PRISM

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SAFETYWIRE

The SMS Journey
Why you should embrace Safety Management Systems
(Source: James Albright, Aviation Week Network Q1 2023)

When I first heard the term "Safety Management System," or SMS, I thought it was just another fad from management schools and I gave it the same respect that I gave to Total Quality Management (TQM), Management By Objectives (MBO) and other programs designed to make headquarters suites feel like they were making a difference. Yes, I promptly ignored SMS and hoped it would go away. But when the International Civil Aviation Organization (ICAO) adopted it as mandatory in 2006, I realized that even if it proved a waste of time, I would have to, at the very least, go through the SMS motions. And then something unexpected happened. SMS proved not only useful, but it made me a better and safer pilot. SMS has become more than an academic process for my flight department, it has become a philosophy.

If you haven't taken the SMS plunge yet, or if you are still just going through the motions, please consider a short story that illustrates how useful working through a problem with SMS can be. And then, consider starting an SMS program of your own or fully embracing the one you already have.

Smarter Together

The first time I saw our mechanics tow the Gulfstream G450 into our narrow hangar, I was alarmed that there were no markings for the center of the hangar floor and by how quickly the entire operation took place. It was as if they were being timed and got bonus points for bravado. I cautioned them that when towing aircraft, the best you can do is a tie: no damage to the aircraft or hangar; there are no prizes for coming in first. They explained the speed was necessary to get over the bump of the hangar door tracks and that they were using a crack in the pavement for alignment. I told them to stop when the main gear was about 5 ft. short of the hangar door tracks and verify the wings would clear before proceeding. We did that and I thought, "job done."

Over the years I noticed that the aircraft's position on the hangar floor varied by 5 ft. or more. With a wingspan of 77 ft. 4 in., we should have had ample space within the hangar door opening of 95 ft. 4 in., ideally 9 ft. on each wing tip. My next solution was to paint a line down the middle of the hangar. Once again, I thought, "job done." While that improved our accuracy, we still seemed to vary about 5 ft. left and right. The nosewheel may have been on my painted centerline, but the main gear were often anything but equidistant from that line. My autocratic rule as their leader wasn't as effective as I had hoped.

A few years later, our company asked me to replace the G450 with a G500, which has a wingspan of 86 ft. 4 in. empty and 87 ft. 1 in. with a full load of fuel. Now we would have only 4 ft. on each wing and our plus or minus 5 ft. tolerance wasn't going to be good enough. Our safety officer thought using the SMS process would give each member of the team a chance to "buy in" to my earlier solutions: slow down, don't proceed unless the nose gear is precisely on centerline. So, expecting only to have my solutions validated by the group, I filed a Hazard Identification and Tracking form, something our safety officer called a "HIT." What happened next surprised me.

The team immediately identified two reasons behind our accuracy problem. First, we were approaching too fast, trying to build momentum over the steep rise of pavement just before the hangar door tracks. Second, even if the nosewheel was on centerline that didn't mean we would have the wings centered if the main gear were not also on centerline. That much, I thought, was obvious. But each member of the team identified a different part of the problem. Then the group found a solution that many of us never considered.

Problem: not all our pilots and ground support personnel understood correct marshalling signals and the result was pilots trying to align the aircraft as best they could, quite often ending up with the nosewheel on centerline and the main gear several feet left or right. Only our former airline and Air Force pilots had ever been formally trained on how to give and receive marshalling signals. None of our ground crew had ever received correct training.

Solution: a back to basics marshalling course for everyone.

Problem: the tow team believed they could "save" a bad starting position with creative moves before the wings reached the hangar. Quite often they could get the aircraft properly aligned, but more times than not they ended up with "good enough."

Solution: paint additional lines prior to the hangar door, giving maximum tolerances for the main gear. (If the main gear were not within their lines, the tow team wasn't allowed to proceed and had to back the airplane out for another attempt.)

Problem: the rise in the asphalt prior to the hangar door tracks meant a minimum speed was needed to overcome the inertia of the aircraft going "uphill" into the hangar. I thought the problem was the hangar track itself was beyond repair. But that wasn't the problem at all.

