



# THE VIEW FROM WASHINGTON

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## Consider the Verb of Human Factors, Rather Than the Noun

**T**he AEA has been involved in the grand vision of human factors for years. We have written about it in the pages of *Avionics News*; we have hosted training programs during the AEA International Convention and at AEA Regional Meetings; we even have a training CD available at [www.aea.net](http://www.aea.net).

Now, I am not a scholar, a scientist or what most would consider a human-factors professional; I'm simply a practitioner. My involvement in human factors began some 30 years ago when we first started "cockpit resource management" in the U.S. Air Force as part of a helicopter flight crew. I have progressed through each phase as human factors migrated from flight-crew communications, cockpit design and engineering to procedures and processes in maintenance.

In September, I participated in a discussion panel during the annual FAA/ATA Conference on Human Factors in Maintenance. During this conference, it dawned on me why we continue to struggle with human factors in maintenance: We are focused on the wrong part of speech. Too often, we focus on the noun of human factors rather than the verb of human performance.

When we talk about human factors, we talk about "what" went wrong: Someone didn't follow the regulations; he was tired; the individual's mind wasn't into the job;

he was distracted; he didn't have the correct equipment. These are nouns: person, place or thing.

The issue of not following the "what" requirement (the noun) is redundant with existing regulations. The regulations tell us what we must do, how we must do it, when we must do it and what equipment to use. Unlike flight regulations, in maintenance, our regulations are absolute; we don't have "authority to deviate" built into our rules like the ops guys do. If you don't follow the regulations, you are wrong — period.

So, when human factors highlight the requirement to follow the regulations, it is redundant. The regulations already tell us we must follow the regulations.

Today, it seems every incident or accident message you read cites some level of human factors as a causal factor. The FAA's "Recommended Human Factors Training" criterion in the repair station regulations covers nearly every aspect of maintenance and maintenance management. When the failure to follow regulations is "justified" as a human-factors failure and the individual assumes no responsibility for his actions, it's a failure of the "system." Unfortunately, when everything becomes human factors, nothing is human factors.

Let me offer a slightly different approach to human factors; let's focus more on human

performance: the action verb "why."

I challenge you to look at "why" an accident, incident or failure happened, rather than just what went wrong. It usually is pretty easy to decide what went wrong: The regulations weren't followed; the technician was tired; the equipment was in disrepair. The problem is, this isn't human factors; this is a failure to follow the regulations.

However, when we ask "why," we can begin to find the root cause (or causes), which helps us address the human-performance issue (or lack of performance) that led to the failure to follow procedures. By drilling down to the root cause of an incident or accident, we can implement efficient solutions to address failures in human performance.

Let's look at something as simple as not following procedures (regulations, manuals, checklists) As Sgt. Joe Friday would say (for you old-time "Dragnet" fans): "Just the facts, ma'am; just the facts." The fact is, the procedures were not followed; the procedures are required to be followed — guilty. OK, that was simple.

Now, we have to start drilling down to the why: Why were the procedures not followed?

Here are some questions to ask:

- Are the procedures clearly written? We know long-standing maintenance instruc-

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tions still contain errors. We know maintenance instructions written by the original equipment manufacturer might not account for alterations and changes made to the aircraft over time. We know we, as maintenance technicians, can fix nearly anything, including a work-around for bad or inefficient procedures.

- Why weren't the procedures followed? This is critically important to ask. Is it because an individual simply doesn't get aviation? Maybe they're in the wrong profession. You cannot attend a conference without someone talking about the critical responsibility aviation technicians have when it comes to the safety and security of customers. The responsibility of the job and our actions probably was the first thing I learned in maintenance school — long before I learned to use a torque wrench.

There are some people who have chosen aviation maintenance as a career who just don't get it. They don't get the absolute nature of our work. They are great folks, have good heart and even might be talented with a wrench, but they don't belong in aviation. They belong in a technical trade where pulling over to the side of the road is an option.

Most likely, when you ask why procedures weren't followed, the answer will come down to one of two reasons: Either the employee accidentally missed a step or he knowingly missed the step.

Let's assume the employee, in fact, accidentally missed a step. Why? He was tired. Why? He didn't get enough sleep. Why? He was working a double shift. Why?

We keep asking why until there simply aren't any more answers, or we divide the answer and continue asking why to each element of the answer.

Fatigue is a hot button with aviation au-

thorities around the world, and every time I hear one of them pontificate from the bully pulpit, I get more frustrated. Fatigue is not inherently dangerous. How we manage fatigue is the problem. We cannot manage something if we don't understand the root cause.

Recently, I was talking to an aircraft mechanic who used to work for a major airline that was bought by another airline. He left the airline during the restructuring because the new airline wouldn't allow him to work overtime. You read that right: He left his job because they wouldn't allow him to voluntarily schedule overtime.

As he explained the routine to me, he would schedule himself to work a couple of doubles during the week, shortening his overall workweek while earning 50 percent more salary than he would if he worked a single shift five days a week; plus, he always had a three-day weekend to spend time fishing and going to his kids' sporting events.

