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Mech

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THE NAVY & MARINE CORPS AVIATION MAINTENANCE SAFETY MAGAZINE

Mech

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Mishaps waste our time and resources. They take our Sailors, Marines and civilian employees away from their units and workplaces and put them in hospitals, wheelchairs and coffins. Mishaps ruin equipment and weapons. They diminish our readiness. This command's goal is to help make sure that personnel can devote their time and energy to the mission, and that any losses are due to enemy action, not to our own errors, shortcuts or failure to manage risk. We believe there is only one way to do any task: the way that follows the rules and takes precautions against hazards. Combat is dangerous and demanding enough. The time to learn to do a job right is before combat starts.

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Back in the Editor's Chair...Full Time

By Dan Steber

This is just a quick note to let readers know that I'm back as the editor of *Mech*. I haven't been gone completely; just working on traffic-safety issues for the command and assisting with *Mech*.

Although we have experimented with layouts and features, one thing hasn't changed: our commitment to share stories from fleet maintainers about the situations that will get them or their shipmates injured or killed. We will continue to share best practices, lessons learned, and risk-management efforts that maintainers have discovered or developed to reduce mishaps, trim cost, make maintenance safer, and save lives. I'm glad to be back.

On the Cover:
Combat Cargo Department Marines from the amphibious assault ship USS *Kearsarge* (LHD-3) connect a cargo harness to an MH-60S Knighthawk after delivering ammunition from USS *Detroit* (AOE-4) during a vertical replenishment.
Navy photo by PHAN Kenny Swartout.

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Admiral's Corner

From Commander, Naval Safety Center

Using Old Approaches for New Solutions

Mech celebrates 45 years of service to the fleet this year, and it's a tribute to the hard work from concerned maintainers like those who read and submit articles for the magazine. You have shared your stories of blood, sweat and tears that have kept other Sailors and Marines from learning lessons the hard way. Your efforts to work smarter, suggest improvements to equipment and programs, and make a difference in safety have helped to reduce mishaps dramatically over the past 45 years.

Back in 1961, when *Mech* first was published, we lost 57 aircraft, five people, and spent $15 million where maintenance error was a causal factor. Although the highest dollar cost then and now is attributable to aircraft mishaps from pilot error, a higher number of mishaps in 1961 were attributable to material failure and bad maintenance. In fact, 10 percent of all mishaps involved maintenance error in 1961. In FY05, no deaths and only two mishaps or 3.9 percent involved maintenance error, but the cost was $23 million.

Since 1980, more than $10 billion in mishaps have happened because of aviator-related causal factors. Maintenance-related ones have cost the Navy and Marine Corps more than $2 billion. You can see the point I'm getting at. Although many people focus on aviator-related mishaps, as we should, maintenance-related ones can't be shrugged off as insignificant. We've made tremendous progress over the years, but mishaps continue to take lives, injure maintainers, and cost us a lot of money. We can't concentrate solely on one category at the expense of other areas because we'll miss a large chunk of the fleet. Two billion dollars is a significant amount, and I need each of you to continue working to reduce and eliminate these mishaps.

Maintainers historically have found solutions to problems faced at work. I need each of you to take home with you the risk management lessons learned at work to mitigate PMV, recreational and off-duty mishaps. Too many Sailors and Marines die each year in these categories. In FY06, off-duty mishaps are at a 17-year high—a trend headed in the wrong direction. You can make a difference in this area.

One last point about off-duty mishaps: The poster on the facing page reminds us that the Critical Days of Summer, running from Memorial Day to Labor Day, will start soon. Historically, this is a notorioius time for mishaps because of an increase in outdoor activities.

I want every Sailor, Marine and civilian to think about the activities they'll be involved in. Use risk management: Ask yourself what's the worst thing that could happen while doing any activity, and build a plan to keep you, your families, and your shipmates safe.

How would they react if something happened to you? Ask yourself what you can do to avoid causing unwanted sorrow to your families.

Have a good time, do the right things, and avoid poor decisions. Make it through the summer, get home to visit families and friends, but return safely to your command and shipmates. We need you back alive!

RADM George Mayer

WESS Improvements Underway:

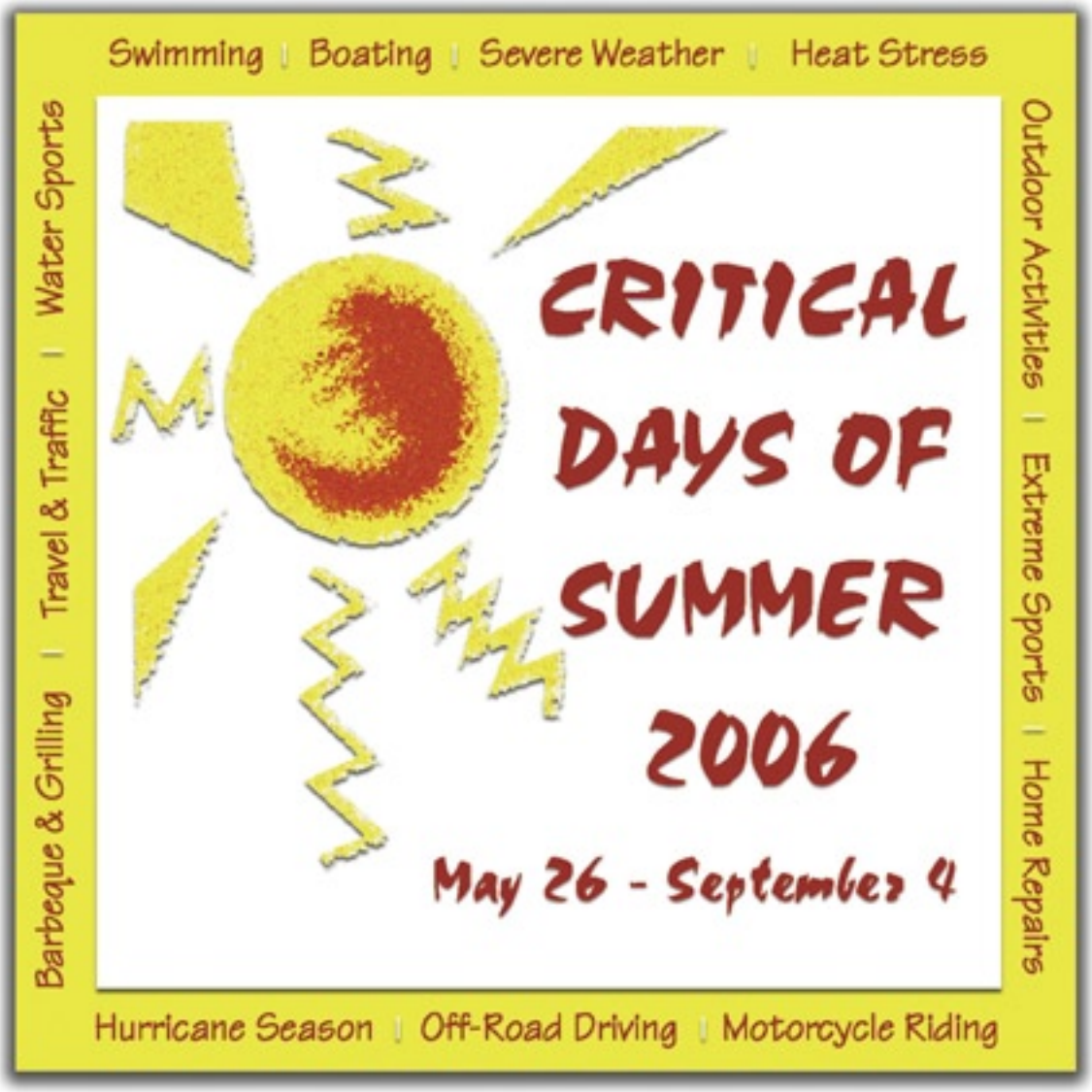
The WESS BRT (barrier removal team) has been listening to fleet feedback and is working on several initiatives to make the system better. A list of common-problem areas is available on the Naval Safety Center website at http://safetycenter.navy.mil/articles/n-z/WESS–BRT–tackling.htm. Visit the site to find simple answers to common questions, check what might help make your WESS experience better, or see if an issue you're having already is being reviewed.