Solution: rebuild the asphalt prior to the hangar door tracks to make the slope more gradual.
It took a few days to train everyone in proper marshalling procedures, a few weeks to get the new lines painted, and a few months to get the slope regraded. A year later we took delivery of our newer (and wider) aircraft and getting the aircraft precisely on centerline is a matter of routine now. The SMS process allowed us to come up with innovative solutions and, just as importantly, gave everyone a deeper understanding of the problem and the reasons behind our new procedures. On those few occasions where the aircraft isn't properly aligned, there haven't been any complaints about having to back the aircraft up for a second try. The entire team has joined me in my zeal for precision.

Flight Operation Quality Assurance
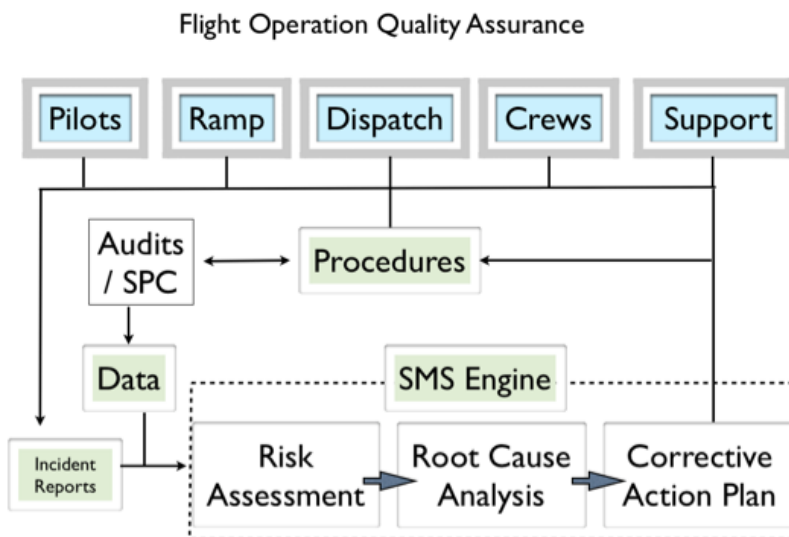
The Hazard Identification and Tracking process also combined with our Flight Operations Quality Assurance (FOQA) system to improve the way we fly. For example, before we adopted an SMS, FOQA identified an occasional unstable approach at Hanscom Field, Bedford, Massachusetts (KBED), our home field. Many locals prefer to fly inside three radio towers that underlie what would be a normal base turn to Runway 29, and we were no exception. When FOQA identified this as a problem, we thought it was a problem with FOQA, not us. This bugged me because it was our lone exception in an otherwise perfect FOQA report each quarter. I called other local operators with FOQA, and it seemed they all accepted the blemish, there was nothing to be done about it.

But one of our pilots saw this as a case for what SMS gurus call the Continuous Improvement Opportunity Program (CIOP). The team realized immediately that the solution was to fly outside the towers, for a final approach that was about 0.5 mile longer than what most consider standard. We worried about what our tower would think about us hogging a little more airspace, but a quick phone call put that to rest. Our SMS program spurred us to stop accepting unstable approaches as beyond our control.

I think every flight operation can benefit from an active SMS program; it will not only make your operation safer, it will also forge your personnel into a team where everyone feels empowered to contribute.

Getting On Board

You might have heard that achieving an industry-compliant SMS program is simply a matter of finding a vendor, writing a check and placing a new binder on your safety officer's desk. You can find someone who will accept your check and produce just such a binder, but that will not, by itself, get you an SMS program that will do you any good. The key idea when adopting an SMS is that it isn't something you add to your library of company policies and procedures--it is something that is integrated into your existing programs and ties everything together. If this makes it seem like adopting an SMS will be a lot of work, that is because it is. While the process should take many years, each step along the way is manageable. The process never really ends, but you will see benefits almost immediately and as your system matures, the benefits will increase.

