket ERA14MA271, Figure 6

I think that we, the half that get it, are partly to blame because we treat these types of behavioral problems in polite, clinical terms. If you suffer from PINC, after all, perhaps it is just a minor malady that can be treated with a week at the simulator or a new gizmo for the cockpit. Your complacency is just a passing phase. You'll grow out of it. Well, none of that is true.

We need to stop looking the other way and as professional pilots make intentional, habitual noncompliance our business. We either retrain the offenders, or we purge them from our hallowed profession. We can do this by tightening up our own behavior when it comes to checklist compliance; you cannot lead by example if your example is flawed. We need to make line observations a regular practice for all professional pilots; and not the anemic 14 CFR 135.299 checks we all know are little more than square fillers. And finally, we need to become aggressive advocates for professionalism; we need to track down the intentionally, habitually noncompliant and "get in their faces." So let's get to work.

Checklist Philosophy

There is no doubt that the crash of N121JM could have been prevented had the pilots simply executed their Before Starting Engines checklist, which instructed them to disengage the flight control gust lock, or the After Starting Engines checklist, which called for a complete flight control check. A profound irony of this crash is that nearly seven decades earlier, the use of checklists became institutionalized following another airplane crash resulting from a gust lock that pilots had forgotten to disengage.

In the early days of aviation pilots were required to simply remember to do everything. While there were written procedures, such as the "Hints on Flying" issued with the Curtiss JN-4 Jenny in 1918, the idea of a checklist hadn't become widespread until after the crash of a Boeing Model 299 in 1935.

In that accident, the airplane's test pilots forgot to disengage the elevator lock and the airplane crashed attempting to take off. The U.S. Army Air Corps decided the airplane was simply too complicated for any pilot to fly and temporarily canceled the prototype program. There was no other airplane in the same league, however, and the service still wanted it. The fix to the airplane problem was deceptively simple:

They developed checklists crews would follow prior to takeoff and before landing. The bomber proved flyable after all and over 12,000 of what became the B-17 Flying Fortress were produced, helping win World War II.

Today, checklists are an accepted part of aviation. And yet many pilots look upon them as optional. They regard them as a crutch for those new to the airplane that can quickly be discarded once the pilot has the "flow" of each procedure memorized. But is this true? No, not according to 14 CFR 91.503(b):

"Each cockpit checklist must contain the following procedures and shall be used by the flight crewmembers when operating the airplane: (1) Before starting engines. (2) Before takeoff. (3) Cruise. (4) Before landing. (5) After landing. (6) Stopping engines. (7) Emergencies."

"Shall be used," in FAA-speak, is another way of saying, "must be used." If you choose to operate your airplane without using the checklist, you are in violation of the U.S. Code of Federal Regulations.

Boeing Model 299 crash, October 20, 1935

OK, these pilots might say they've memorized the checklist. Why is that any different from pilots who "flow" the procedure and follow up with the checklist?

FAA Order 8900.1, Volume 3 outlines the way the FAA ensures its standards provide for safe operating practices. Chapter 32 of that Order codifies exactly how checklists are to be used. You might say that as a noncommercial operator you are not bound to such commercial regulations. But ignoring the decades of evidence that went into these rules places you in violation of 14 CFR 91.13, Careless or Reckless Operation.

Taking all the lessons learned and regulatory guidance into consideration, there are two basic ways to accomplish a checklist: "challenge-do-verify" (CDV) and "do-verify" (DV).

A challenge-do-verify method is just what we think about when using the term "checklist." The pilot monitoring (PM) reads a challenge, the pilot flying (PF) accomplishes the step, and the

PM verifies that it was done correctly. The CDV method is the most accurate way to accomplish a checklist, but many would argue it takes more time than necessary.

A do-verify method is easier in that you just get things done and then come back to the verification step. This is what many call "the flow," whereby you accomplish the items in a visual pattern that makes memorization easier, and then you verify each step with the checklist. While that procedure may be quicker, it is prone to error because we often see things as they should be, not as they are.

Which method is better? Most pilots will tell you it is strictly personal preference. Having jumped into and out of Gulfstream aircraft five times in the last 25 years, I can say not even the manufacturers are immune to this dilemma. One year the flow is verboten, the next year it is the recommended procedure.

However, FAA Order 8900.1, Volume 3, Chapter 32 is fairly explicit on the subject:

"In the taxi and pre-takeoff phases, aircraft configuration (such as flaps, trim and speed brakes) and flight guidance items (such as heading, flight director, altitude select panel settings and airspeed bugs) have proven to be critical. All flight crewmembers should confirm these items, and at least two crewmembers should respond to applicable checklist items. On approach, flight guidance checklist items have proven to be critical items. At least two crewmembers should confirm and respond to these items. A response should be required from each pilot when the same setting is required on two separate devices (such as computers, flight instruments or altimeters)."

In fact, Paragraph 3-3404 removes all doubt on the subject of CDV versus DV:

"All checklists, except the after-takeoff and after-landing checklists, should be accomplished by one crewmember reading the checklist items and a second crewmember confirming and responding to each item. POIs (Principal Operations Inspectors) shall ensure that critical items on the before-takeoff and before-landing checklists are confirmed and responded to by at least two crewmembers."