TOOLS YOU CAN USE

Campaign Tools
CDS Campaign Kit
Fact Sheets
Activity Calendar

Multimedia
Presentations
Audio/Video
Posters
Logos & Slogans

Outreach
Partnerships
Ad Campaigns
Success Stories



Contact the motor-vehicle division at 757-444-3520 Ext. 7602 or request your Critical Days of Summer (CDS) campaign kit at NRFK_SAFE_PAO@navy.mil

Will You Survive?

Read about your shipmates' survival stories. Learn how a mother copes with her son's death. Know the rules of the road. Read all about it in the Spring 2006 issue of *Sea&Shore* Magazine.

DON'T WAIT . . . BUILD YOUR CRITICAL DAYS OF SUMMER CAMPAIGN NOW.

GET YOUR TOOLS @

www.safetycenter.navy.mil/seasonal/criticaldays.htm

Don't Practice What's Not in the Book

By AE2 Matthew Thurston

I was working as the night-check supervisor in the AE shop. When I walked into the shop at the beginning of my shift, I noticed that the AE1, my shop supervisor, had an airspeed indicator in his hand. I asked him, "What's wrong with that?" He shook it, and a large rattling noise could be heard—not a good thing. The night wasn't starting off well and would just get worse.

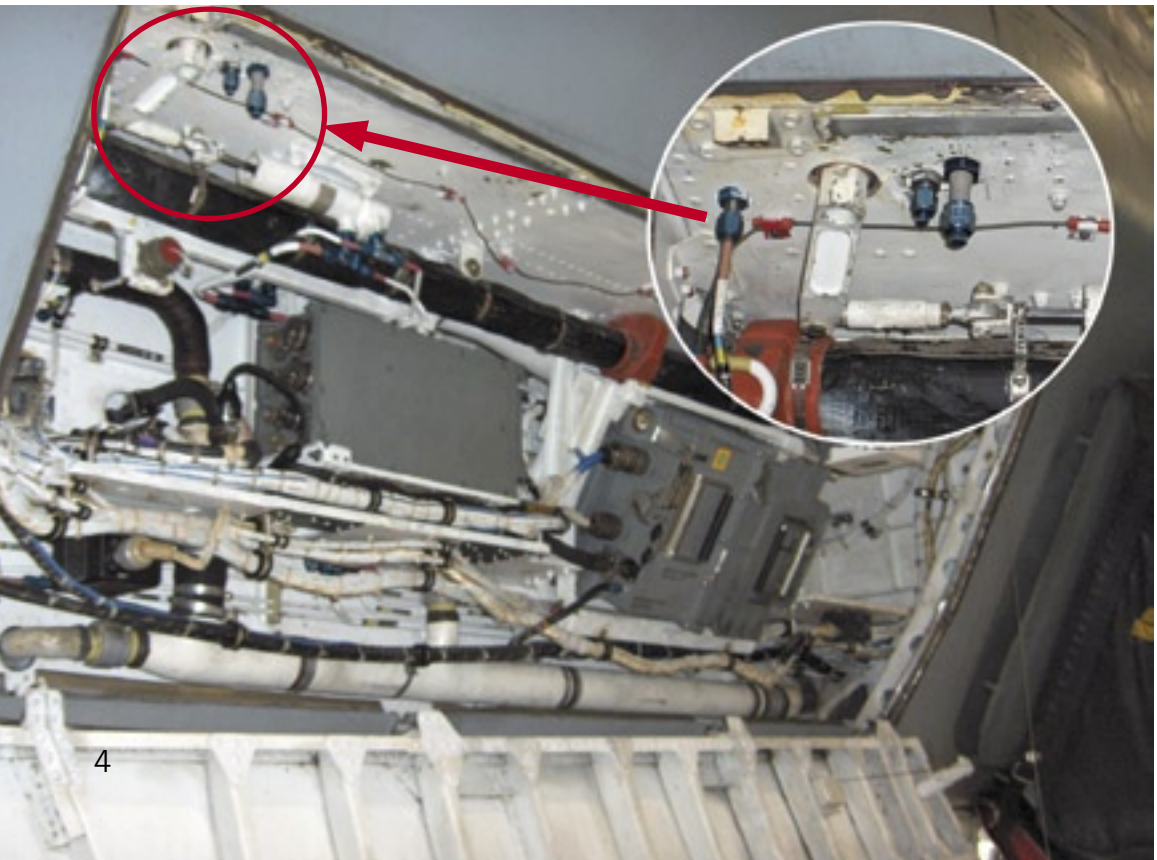
The shop supervisor then told me that a TTU-405 test set already was hooked up to the aircraft. He was giving me the priority for the night.

When a new airspeed indicator was received from supply, I headed out to the aircraft with one of my workers to install it and to perform an operational check.

Arriving at the aircraft, we saw the TTU-405 test set was hooked up through the pitot static-drain lines in the port cheek panel (blue caps in picture), instead of directly to the pitot and static probes. We both thought nothing of the arrangement at the time because it's a common practice in the Prowler community to hook up the test set to the drain lines. This practice also is being taught to students at AE Initial School at Center for Naval Aviation Technical Training Unit (CNATTU).

The installation of the airspeed indicator went without any problems. After the installation was complete, we grabbed the handheld controller for the test set and the op-check manual. We started from step 5 in the op-check manual because the day shift already had completed the pre-op checks on the test set. I realize now that had I looked back three steps, I would have seen that the procedures specify using the adapter set and hooking up the test set hoses to the pitot and static probes. As it was, the operational check went without a hitch.

We then started to remove the hoses from the drain lines in the cheek panel. While doing this, I noticed the caps that cover the drain lines were missing. I looked inside the top of the TTU-405 case, the backpack for the hoses, and approximately 18 inches around the drain lines, but I couldn't find them. I assumed that the day check must have left them in the shop. As we were walking back to the hangar, I asked an airman heading out to the aircraft to grab the drain caps from the shop and to install them.



After we got back to the shop, I took a smoke break, used the head, and took about a 15-minute phone call from my wife. You can guess what happened. The airman, who had been asked to install the caps, didn't do the job, and I completely forgot about it. We signed off the MAF and didn't think anything else of it until the jet tried to take off the next day.

On the takeoff roll down the runway, the aircraft had zero airspeed because the drain caps had not been installed. The

missing drain caps were found wedged inside the door in the same cheek panel where we had worked.

Three major mistakes occurred: We had deviated from the book, had become preoccupied after finishing a job and forgot the task at hand, and had failed to get a thorough passdown, both oral and written, between the shifts.

You may ask, "What's the big deal?" Well, had this mistake occurred on the ship and not at NAS Whidbey Island, I could have written an entirely different story. According to the NATOPS manual, after a cat-shot with zero indicated airspeed and altitude, the first step is to eject!

In other words, my mistake could have cost four aircrew lives. If they didn't or couldn't eject, how could we have explained that error to a spouse or children? How would you say, "I'm sorry I killed your husband, wife, mommy or daddy, because I simply forgot?" I know I couldn't.

I hope every maintainer for any type aircraft will think about my mistake before doing any aircraft maintenance. I now carry around a little green wheel book to write down everything I do during the day and the things I still need to do.