The first step is to get everyone's "buy in" and that step begins with senior leaders. Why, they might ask, do we need to adopt this when we've gotten along just fine without it? For most of us, the answer will be: it is required. But that isn't universally true.

If you are a U.S. commercial operator, you must have an SMS program. The regulatory requirement is in 14 CFR 5.1(a), which says, "A certificate holder under Part 119 of this chapter authorized to conduct operations in accordance with the requirements of Part 121 of this chapter must have a Safety Management System that meets the requirements of this part and is acceptable to the Administrator by March 9, 2018." Part 119 defines certificate holders as air carriers and commercial operators under 121, 125 and 135.
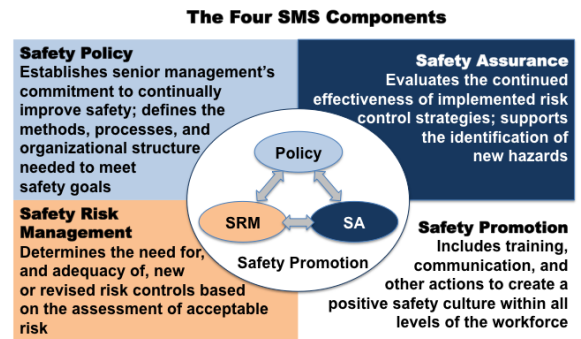
If you are flying under non-commercial rules, Part 91, and fly internationally, the International Civil Aviation Organization (ICAO) Doc 9859, paragraph 8.4.7 says, "In accordance with Annex 19, the State shall require that service providers and international general aviation operators implement SMS.

In the United States, that leaves a lone exception to the SMS requirement: domestic-only Part 91 operators. If you fall into this category, an SMS program is voluntary but can be economically beneficial. My Part 91 flight department receives a 15% annual discount on our insurance, more than offsetting any costs associated with our SMS program.

Once you have leadership behind you, the next step is to get everyone in the organization on board. It will be helpful to have at least one person trained to speak the SMS language and ready to show the way with your next chance to improve your operation. Most organizations hand this over to their safety officer, but I think it is important to realize that in a robust SMS, everyone is a safety officer. The person with the title helps train others, but in the end, it takes everyone to inculcate a good safety culture.

Key Parts of an SMS

The key to understanding SMS is realizing that it is a decision-making system designed to change the way you operate. It is built around four components: safety policy, safety risk management, safety assurance and safety promotion. You will need the four components to reap all the benefits of a robust SMS program.

The Four SMS Components

Safety Policy
Establishes senior management's commitment to continually improve safety; defines the methods, processes, and organizational structure needed to meet safety goals

Safety Risk Management
Determines the need for, and adequacy of, new or revised risk controls based on the assessment of acceptable risk

Safety Assurance
Evaluates the continued effectiveness of implemented risk control strategies; supports the identification of new hazards

Safety Promotion
Includes training, communication, and other actions to create a positive safety culture within all levels of the workforce

A safety policy is where the organization sets its standard operating procedures (SOPs) and management conveys its commitment to the safety program. This is typically done with a flight operations manual or other written document easily accessed by members of the organization. If you don't have such a document, you can start with the SOPs in your aircraft manual and a letter from the company that basically says you will follow those, and the company will employ a policy that encourages all members to report any safety issues. A key component of this letter is the executive's support of a confidential employee reporting system to report all hazards, accidents, incidents and safety issues without fear of reprisal.

A safety risk management program provides a mechanism for people to report potential problems and for the organization to mitigate those problems in a collaborative process. It can be as simple as a blank form or an email to the safety officer, followed by one or more people coming up with a fix.

Safety assurance is a way to monitor and measure how things are going, including those things that have been addressed by the safety risk management program. In short, it answers the question, "did our fixes work?"

Safety promotion lets everyone know that they are a part of the SMS, the organization's safety priority, reporting procedures and how risks are mitigated. It should involve regular training and participation.

You already may have most of the basic components of a functioning SMS in place or you may be starting from square one. Back in 2008, I was convinced we could bring ourselves up to whatever SMS requirements were needed to fly internationally and only pay for our audits to document our SMS status. This method helped us to really understand the nuts and bolts of our SMS, but it was a lot of work and took too much time.