It makes sense that a DV approach is needed right after takeoff; after all,

you are pretty busy at that point. But we drill these procedures during training and scrutinize each step of the process. Our eyes need to be outside the cockpit and we work very hard at getting this phase of flight just right. We don't have that excuse while starting engines, configuring the airplane for takeoff, and taxiing to the runway. Then a CDV procedure is the only sensible choice.

It could very well be that you started your professional piloting career with the best of intentions and the promise to do things "by the book, each and every flight." But over the years you became comfortable, proficient and, well, an expert. You may have dropped your CDV and gravitated to the DV. In the case of N121JM's pilots, they gravitated even further to just D with no V. How can we ensure that we, those who get it, don't become they, those who don't?

Line Observations

If you are in a very large flight organization with, say, hundreds or thousands of pilots, you probably have a very robust set of flight examiners, check airmen and standards officers who work full time to ensure every pilot is flying as the company intended. These evaluators don't fly with you on a daily basis and may have never met you before settling into your jump seat for a line check. They don't have to live with the repercussions of hurting your feelings. They have one goal in mind: keeping you in line with the company's rulebook.

If you aren't flying for a major airline or the military, you probably don't have such a watchdog unit ready to pounce

on you unexpectedly. Even a 14 CFR 135 operator is hardly under threat from the mostly harmless 135.299 check ride. I've given a few of these and received my fair share as well. The only legal requirement is for the check airman to observe a takeoff, an en route segment and a landing. I once had one of these administered by a check airman who never entered the cockpit during flight. It was hardly a check at all. Even with a diligent check airman, flying an empty leg on a day of your choosing hardly shows how you operate in actual, real-life conditions.

There is an easy way to take out an insurance policy against complacency and it is called a Line Operation Observation (LOO). You simply invite a pilot whom you respect to ride along in the jump seat on one of your operational trips. If you fly business executives, for example, organize your LOO on just such a trip. This pilot doesn't have to be type rated in your aircraft but needs to be knowledgeable in the type of flying you do. Finding an LOO pilot with previous instructor or flight examiner experience will increase the benefit of this exercise.

A good LOO pilot is also knowledgeable of regulatory requirements and safe operating practices. The pilot should be skilled in observation and patient, and should be motivated by the thought of making everyone safer.

Since an LOO is not a formal check ride and the observed pilots' licenses are not at risk, this is a low threat event. Nonetheless, the observed pilots will be under self-imposed pressure to do things just right. The observer should do his or her best to just observe and

avoid hindering the real job at hand. Once completed and the airplane has been put to bed, the LOO pilot simply reports what he or she saw during the flight. An honest assessment can serve as a wake-up call for good pilots who have lost their edges.

I've given many of these over the years and some of the results often surprised the observed pilots. They had no idea that they had stopped visually clearing for traffic after takeoff. They were stunned to hear the amount of time they spend "heads down" in the traffic pattern. They were unaware of recent innovative radio read-back procedures that could have spared them a missed altitude assignment. They realized that while they preached flying stabilized approaches, they weren't flying them. In all of these cases, a simple observation brought them back "into the fold." An LOO is a cheap insurance policy against complacency.

Of course the LOO is an insurance policy for those of us who "get it." What about those pilots who don't?

Advocacy

Articles in magazines and safety journals have no impact on those who refuse to read them. A well-organized safety stand-down and a riveting quarterly safety meeting is wasted on those pilots who refuse to hear their messages. It's a target audience peopled by pilots who believe themselves above all that. And they are the ones who need the wake-up call. But those of us who get it are partly to blame, and I include myself in this group.

For example, in 2003, I was standing at the counter of one of the FBOs at Washington Dulles Airport (IAD) when two incoming Citation pilots were handing the forms for their jet to a new crew. The incoming crew had brought the airplane in empty and had broad grins on their faces. They reported the airplane was in good shape and that they had managed to fly it 2,000 ft. above its service ceiling because it was so light. All four pilots agreed the Citation is quite an airplane. I just shook my head, decided to mind my own business, and made a mental note to never allow anyone I know to fly with that fractional company.

But that's not what I should have done because as a professional pilot, it is my business. I should have gotten their names and turned them in. That could have rid our profession of at least two

Line observation

Thales SSJ100 simulator

habitual, intentional noncompliant pilots and would have telegraphed to the other two that we, the professionals, are not amused by those who aren't. In fact, we are offended by their behavior.

We professionals need to target such noncompliant pilots for extinction. The word needs to get out that ours is a profession only for pilots who take the job seriously. Since the Bedford crash I've heard from many contract pilots with vivid examples of flagrant procedural noncompliance in many flight departments. Missing from each story, however, was any negative response on their part.

I fully realize that most contract pilots are reluctant to speak up against the person who signs their paycheck, because doing so might negatively impact their livelihoods, after all. But you per diem pilots are on the leading edge of this fight. You need to telegraph that this behavior is so egregious, you are willing to speak up.

And finally a word to schoolhouse instructors and independent auditors: These habitual, intentionally noncompliant pilots are experts at deception. Having spent much of my career as a flight examiner and auditor I can say that you should be able to tell when the person being examined is doing things by the book just for show. In fact, an essential part of your job is to figure this out and help us bring pilots like these back into the fold.

We all have a role to play. We, the professional pilot class, need to lead by example. We need to shock the habitual, intentional noncompliant pilots into our world. They need to be ostracized and shamed into doing their jobs as professionals or they need to be unceremoniously thrown out. This is our fight and we have to win it. **BCA**