I learned an important lesson, especially about maintenance practices that widely become used and accepted. Just because a procedure is used throughout a squadron or in an aircraft community doesn't make it right. Please read your pubs, and do all the maintenance and QA procedures by the book. It's the only way to make sure something like my mistake doesn't happen to you.

Petty Officer Thurston works in the AE shop at VAQ-131.

Maintenance officer comment: Where was QA in this process?

Missing Tools Can Happen to Anyone

By AE1 Daniel Evans

Throughout my naval career, I've sat through numerous briefings, read dozens of articles, and personally reprimanded a few of my own troops about tool control. I always have prided myself on never losing a tool. So you can imagine my horror when it happened to me.

I was new to the squadron and anxious to prove myself. I always had worked on fixed-wing aircraft, so helicopters gave me a new, challenging learning experience.

As usual, the flight schedule was full, and we were working to keep aircraft mission capable. I was working with two other petty officers, another first class and a second class. We were flight-line troubleshooters and were called out to aircraft 555 to work on numerous preflight discrepancies. We found a problem with the auxiliary power plant, and, not wanting to lose the mission, we had the pilot shut down the helo so we could rush to fix the problem. We climbed on top of the aircraft and quickly went to work removing the APP compartment cowling. We spotted some loose electrical connections, which was an easy fix. Within 10 minutes, the APP was repaired and the helo ready to restart.

We checked our tools and headed inside to sign off the paperwork. In the meantime, 555 took off, and we thought everything was OK. A short time later, the second class on my crew was called out to another aircraft. While checking his tool pouch, he saw that an adjustable wrench was missing.


The wrench was found in this area.

My first reaction was disbelief. Even with three people looking at the tool pouch, we still had lost a tool. I immediately had everyone search their pockets, work areas, and other tool pouches. The tool couldn't be found. We then notified maintenance control, started a missing-tool report, and had the aircraft recalled.

When 555 got back, we opened the APP compartment, and, sure enough, the tool was right where we had left it.

I was angry with myself and couldn't believe I had let this happen. I am happy that we were fortunate to get the aircraft and crew back safely. Things could have been much worse. This event was a powerful reminder of how important it is to be ever vigilant about tool control.

Petty Officer Evans works at HM-14.

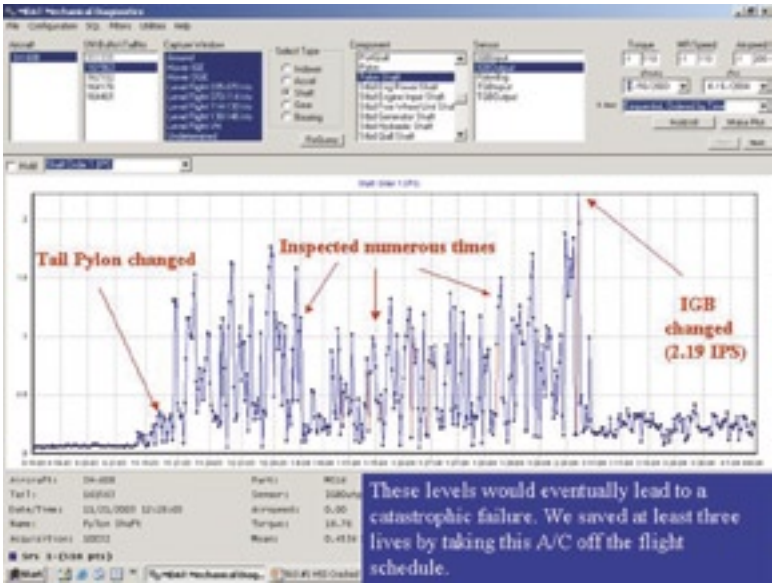
HSL-41 Leads DoN M

By Lt. Chris Morgan

Helicopter Anti-Submarine Squadron Light 41 (HSL-41) is in the midst of a proof-of-concept demonstration of a new knowledge-management process known as military flight operations quality assurance (MFOQA). The overall goal of MFOQA is to provide squadron personnel and fleet leadership with objective, quantifiable, relevant, and timely information regarding mechanical and electrical systems' performance, as well as aircrew performance. The MFOQA process is a marked shift from traditional maintenance and standardization in that it involves proactive, near-real-time analysis of trends and performance in order to enhance maintenance, training, standardization, and safety.

HSL-41 is the lead squadron for the Department of the Navy-sponsored MFOQA demonstration project to assess the ability to integrate MFOQA processes into naval aviation and the benefits of doing so. The core concept behind HSL-41's participation in the MFOQA process is data collection and the use of that data to show measurable improvements in operational readiness, reduction of risk, and training standardization. To accomplish this goal, HSL-41 is using the integrated mechanical diagnostics system (IMDS), with enhanced capabilities provided by the joint advanced health and usage monitoring system (JAHUMS). Dr. David Haas, the technical lead for the DoN MFOQA demonstration at the Marine and Aviation Division, Naval Surface Warfare Center, Carderock, indicated that the Seahawks' experience with IMDS and JAHUMS technologies, combined with their enthusiasm for using promising technologies and processes to improve their day-to-day

FOQA Development

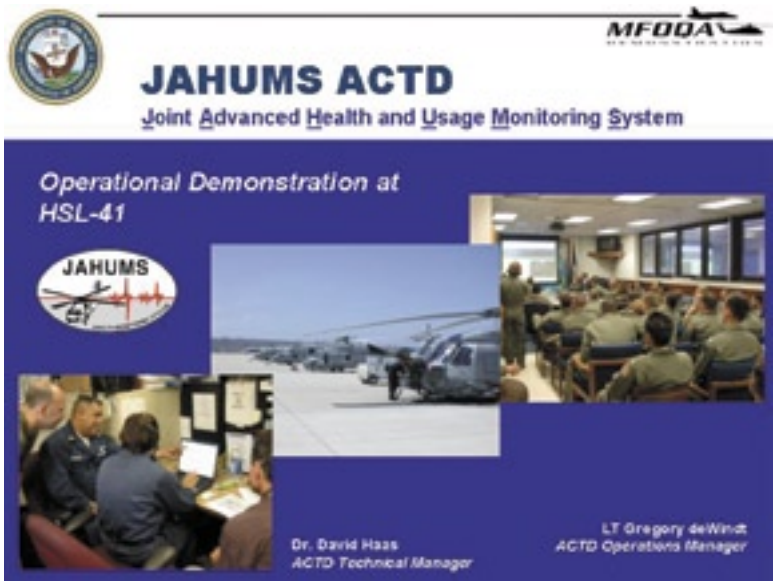


operations, made them the logical choice as the lead DoN MFOQA squadron for rotary-wing aircraft.

On the flightline at HSL-41, JAHUMS technologies are integrated into four aircraft. The backbone of this open architecture of technologies is the IMDS. A central processing unit collects data full time from a network of installed accelerometers. That data is supplemented by aircraft-performance data passed through the aircraft-signal processors. In addition to JAHUMS software, each aircraft has a helicopter in-flight reporting system (HIRS) and a cockpit voice flight-data recorder (CVFDR). The HIRS system provides aircraft monitoring and parameter tracking from the ground station in real time, while the CVFDR records cockpit audio.

On the ground at HSL-41, the squadron has an IMDS ground station, a JAHUMS ground station, a JAHUMS portable electronic display device (PEDD), and a 45-inch, plasma, flat-screen for real-time flight monitoring or flight playback. Aircraft data is recorded onto a PCMCIA (memory) card during flight and then downloaded onto the IMDS ground station after the flight. Then it goes to a database on the JAHUMS ground station. Simultaneously, the data is uploaded with squadron NALCOMIS data to NAVAIR at MCAS Cherry Point. There the data is archived, and engineers perform post-flight diagnostics and trend analysis. Squadron members also can analyze the data to find trends.