Getting Started

The easiest way to spool up your SMS program is to hire a company specializing in getting you up to speed quickly; just type "SMS for business aviation" in your favorite Internet search engine. These providers will take your existing manuals and procedures, make them SMS compliant and shepherd you through your first audit. Jim Hosey, president of Aviation Consulting/Auditing, offers some insight into the process when going this route. "A smaller flight department will need six months to a year to get started. A larger flight department can spool up in half that time because they have more people to handle the work. In either case, you can be at 100% in two to three years." He recommends membership in the Business Aviation Safety Consortium (BASC), www.aviationconsortium.com, to streamline the process. Membership runs $5,000 annually.

You don't have to use a consultant or vendor to start your SMS program; you can do it on your own. Fortunately, there is a lot of help available today to flatten the SMS learning curve. The National Business Aviation Association (NBAA) holds regular SMS Implementation Workshops, normally scheduled at its annual Business Aviation Convention & Exhibition. See nbaa.org for more information. FlightSafety International and the International Business Aviation Council (IBAC) have co-developed an SMS course designed for flight department managers and those tasked with developing an SMS. See https://www.flightsafety.com/ for details.

I recommend you look at Advisory Circular 120-92B, Safety Management Systems for Aviation Service Providers. While this AC is meant for Part 121 certificate holders, the guidance is helpful for anyone getting started with SMS.

Phased Implementation

When IBAC first introduced the International Standard for Business Aircraft Operations (IS-BAO) in 2002, the acknowledged progression was to move from an entry level called "Stage 1" and eventually to "Stage 3." Some operators thought that Stage 3 meant you were done and that from that point on you could coast. Of course, this isn't true. You don't need to follow the IS-BAO model at all, but you do need to implement your SMS with the idea it is a continuing process. AC 120-92B recommends a phased approach using four levels of implementation.

Level 1 is for planning and organization. This is where you get everyone on board, identify what you already have and what you need. I recommend sending at least your safety officer to training. Hiring a consultant at this point can speed the remaining steps considerably.

Under Level 2, you have in place a basic safety management system and will develop your safety risk management and assurance programs. Members of your organization should be able to identify hazards and unacceptable risks, know how to report these, and participate in teams designed to identify solutions and mitigate the risks.

With Level 3, you will have a fully functional SMS and will be able to further use your safety risk management and assurance programs in a proactive manner.

Level 4 is for continuous improvement. All required SMS processes are in place, and you will continuously monitor your SMS for the life of your organization.
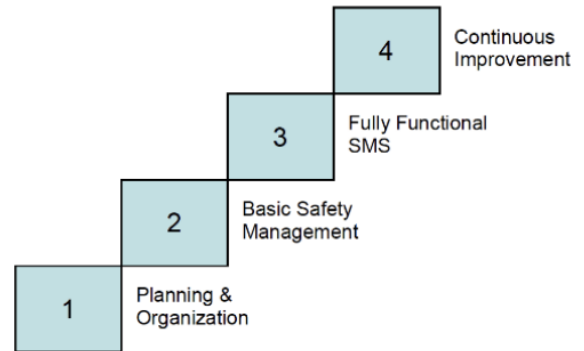
"**Certification**"

If you are a U.S. commercial operator, you will need to prove you have a qualified SMS under 14 CFR 5. If you are flying internationally as a U.S. operator under Part 91, you will need to prove you have a qualified SMS under ICAO Doc 9859. The most effective way to prove your system is through an approved SMS auditor. This will provide more than just peace of mind; it should expedite international ramp inspections. If, for example, you are given a Safety Assessment of Foreign Aircraft (SAFA) under the European Union Ramp Inspection Program (EU-RIP), having an SMS certificate from an accredited auditor may satisfy many of the inspector's questions.

With or without that piece of paper saying you have an SMS program, you should realize that SMS is never finished, it is a continuing process. Even after you have your operation in what appears to be "tip top" shape, realize that SMS will be needed to face the challenges sure to come.