Now, before the airline world tars and feathers me, I'm not judging this practice one way or the other. There are plenty of folks who work double shifts to send their children to college or to pay their mortgage or to pay for health care. What I am using it for is to explain why we ask why. If this technician had committed an error at the end of his second shift, fatigue would be cited as the cause or a causal factor, and the employer would be scrutinized for its management "overworking" employees. When, in fact, it was the employee who chose to work the extra shifts, not the company mandating overtime.

If fatigue is a factor in the cause of an accident, why was the person fatigued? It is because they were bass fishing all night?

Do they have a newborn who isn't sleeping through the night yet? Are they moonlighting at another job? Or is it the fire season and there are lives on the line and overtime is required? Each of these "causes" has a different and often unique solution.

Perhaps fatigue wasn't a problem; perhaps the employee was distracted. Why? Why was he distracted? Did he get called away from the job at a critical phase because the boss called a meeting? Did he have a phone call? Did a customer need to talk to him about a potential problem?

What if the mistake wasn't a random oversight of a step but rather a routine deviation that finally caught up with the mechanic? What if not following the procedures, as written, was routine?

Why was it OK not to follow the procedures? This is a really tough question because sometimes we are to blame for our technicians not following procedures. However, we still ask why: Why weren't procedures followed? An organization can have a culture of using the procedures for "reference only" and not really following them. Management (at any level) can establish a culture for following the procedures when the boss is looking, but slacking off when work really needs to get done. Organization can have a culture where efficiency work-arounds are rewarded.

By asking why, we narrow the cause of the failure, which allows us to develop cause-specific solutions and/or procedures acknowledging these failures might exist in the future.

Let's look at some of the possible root causes and solutions:

- The maintenance instructions contain

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## FREQUENTLY ASKED QUESTIONS

### International

#### Aircraft Mods

*The following information is derived from an EASA “Frequently Asked Questions.”*

#### QUESTION:

My aircraft has been modified in the United States by Form 337 action. Can EASA accept this?

#### ANSWER:

There is no automatic acceptance of Form 337 approvals by EASA, except under certain limited conditions. They need to be assessed individually and might need to be separately approved, normally by application for a minor change or by an approved organization under their DOA.

#### QUESTION:

How do I know whether an STC has been grandfathered?

#### ANSWER:

Any STC approved or validated by any member state before the establishment of EASA is deemed as “grandfathered,” under Regulation 1702/2003, Article 2 (3)(a). Unfortunately, there are tens of thousands of these approvals, and it has not been possible to put together a database. EASA normally recommends contacting the STC holder (the FAA website has

these details) and checking with them directly as to whether or not they have any European Union customers. The STC holder should know who its customers have been because it has obligations to maintain continued airworthiness for modifications.

#### QUESTION:

How does EASA deal with approved model list supplemental type certificates (AML STCs)?

#### ANSWER:

In general, an STC can apply to only one type certificate. Certain exceptions can be made when the installation of a piece of simple equipment is clearly identical from one aircraft type to another; however, EASA procedures state an STC should apply to only one type certificate. Each new type certificate should be the subject of a new application. This principle also applies to the validation of FAA STCs. □

*Note: The AEA offers “Frequently Asked Questions” to foster greater understanding of the aviation regulations and the rules governing the industry. The AEA strives to ensure FAQs are as accurate as possible at the time of publication; however, rules change. Therefore information received from an AEA FAQ should be verified before being relied upon. This information is not meant to serve as legal advice. If you have particular legal questions, they should be directed to an attorney. The AEA disclaims any warranty for the accuracy of the information provided.*

errors. Does the organization have a procedure to report OEM failures to the OEM and the FAA? Is there a process for follow-up? Does the organization have a process for developing alternative processes when a given process or procedure is no longer valid because of changes and alterations to the product?

- Personal issues led to the technician being tired and not at his peak. What can be put in place to minimize this risk in the future? Perhaps, an open door policy is needed, one saying, “Hey boss, I’m not at my peak today; how about if I not perform any final inspections and return-to-service?”

- Normal procedures allow (demand) technicians to constantly be pulled in different directions without considering the critical nature of the immediate task. When I’m in the middle of writing my monthly articles for *Avionics News*, I often turn off the phone and put myself in a sterile environment so I can focus on the task at hand. I’ll pick up the voicemails later. In the cockpit of commercial airplanes, there is a procedure for a sterile cockpit below 10,000 feet to minimize distractions at a critical phase of flight (landing). Does the maintenance organization have procedures to manage distractions, especially at critical phases of maintenance?

- The corporate culture has led to a belief that deviating from published procedures is acceptable and encouraged. I’m sorry to be the bearer of bad news, but you are the corporate culture. How are you going to change your demonstrated behavior so you are not “broadcasting” through your words and actions this is the accepted norm?

The solutions address not “what” went wrong but rather “why” they went wrong.

I believe accidents and incidents can be reduced when we focus on the root causes — which is the “why” — of actions or inactions of our technicians — who are the verb of “human performance” — rather than trying to regulate objectively the failure to follow procedures — the noun of “human factors.” □