After data is downloaded, and if the aircrew exceeded any engine parameters, the JAHUMS ground station launches a debrief session called the pilot debrief module (PDM). The PDM generates a sequence of questions relevant to the flight and displays them to the crew member. The crew member then can look at the data and determine if an actual malfunction occurred or if the exceedance was noted during a normal sequence of aircraft events. If no exceedances were recognized during the download, the pilot can initiate a PDM by searching for JAHUMS-supported symptoms of possible engine-related malfunctions. The Q and A session then follows. After the debrief, a discrepancy set is created to aid diagnostics by maintenance personnel, and a maintenance work order is generated and sent to the squadron NALCOMIS system. Maintenance personnel who are assigned the work order have the ability to view the work order, the discrepancy, and the diagnostic model on the PEDD and use it to troubleshoot and correct the malfunction.



Recent lessons learned and accomplishments have shown that IMDS and JAHUMS technologies can support the development of the MFOQA process.

In 2002, during a night-vision-goggle training flight in El Centro, Calif., an engine high-speed shaft sheered, causing catastrophic damage to the engine and forcing the aircrew to land and shut down. Fortunately, the crew did not experience the malfunction while transiting over the mountains on the 60-minute flight from NAS North Island to NAF El Centro, as no pilot would like to perform an emergency landing in the mountains at night.

It is obvious that the MFOQA process would have prevented this entire evolution by removing the aircraft from the flight schedule. Unfortunately, the data from the aircraft had been sent to Cherry Point but, due to a lightning strike, was held up at a mid-tier server. It is important to note, however, that once the data was received and analyzed, engineers at Cherry Point recommended an immediate change of the high-speed shaft.

In 2003, IMDS determined that a drive-system gearbox for the tail rotor on one of the aircraft was trending out of limits. The traditional automated track and balance (ATABS) system was installed to verify the IMDS data. Initially, ATABS was unable to detect any problems. It was not until 25 minutes of constant run time that the ATABS system finally detected the discrepancy. As a result, the gearbox was removed from the aircraft. Follow-on inspections determined that the gearbox had been manufactured incorrectly. The savings to DoD: one SH-60B and a three-person aircrew.

In 2004, IMDS indicated that another high-speed shaft was trending out of limits. Several visual inspections of the shaft revealed no defects, and, each time, the shaft was rebalanced. However, by this time, the IMDS had been expanded to allow for in-house analysis of the high-speed shaft data. As a result of this analysis, the aircraft was placed into a planned maintenance period early. Upon removal of the shaft, a visual inspection revealed an internal crack that never would have been detected while the shaft was installed. The savings to DoD: one GE-401C turboshaft engine, $676K.

The most tangible results of MFOQA at HSL-41 have been seen in the area of functional check flights following planned or major maintenance. Since HSL-41 began using IMDS and JAHUMS for FCFs, a drop in post-planned maintenance man-hours has been noted. In a single work center alone, maintenance man-hours for FCFs dropped from 81.5 man-hours to an incredible 19.4 man-hours.

One thing is for certain: HSL-41 has proven that IMDS and JAHUMS technologies, coupled with the MFOQA process, saves time, money and, most importantly, lives.

Lt. Morgan is the QA officer and flies with HSL-41.

I want to pass along that Dr. David Haas at NSWC Carderock has done a lot of work to get MFOQA to where it is today. Kurt Garbow, at the office of the deputy assistant secretary of Navy for safety, also was a strong advocate and a champion for the MFOQA program, pushing to get it implemented. In fact, he reports that on Feb. 2, 2006, the secretary of the Navy signed a policy memo implementing a directive from the office of the secretary of defense to incorporate MFOQA DoD-wide. That milestone has been long awaited, and it allows the Navy and Marine Corps to move ahead with this vital technological advance that will improve aviation and maintenance procedures, reduce costs, provide an excellent training tool, and, more importantly, potentially will save lives.—Ed.

Why the Afterbody Went Flying

By AD2(AW) Randy Penrod

The P-3C is a multi-crew aircraft, and its aviators rely on crew resource management (CRM) every day for mission accomplishment. At the core of CRM are the tenets of decision-making, assertiveness, mission analysis, communication, leadership, adaptability and flexibility, and situational awareness. These same tenets work in maintenance. As a maintainer, I learned the importance and value of a few of the skills, specifically situational awareness and communication, one duty weekend in Brunswick, Maine.

An unsecured afterbody can become a missile.

That particular weekend was busier than normal as we focused on getting an aircraft full mission capable (FMC) for the coming week's flight schedule. Two props on the aircraft needed balancing, which entailed turning the aircraft, running the balance gear, adding or subtracting weights to the props, and turning the aircraft again to check the balance.

On the turn, I was the collateral-duty inspector (CDI) with an experienced third class petty officer and a new third class to assist me. The turn occurred without incident, and, afterwards, as I have done countless times before, I went into the shop to update maintenance control and the maintenance action forms (MAFs) while the other two maintainers removed the balance gear and installed the propeller afterbody assemblies.

Finished with the MAFs, I headed back out to the aircraft and intercepted one of my team members. That maintainer told me the ground-turn crew planned to start engines again to check reverse shaft horsepower (SHP) on the No. 3 engine—one of the engines we just had balanced.

Within seconds of returning to my shop, the maintenance chief called, saying the afterbody fell off the aircraft. My heart sank, and I could not believe it! I immediately proceeded out to the aircraft and saw that my team had failed to install the bolts, allowing the afterbody to fall free during the turn.

The flight engineer (FE) was new to the command and had failed to recognize I was the CDI and started the engines again without confirming the afterbodies were installed or completing another walk-around inspection.

I'm thankful that the flying afterbody didn't hit anyone or anything on the way down. Everyone involved in this fiasco relearned two basic CRM or MRM (maintenance resource management) skills: communication and situational awareness.

As the CDI, I should have let the FE know that I was heading into the hangar to sign off MAFs and my workers were installing the afterbodies. My workers should have told the FE that the installation had not been CDI'd and should have had the situational awareness to stop the turns, knowing I had not signed off on their work.

The FE, noticing the petty officers no longer were working on the afterbody, assumed the work was done. Instead of talking to someone or checking the work, he proceeded to turn the engine.

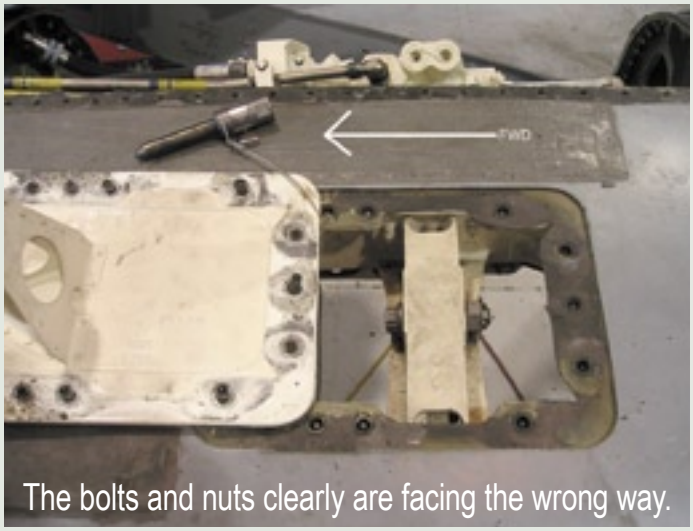
The requirement to have ready-for-tasking (RFT) aircraft, increased operational tempo, and perceived pressure are common to all fleet squadrons, and these conditions have the potential to cause a mishap. It happened to us, but we have the ability to learn from our mistakes, as do other Sailors and shipmates.