SMS in Action

There is no doubt a SMS can improve your organization during the early implementation and development stages, but the benefits may prove even more valuable with the inevitable changes over time. In the many years since we considered our SMS fully implemented, we've used our program to face challenges as they occurred and even to anticipate them before they could become problems. Here are a few examples:

*Our Hazard Identification and Tracking (HIT) program quickly became my favorite part as it slayed one problem after another. Everything from the way we towed our aircraft to the way we entered a VFR traffic pattern was improved. But it really earned its place in our arsenal the day I was called about a passenger slipping on our hangar floor. The center of our hangar floor had an anti-slip coating, but on that day the ramp was covered in snow and the passenger decided to take a shortcut away from the center. The solution was to recoat the entire floor with the abrasive coating. The reason I was impressed was that the hangar manager, who felt somewhat responsible, didn't think twice about filing the HIT report. I can imagine a few years ago the thought would have been to dismiss the incident as "one of those things" and I might not ever have heard about it.

A good SMS program should have an Emergency Response Plan (ERP) that is well thought out and has been practiced regularly. We had such a plan but never practiced it until one of our audits flagged us for this. At our first practice, a line technician said there was no way he was going to remember the right words if he were contacted by the press so his plan would be to do the "Sergeant Shultz" routine, saying "I know nothing." One of our pilots filed a Continuous Improvement Opportunity Program (CIOP), saying we should give everyone a wallet card with the pre-approved statement. Along the way the team also thought it would be good to have key phone numbers on the reverse of the card.

We give everyone in our organization a chance to rate our "Operator Safety-Risk Profile" at least once a year and whenever we have changes in personnel or equipment. The form we use tracks operational things like our local airport's approaches, technical factors such as problems with our aircraft, and human factors like the number of pilots or mechanics. Over the years we only had two instances of identified elevated risk. The first was when one of our pilots was medically grounded just as another quit and the second was when our aircraft's operations were significantly curtailed due to a fleetwide limitation. In both cases we were able to proactively adjust our operations to accommodate the elevated risks.

You are not alone if you recoil from all the alphabet spaghetti. HIT? ERP? CIOP? Those acronyms are purely optional; the important thing is the culture that goes along with them. A good safety culture fosters in everyone the idea they can report any problem without fear of repercussion. They should appreciate that no matter where in the organization they are, they can generate an idea to make things better and know that idea will be treated seriously.

Our SMS has proven itself time and again. It has made us all safety officers and has changed our mission-oriented operational culture into a safety culture.

If you don't have an SMS program, you need one. It will take time, but you will reap benefits with each step. If you already have an SMS but you haven't given it a thought since your last audit, you should evaluate your safety culture with the idea of making it even better.

Additional Help

I recommend getting professional help when starting your organization's SMS, but you could tackle it on your own. Here a are a few resources to get you started:

Title 14 CFR Part 5, Safety Management Systems for Certificate Holders Operating under 14 CFR Part 121.

Advisory Circular 120-92B, Safety Management Systems for Aviation Service Providers.

Annex 6 to the Convention on International Civil Aviation, Part 1, International Commercial Air Transport, Aeroplanes.

International Civil Aviation Organization (ICAO) Document 9859, ICAO Safety Management Manual.

FAA Public SMS Web site: http://www.faa.gov/about/initiatives/sms/specifics_by_aviation_industry_type/

ICAO SMS Training Web site: https://www.icao.int/training/pages/safety-management-training-programme-(smtp).aspx

—**James Albright** is a retired U.S. Air Force pilot with time in the T-37B, T-38A, KC-135A, EC-135J (Boeing 707), E-4B (Boeing 747) and C-20A/B/C (Gulfstream III). Since turning civilian, he has flown the CL-604, Gulfstream GIV, GV, G450, and now the GVII-G500. He is the webmaster and principal author at Code7700.com

Global Aerospace's SM4 Aviation Safety Program Provides Valuable Insight on The Cost of Cutting Back on Sleep

(Source: Digitaljournal.com PRESS RELEASE (Prodigy Press Wire)

Adjusting to the physiological and psychological changes from traveling across time zones is essential for flight crews. However, another factor is added to the equation in most U.S. destinations every six months: the shifts into and out of daylight saving time. A bill to eliminate the twice-yearly practice of changing our clocks by an hour is making its way through Congress. In the meantime, it's worth considering why adapting to daylight saving time is so hard on many people.