Petty Officer Penrod is a powerplants collateral-duty inspector with VP-26.

To Reverse or Not

By Emmanuel Basye

This area is where bolts and nuts often are assembled incorrectly.



The bolts and nuts clearly are facing the wrong way.

We just had completed a modification on an FA-18F ahead of schedule and was ready to turn it over to the squadron. During the turnover, the squadron prepared to tow the aircraft and then moved it outside the hangar. Once it was out of the way, another aircraft was moved inside the hangar to take its place, and the whole process started all over again.

After this exchange, I normally do a walk-around to check the doors, fasteners, and panels. If any are missing, I make a note. Part of our job is to remove both engines to do the required modification. The supervisor briefed the team, and off we went. After removing the door and disconnecting fuel lines, electrical cables, P-duct, bleed-air line, and PT shaft, we were ready to roll. I did another check and then notifed our QA for a final inspection, who then gave me the OK when everything was clear. Our team then started to set up the ETU stand under the engine. When the engine removal was completed, we moved one engine to a 3,000 engine trailer and secured the other to an engine stand. This particular evolution went smoothly, so we took a break.

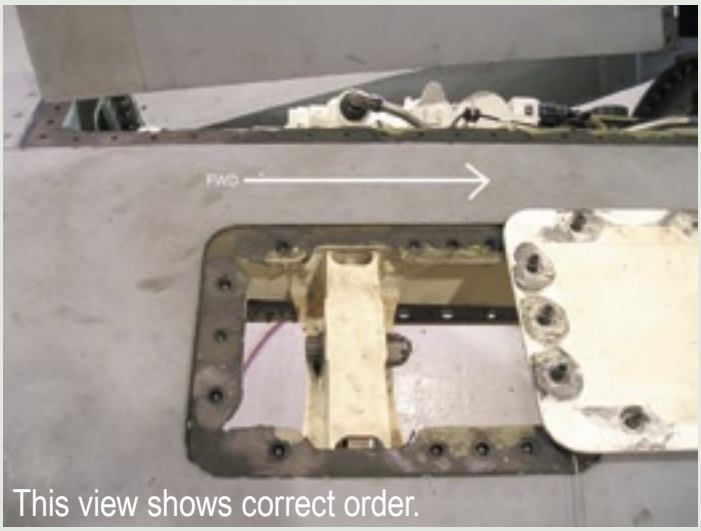
After getting back to work, I went on top of the aircraft to inspect an area that required another door removal. I then walked over a few steps to the aft engine-mount location to inspect the expandable pin and to verify the locking mechanism function and condition. Though this inspection isn't part of the job contract, we do it as a courtesy. If any discrepancies are found, we notify the squadron.

After finding the right hand expandable pin in good condition, I looked at the left hand pin and it looked good, too. However, my brain was telling me that something was amiss. I then stood up and looked at the right and left side shear-bolt nuts. As I glanced at the two sides, I wondered why the bolts were facing in opposite directions. Realizing one of them was installed in reverse, I went to another aircraft that recently had been through the same procedure to compare the bolts. Sure enough, the right hand shear bolt was installed the wrong way. Just to make sure and to verify the proper installation, I also looked in the IETMS. Sure enough, the bolts were not installed correctly.

I then notified our shop's lead man, QA, and supervisor. Our lead man took digital photos to document the problem. While he was doing that, our QA looked at the aft mount and then went back to the office to notify the squadron. Later, a squadron QAR came by, looked at the situation, and then left. Beforehand, though, he told us that he would notify his maintenance control for corrective action.

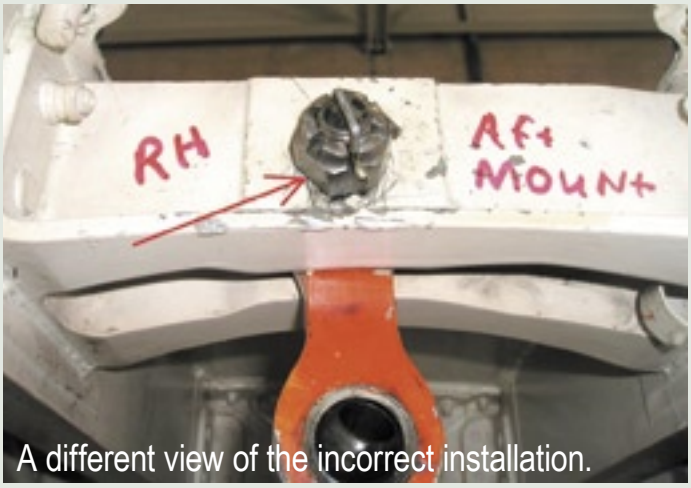
The next morning, as I was setting up my tools behind the aircraft, I looked up and noticed the shear bolt was re-positioned and installed the right way. However, while looking at the bolt and nut from the ground floor, I realized something else was wrong. I moved the

t To Reverse



This view shows correct order.


The flat washer is installed incorrectly.



A different view of the incorrect installation.

ladder underneath, and it only took seconds before I realized the aircraft now needed more maintenance.

The flat washer was installed backward—again! I notified the same people, and our QA also called the squadron. The work was back to square one. I'm sure you have an idea how the mod team, as well as the squadron personnel, reacted to this problem.

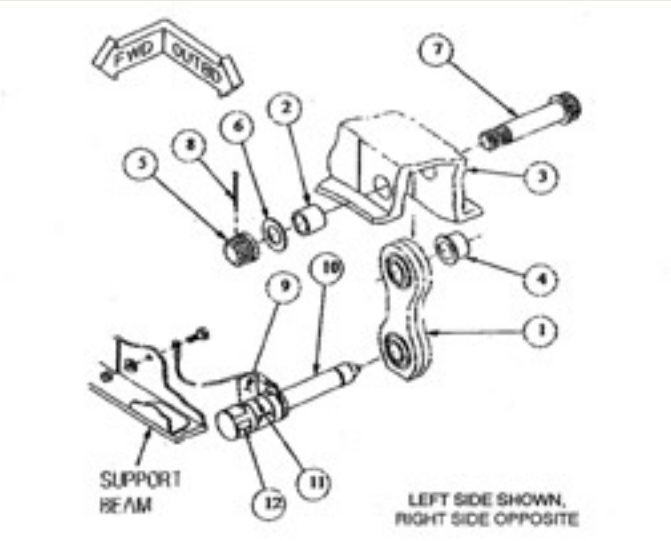
What can you take from this article? If you forget to look in the technical manual, IETMS or whatever, and just go do the job without a reference, you're asking for trouble. When the right-hand shear bolt in this case was found installed in reverse, maintainers should have looked at other possible problems. Perhaps the person who was supposed to inspect the completed installation (or corrective action) at that time wasn't there. Perhaps the inspector didn't notice the washer was installed incorrectly. Perhaps the technician forgot to ask to have the corrective action inspected.

Either way, time, effort, and manpower were wasted. I'm sure the supervisor and peers were shaking their heads in disbelief and dismay.

When in doubt about a job, ask questions, or check the IETMS or technical manual before you do a corrective action.

Aviation maintenance can be rewarding for those who enjoy working on any type of aircraft, but it can be unforgiving or deadly when simple and minor maintenance is done incorrectly.

Mr. Basye is a maintainer on a mod team at NAS Lemoore.



Illustrated parts breakdown of the correct configurations.

ORM—Assess the Environ

By Lt. John Turner

VF-31 completed another compressed inter-deployment readiness cycle (IDRC), logging more than 3,200 hours in the 10-months since our last deployment. Then we deployed to the Arabian Gulf, conducting combat operations in support of the Global War on Terror. We accomplished this feat safely. I am proud of both the squadron's achievement and my maintainers' accomplishments, despite having suffered bumps and bruises during the cruise. Along the way, I learned a lesson about the need to answer the "what ifs" before doing any task.

My philosophy on success in the business of warfighting remains unchanged: Bring everyone and everything home safely and in one piece. Reflecting back on my tour from that viewpoint, I maintain that we were extremely successful. Still, accidents happened.

I remember the call, "Medical emergency! Medical emergency! Medical emergency on the flight deck." The announcement rang across the 1-MC. During F-14 startup and hydraulic zero-air procedures, a start unit's pneumatic-starter duct (huffer hose), charged at 75 psi, had separated from the aircraft quick-disconnect coupling. The wild hose struck my plane captain (PC) on the back, bringing him to the deck. After initial numbness and tremendous anxiety, he began to move his extremities, placing my mind at ease.

The wild hose struck my plane captain (PC) on the back, bringing him to the deck.

ment and Dodge the Huffer Hose

These bands hold the hose to the coupler and often become damaged or aren't connected properly.

It's critical to attach the hose securely to a coupler like this one.

Take a look at the hose and bands for wear and security.

A hose can flail around once it separates from a coupler.

Over the years, innovations in material composition and improved maintenance procedures have reduced the frequency of material failure. Yet, the hazard still exists. Can any hazard be completely eliminated?

On board ship or station, squadron ground crews and hangar or flight-deck personnel inspect assigned support equipment (SE) daily. The NAVAIR 19-600-306-6-1 checklist specifies, "Visually inspect pneumatic duct for evidence of damage (chafing and tears), connectors for integrity of banding material, air-hose coupling (aircraft side) for integrity of safety wire, and quick-disconnect coupling-retaining mechanism for corrosion and for presence of retaining balls." In this incident, the inspection had been performed, and no indications of impending material failure were discovered. Nevertheless, the hose-fixture union failed. The effects of the failure could have been far more devastating had my PC not employed effective operational risk management (ORM).

Effective ORM has five steps: Identify the hazard, assess the hazard, make risk decisions, implement controls, and supervise. Applying sound ORM principles cannot eliminate every risk or avert damage to equipment and injury to personnel, but I submit that adherence to its principles will limit the negative impacts of those risks.

VF-31 aircraft on the flight deck ready for a cat shot.

Naval aviation is inherently dangerous. We require constant reminders of its hazards. By possessing a keen awareness of our operating environment ("head on a swivel," as my father always said) and understanding the risks, we can predict, with a degree of certainty, the answers to the "what ifs." Armed with this knowledge, we can take precautionary measures to avoid risks and limit their potentially damaging effects.

My plane captain realized the risks and applied ORM effectively. He understood that the hose fixture could separate, and, if it did, it would happen immediately upon the application of air. He also realized that if it were to separate, the most likely direction a ruptured hose would swing would be toward him. He stood well clear as air was applied, approached the aircraft cautiously, and turned his vital organs away from the hose. This step minimized the potential injury or damage the hose would inflict.

Nothing in the Naval Aviation Training and Operating Procedures Manual (NATOPS), Maintenance Instruction Manuals (MIMs), pre-operational checklist, or scheduled inspection criteria states those procedures. Given that all published maintenance requirements and precautions had been met, he simply asked the "what if" question and prepared himself for a worst-case scenario. He was thinking operational safety and keeping his head on a swivel.

If we have done our best to ensure our operational environment is "as safe as it can be," mitigate risk, and ask ourselves what's the worst thing that can happen, we will have done everything in our power to limit occupational injuries and equipment damage.

After a thorough exam in the emergency ward, my PC was back to work. Fortunately, this incident yielded only minor bruises. I still believe an MMCO's success is measured in his ability to bring everything and everyone home safely, in one piece. However, it does not mean an uneventful deployment. And should an accident happen, ORM, coupled with a keen sense of situational awareness, will limit the damage.

Lt. Turner was the MMCO at VF-31 when this story was written.

A Simple Ride in the Desert

By AT2 Jake Dobbs

One beautiful September day in Nevada, my friend and I decided to go motorcycling. Looking for that mental release from the pressures that come with an air-wing detachment to Fallon, we borrowed motorcycles and protective gear from some squadronmates. Fortunately, their gear fit us perfectly. Unfortunately, it's the only thing that went right.

My riding partner was inexperienced and unfamiliar with the area, so we decided to take a slow and relaxing ride over the mountains and into the foothills. First, our plan was to pick up oil for the motorcycles' 3,000-mile change and then return.

As we left the curve-filled portion of the ride, my friend and I entered a section of straight road, grinning. I noticed the local speed limit sign read 35 mph, so I glanced down at my speedometer and it read 33 mph. Just as I looked down, I felt a slight bump, and then the rear tire began sliding to the right. I jerked back to avoid hitting my friend, not realizing that I just had hit a rabbit. I should explain here that, with a 155-pound rider and a max weight of 300 pounds, the 160 bhp available on the rear wheel of the 2002 Yamaha R1 often causes it to become a unicycle. As the rear tire slid off of the dead rabbit, the tire gained traction and caused the bike to show its unicycle-like tendency. I tried to control the bike, but it just kept coming over backward until the tail section dragged on the asphalt. In hindsight, I realize I should have used the rear brake to bring the nose down.

As I flew off the back of the bike, my head bounced off the ground, and I remember thinking, "Wow, that was like hitting my head on a pillow!" The Shoei helmet was well worth the $650 my friend had spent. What a great buddy!

As I slid across the pavement on the borrowed leather jacket and the butt of my "Lucky" brand jeans, I watched the bike flip over and slide across the oncoming traffic lane into a gravel ditch. About that time, my feet came over my head, causing a series of summersaults. After about three or four flips, I finally came to a stop on my feet and gave my partner a "thumbs up" to let him know I was OK.

I then made my best attempt to run across the street to examine the bike but could manage only a weird hobble. My riding partner came to a stop with his jaw hanging out from under his helmet and helped me pick up my bike off the gravel. We lifted the mangled bike and noticed the engine's "life blood" pouring out onto the shoulder of the road. I couldn't help but think that there were much easier ways to remove the oil from an engine! Of course, it could have been my life's blood leaking out of my body.

I then had to make the worst phone call ever.

"Hey buddy, I wrecked your bike," I told my friend.

"Stop playing!" he screamed.

"I'm serious, and we need a trailer," I managed to respond.

I'm sure you can guess where it went from here. When all was said and done, I ended up with a sprained wrist, sprained arch in my left foot, a few bruises, and some road rash—no bigger than a silver dollar.

Despite my minor injuries, I did some significant damage to my friend's bike. Even with that, the results of the accident were as good as could be expected. In fact, the only reason I'm writing this article from my work center and not from a hospital bed is that my friend bought high-quality safety equipment, which happened to fit me properly.

Even on the best of days and the nicest of roads, accidents can happen. Even if you obey all the rules of the road and use all safety precautions, other vehicles, pedestrians, or suicidal rabbits still can turn a pleasurable ride into a rotten experience. You can help yourself with the right helmet and durable, protective clothing.

Petty Officer Dobbs works with VAQ-139.

Motorcycle mishaps are on the rise. As of early January, the Navy had doubled its limit for the entire year, and the Marine Corps isn't far behind. Too often, speed, fatigue, alcohol, or the lack of training, experience or safety equipment cause mishaps and death. This Sailor had all the proper safety courses, PPE, and documentation to ride a motorcycle. However, he failed to expect the unexpected, and his quick glance at the instruments couldn't have come at a worse time. Sounds like that rabbit must have been a jackalope to get that bike to pop a wheelie.—Ed.