In a word: sleep. It's the one activity that all of us perform more than any other, and yet it's also the one that most often gets put on the back burner.

When you think about it, the blissful practice of "sleeping in" lays bare the reality that there is just not enough sleep occurring in our modern world. You don't ever hear of anyone "catching up" on nutrition. Even exercise is prioritized over sleep—as evidenced by 4 a.m. spin classes and 24-hour workout gyms.

The Cost of Cutting Back on Sleep

Sleep is precious. Ample scientific evidence exists that getting enough sleep sharpens the brain, improves mood, helps regulate blood sugar, controls weight gain and boosts athletic performance.

Earlier this year, the American Heart Association added sleep to its cardiovascular health checklist, asserting that sleep duration is "an essential component for ideal heart and brain health." And just last week, the Journal of the American Heart Association published results from a sleep study of 1,920 people conducted by Columbia University that found participants with short sleep duration had higher chances of having poor sleep efficiency (less than 85% of the time in bed asleep), irregular sleep patterns and excessive daytime sleepiness. They also had higher prevalence of obesity, type 2 diabetes and high blood pressure.

The cost of sleep deprivation

$411B
COST TO THE ECONOMY EACH YEAR

50–70M
U.S. ADULTS HAVE A SLEEP DISORDER

2M
WORKDAYS LOST

An average Fortune 500 company could save $40 million a year if half of its workforce engaged in a sleep-health program. A national transportation company with 1,000 employees loses more than $600,000 a year due to sleep-deprived employees. An employee with obstructive sleep apnea can cost an employer more than $3,000 a year in excess health costs. More than 250 workers likely have sleep disorders that increase the risk of being injured or killed on the job.

Sources: RAND study, Sleep Association, Harvard Gazzette

You may be shaking your head while reading this, thinking: "Great, but I'm in aviation." Your schedule may be highly irregular, with a high degree of what we call shift start time variability. Or you may frequently fly overseas and face the ordeal of trying to sleep when your body is back in your home time zone—or worse, trying to remain alert during your biological night.

Sleep in Aviation

As an aviation professional, making sleep a priority goes beyond promoting your personal health. It is a key ingredient in your ability to perform the safety-sensitive job of flying aircraft reliably and safely.

When we work with flight departments and charter operators to implement a fatigue risk management system, we always start with formulating a set of clear policies that recognize sleep as a priority, endorsed by the accountable executive and supported with training about sleep delivered to flight crew members.

Don't worry if your schedule doesn't consistently provide you with the opportunity to obtain a full eight hours of sleep per night. In his PhD research study of astronauts' sleep, Daniel Mollicone, Pulsar's CEO and Chief Scientist, found that what really matters is total daily sleep. The cognitive performance of individuals following a split sleep schedule is in line with that of individuals whose sleep is consolidated in a single nocturnal period—provided that the majority of the split sleep occurs during the biological night.

The bottom line is that any sleep is good sleep, and you should make sleep a core part of your organization's commitment to safety. Pulsar Informatics specializes in delivering technologies and formulating best practices in fatigue risk management. Contact us to request a gap analysis of your existing policies and procedures to learn how we can help.

6021 South Syracuse Way
Suite 301
Greenwood Village, CO 80111

+1 513.852.5110
+1 800.361.2216

argus.sales@argus.aero

SAFETY MANAGER'S CORNER

Corrective Actions

Safety management as a concept certainly presents multiple objectives and opinions as to which are of most importance vary, but arguably one with high precedence is corrective action response. Every identified problem, deficiency or hazard demands attention and an effective response. Although that might seem obvious, too often corrective action responses act like water and flow to the easiest path, happy to be put away and forgotten.