Tango With a

By AEAN Christopher Pike

All of a sudden, I heard the AE3 CDI yell, "Watch your head!"

It all started out as a normal night-check shift in the AE shop at VFA-86. I was on the way out to the flight line with an AE3 CDI to rig the electronic drive units (EDUs) for an FA-18 wing-fold system. In order to rig the EDUs, I needed an NC-10 mobile electrical-power cart to put power on the jet, but the cart was in the hangar. Before this job was done, I would wish I had stayed there.

The squadron's standard operating procedure (SOP) states that support equipment is not moved in the hangar with a tow tractor. Because of the SOP, we usually don't bring the NC-10 into the hangar, but it recently had been used on a jet where no power cord was available. In order to get it out to the flight line, we had to roll the NC-10 outside the hangar and hook it up to a tractor. We then could pull it to the jet.

The NC-10 was on the other end of the hangar, and, because it weighs more than 6,000 pounds, I rounded up a few shipmates to help move it. Although the NC-10 is on wheels, moving it is much like pushing a car around in neutral. Unlike a car, the NC-10 doesn't have a steering wheel, so the tow bar in front needs to be turned to steer the cart.

The move crew pushed the cart while I manned the tow bar—since it is easier to pull it while steering. I was walking backward as we crossed the hangar, approaching the starboard side of a parked jet. Although I couldn't see where I was going, the move crew was looking ahead and telling me which way to steer.

All of a sudden, I heard the AE3 CDI yell, "Watch your head!"

It happened just as I was about to run into a control surface of the jet behind me. I tried stopping the power cart, but, as I planted my feet, I slipped on JP-5 that had spilled on the deck. As I fell down, the bar came down on my hand, cutting open my pinky finger. We applied pressure to the wound, stopping the blood. I jumped into a car, and a team member drove me to the naval hospital.

The cut required seven stitches to close, and I spent six days SIQ and light duty for another 10. What

Power Cart

seemed like a simple maintenance evolution cost me two weeks away from the job and a permanent scar on my hand.

A little time-critical ORM might have prevented this mishap. Two primary hazards existed: running into a jet or some other object while moving the NC-10 out of the hangar, possibly damaging both objects; and rolling it over a slick surface where one of the move crew could slip.

We normally move the cart slowly, so a mistake should cause only minor damage. The job only posed a minor risk, and fixing the jet was a squadron priority. We did implement some controls (e.g. the team pushing while I pulled and steered), but we could have implemented just a few more to mitigate the hazards. I could and should have told everyone the route we would take through the hangar and should have quickly checked the deck for slick spots.

With those controls, everyone would have been prepared for the route, and no one would have been surprised at seeing the control surface near our path of travel. We also would have avoided the JP-5 on the deck.

The final step in ORM is supervision. Whenever we tow a jet, VFA-86 SOP requires a first class petty officer to be present and to serve as a safety observer. We should have applied this requirement. It would have ensured we were on the right path and could have helped us to avoid what turned out to be a dangerous situation.

When we discuss ORM, it normally is in a PowerPoint presentation about the five steps and is presented in some detailed fashion. In reality, we practice time-critical ORM every day. We do it when following checklists, SOPs, and using common sense in dangerous environments.

This is a simple story, but it illustrates the importance of quickly using the five-step process on any job. A quick review of the situation would have taken only a couple minutes and might have prevented the scar on my hand.

Airman Pike works in the AE shop at VFA-86.

Good story from a young Sailor who learned the hard way. One amazing part of the story easily can be missed. The squadron had a standard operating procedure that required senior supervision for aircraft moves. Maybe that policy should include SE moves in confined spaces.—Ed.

Navy photo by PH2 LeLand Comer

Moving any cart around the deck potentially is hazardous.

The Right Time and Place to Rest

By AN Sheena Hays

My day didn't start off on the best foot because I was tired. A few of my shipmates were a little hazy about the silence-about-the-decks concept, so sleep didn't come easy.

I reported to work as a plane captain for VFA-146 but with a little black cloud over my head. Trying to put it behind me, I suited up in my full flight-deck uniform and headed for the flight deck to prepare my jet for the night's flight schedule.

I knew my jet wasn't going up for a few hours, but the No. 1 rule for an FA-18 flight schedule in the Arabian Gulf is the probability of change. After all, an "up" jet on the roof is a spare flyer for every event. With that in mind, I completed my walk-around, opened and propped the required doors, checked and depressed circuit breakers, prepped the seat, dove the ducts, pulled pins, and then decided to do another walk-around…just in case.

After I had finished my second walk-around, one of the yellow shirts approached me and rudely motioned me to get in the cockpit because they were going to move my jet. As I felt my blood come to a rolling boil, I attempted to shrug off the harshness and worked quickly to pin, pull, and close everything, so we could move the Hornet safely and correctly.

They repositioned me from the navigation pole to the six-pack, directly in front of the window for flight-deck control. Whistles blew, brakes were set, and, minutes later, I was down the ladder to reprep my jet, for the second time in minutes. It is fair to say I wasn't really smiling anymore, but I finished and walked around the whole jet, checking for chains or anything that might have been out of place.

I reached the point where I had started and noticed a fellow VFA-146 shipmate out the corner of my eye. He

was working as the flight-deck "scrubbie" driver. I hadn't seen him in a while, considered him a good friend, and wanted to see how he was doing. I motioned for him to come over. We began to talk, and, without thinking about the fact we still were recovering aircraft, we took a seat on the tow bar that was hooked up to my jet—only a few inches from the foul line!

We had been sitting for only 30 seconds, but that was 30 seconds too long. When it registered how unsafe our action was, we turned to get up, but it was too late. One of the flight-deck coordinators already was en route to fix our mistake. He ordered us to report to flight-deck control.

After a brief one-way conversation with "Dog," the CAG chief, my maintenance chief escorted me back to my shop because I had been kicked off the flight deck for the night.

Because of my lack of attention to detail and unsafe action, I had let down my fellow line-team members, my immediate supervisor, my chief, and myself. Everyone else had to pick up my slack because I had dropped my guard. I chose an aircraft carrier's flight deck as the place for a social call. I had been trained and qualified to work on the flight deck for quite some time, so I had no excuse for my actions.

I hope everyone will learn from my mistake. If you never think that complacency can or will happen to you, think again. It takes just a second to do the wrong thing and face the dog, or, worse, maybe not live to face anyone.

Airman Hays is a plane captain with VFA-146.

That's Gonna Leave a Mark

By AM1(AW) Steven Kedzie

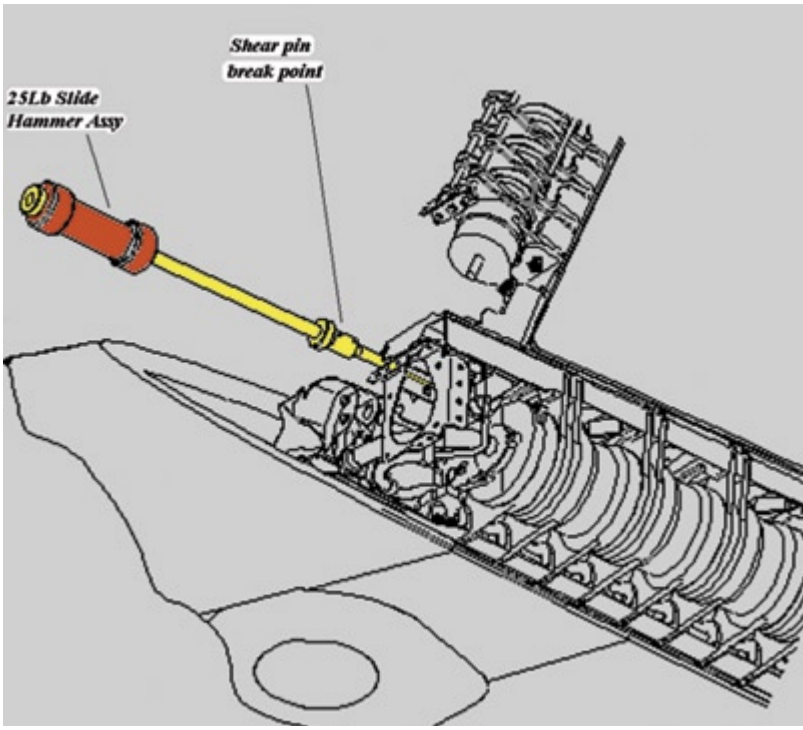
Do you know what a left hook from Mike Tyson feels like? I believe I do. I found out one night when least expecting it.