Let's use the following example report for discussion purposes: *While starting the second engine of a LR60, primarily focused on the engine instruments, I glanced up and noticed the lineman moving his arms and wands around in the "STOP" indication. Through peripheral vision I realized the aircraft was slowly moving and I pushed on the brakes to stop the roll. The SIC and I both noted the parking brake was set. Pumping the brake pedals and re-setting the parking the brake, we both agreed there might not have been enough pressure in the lines to hold the brakes causing the aircraft to roll when the linemen removed the chocks. During preflight checks, I had utilized the hydraulic pump a few times throughout the checks, as well as releasing and setting the parking brake as required during the checks.*

Developing an appropriate corrective action requires several fundamental and essential steps. First, the actual problem or hazard must be identified. In this example, the hazard is unwanted aircraft roll. Second, what is the root cause? Numerous techniques exist to work through root cause identification, and choosing one largely depends upon personal preference. This analysis is essential and will vary in complexity. Some hazards point to clear source (icy sidewalks create slip and fall hazard) where the root cause (winter weather, drainage) is out of rectifiable reach, while others demand increased inspection. In our example above, what might the root cause be? Insufficient crew training, equipment malfunction, hurried preflight due to changing circumstances (weather, flight profile, etc.), insufficient crew knowledge, or deficient company SOP could each be the cause. Certainly a few other possibilities exist as well. Determining an accurate root cause allows the solution action to target the bullseye.

Human error is always the easy choice when identifying root causes and targeting corrective actions. The reason is simple: put the blame on an individual and a larger, more complex and more expensive solution can be ignored. It's also a much quicker response; counseling and emailing is easily and quickly accomplished. Responses like "will brief at the next safety meeting" and "counseled crew" cost almost nothing in measures of time and money. But do they work? No doubt communication is important, on both an individual (the crew) and a company-wide level (all employees), but it's not a corrective action.

Referring back to our example report, perhaps an aircraft systems training modification is appropriate. Perhaps development of a preflight SOP for this aircraft type is in order. Perhaps a checklist change that requires a parking brake check before engine start will mitigate the risk. Every hazard is unique and discovering the best solution usually isn't simple. As a safety manager, don't let the corrective action be an ineffective check in the block.

PRISM

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Quote of the Month

> **"You are not judged by the height you have risen, but the depth you have climbed"**
>
> — Fredrick Douglas

You may not be starting from the middle. You may be starting from the bottom. It doesn't matter. All that matters is progress. You will be measured against the change you instill, not against the accolades that you accumulate.

On Short Final...

I AM NOW AN AIRPLANE

Purrrrpared for take off Captain Kangaroo!

6021 South Syracuse Way
Suite 301
Greenwood Village, CO 80111

+1 513.852.5110
+1 800.361.2216

argus.sales@argus.aero

CONTACT LIST

Susan Cadwallader

susan.cadwallader@prism.aero

VP,SMS Services

Jenna Albrecht

Jenna.albrecht@prism.aero

Program Manager, SMS Services

Wayne Ehlke

Wayne.Ehlke@prism.aero

Safety Analyst, SMS Services

Rhodri Norton-Quick

Rhodri.Norton-Quick@prism.aero

Safety Analyst, SMS Services

6021 S. Syracuse Way, Ste 302

Greenwood Village, CO 80111

 # PRISM PREFERS

www.argus.aero

UPCOMING COURSES

May 02 to May 04, 2023—PROS Course
Virtual ICAT Presentation (V-ICAT)
Online, Time: 1800-2200 (MDT; UTC/GMT -7)

May 15 to May 19, 2023—PROS Course
Aviation Lead Auditor Training (ALAT)
Denver, CO

Aug 21 to Aug 25, 2023—PROS Course
Aviation Lead Auditor Training (ALAT)
Denver, CO

Sept 26 to Sept 28, 2023—PRISM Course
Safety Management System (SMS)
Denver, CO

Oct 30 to Nov 3, 2023—PROS Course
Aviation Lead Auditor Training (ALAT)
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Go to Upcoming Training Classes to register.

+1 513.852.5110
+1 800.361.2216

argus.sales@argus.aero