It was a typical mid-week night for the Maintenance Department. For more than a month, we had been removing the outer wings of our Rhinos to repair wing-fold bushing migrations, and, by this time, we were extremely proficient. In fact, we were at a point where night check was able to remove two outer wings and have them repaired by the contractor and ready for reinstallation before knock off. Fortunately, on this night, we only had to remove one: the starboard outer wing on aircraft 115.

After the initial step of removing the various panels and hardware from the wing, large wing pins must be removed before the outer wing is free of the wing-fold transmission. Each of these pins is approximately one meter long and made of solid titanium. Their removal requires the use of a common tool: the slide hammer.

The slide hammer looks exactly as its name implies. It is a sliding handle with stops on either end, and it's threaded to one end of an extension shaft (see picture). The other end of the extension shaft is threaded to the wing pin being installed or removed. By moving the slide hammer back and forth to the desired stop, the wing pin is driven in or out of its housing. A shear pin resides in the threaded connection between the slide hammer and the extension shaft. The purpose of the shear pin is to prevent damage to the wing pin by breaking and releasing the slide hammer from the shaft if too much force is imparted on it during hammering.

After removing the panels and hardware, we used a deck crane to support the wing and prepared to remove the first outer wing pin. I was standing about eight feet forward of the starboard leading edge to safely observe



and direct the job. Once the slide hammer was threaded to the forward end of the wing pin, the hammer operator began moving the sliding handle back and forth to remove the pin. After a few good hits on the forward stop, the pin began to move. With the pin a few inches out, I decided to reposition myself to support the pin as it came out.

Unfortunately, as I walked around the hammer operator toward the pin, my face moved through the path of the slide hammer at the precise moment the shear pin gave way. The hammer operator had no chance to arrest the momentum of the slide hammer as it separated from the extension shaft and hit my right cheekbone. I immediately saw a bright flash—one that I imagine would follow a left hook from Mike Tyson. I felt as if I was going to pass out and grabbed onto the deck crane for support. I heard other maintainers asking me if I was OK as I reached up to feel my mouth and survey the damage. To my surprise, there appeared to be no blood; however, I felt a gap in my teeth and looked down to see one of my teeth lying on the hangar deck. I would find out a few hours later at dental sick call that my right incisor had sheared at the gum line and exposed the nerve. Luckily no bones were broken, and, following a tetanus shot and root canal, I was good to go. Considering the potential injuries I might have suffered had I been a split second earlier or later crossing the slide hammer's path, I was lucky.

Outer wing removal can be a tedious job, but it requires attention to detail and constant situational awareness. From the initial step of removing panels and hardware, to the final step of wing-pin removal, one moment of inattention can be costly. My team was experienced, we were wearing the proper PPE, and we had a sufficient number of personnel, including safety observers. Despite all of that, this accident still occurred.

What could I have done differently? I could have remained at my original position or crossed in front of the hammer operator with more of a buffer zone. That choice would have kept me out of the path of a knock out blow from a slide hammer. Before you act, always take the time to assess your surroundings. You may avoid injury or worse.

Petty Officer Kedzie works with VFA-102.

Motorola and Boeing Do Not Mix

By AZAN Tyler Brackeen

One morning while on detachment at NAS Fallon, Nev., I went to FOD walkdown, which is a function practiced daily here at VFA-25. It was a beautiful sunny day, and, in my rush, I did not realize that my coverall pockets were loaded down with random, loose personal gear.

I was not fully aware of the potential hazards that were in my pockets as I briskly walked to the flight line. The full magnitude of my decision to carry unauthorized items onto the line escaped me because the task was simple: Go to the flight line in time for FOD walkdown. At least that's all I thought about the situation at the time.

This daily ritual is an all-hands evolution, conducted every morning before the flight schedule begins and at every shift change in my command. Every squadron in every CAG and every command that flies aircraft does a FOD walkdown at least once a day. When hard objects are found, they are recorded and placed in a bag. These items are listed in a log with a location where the loose gear was found. This FOD list is then routed up the chain of command in hopes of finding where it came from and to keep it from happening again.

That day, I was carrying a cellphone, BIC lighter, and three coins. None of them seemed terribly bad or dangerous at the time, but I now realize these items represented potential hazards that could destroy engines, aircraft, aviators, or shipmates. Not one item I was carrying was more or less important than the other, but none of them belonged on the flight line.

All commands use tool control and FOD programs to control the items that can cause mishaps, injuries or deaths. An active inventory on all items used on the flight deck or flight line is essential, including tools and consumables. Any unaccounted object that can damage an engine or aircraft that is found on the flight deck, hangar or flight line is commonly referred to as foreign object damage (or debris) and can consist of many everyday items that Sailors or Marines carry in their pockets.

Photo by PH1 Christopher Bishop, inset photo by AT1(AW) Rumbo

All hands are responsible for the FOD program, and increased awareness is crucial to the integrity of the aircraft. A simple item such as a coin can and has caused the loss of aircraft and aviators. The mindset that loose personal gear isn't a big deal is unsatisfactory, and I learned the hard way.

Everyone must make a conscious decision to leave personal items in the work center before proceeding to FOD walkdown. Pockets should be empty anytime people go out on the line. If not, it could lead to a devastating accident. Preventing FOD and mishaps is part of the operational risk-management process, and program requirements and steps for an effective program are found in COMNAVAIRFORINST 4790.2, Volume 5, Chapter 12, as well as wing and local command instructions, when available.

I was wrong for carrying unauthorized items onto the ramp, and each caused a specific threat.

The first item, a cellular phone, operates within the RF frequency range when in use. Some live ordnance also work within the RF frequency range; hence, ordnance has the potential to detonate from the use of a cellphone, causing the loss of millions of dollars of property and, more importantly, the lives of many Sailors.

Coins and lighters also pose threats. Coins are quite possibly the most overlooked items. Any small coin can completely destroy a 404-GE400-turbofan engine at an estimated cost of $3.5 million. They can get sucked into the intake of the jet, causing the engine to need a complete overhaul. Those types of mishaps have happened in the past and, unfortunately, continue to occur every year. These loose items also can get blown around the flight line and into faces or eyes.

The BIC lighter had the potential of a heat source. While I was searching for FOD underneath the aircraft, a careless spark could have ignited a venting fuel tank and caused a wide-scale explosion, resulting in the deaths of many people and the destruction of many aircraft.

These potential hazards can be prevented with a simple 20-to-30-second check to "de-FOD" yourself before a daily walkdown. I had put my shipmates and myself in danger and didn't even think about it. I was caught and faced the wrath that came with my poor decision. Foreign object damage is definitely not a subject to be taken lightly. I paid the price of being embarrassed, but other Sailors and Marines can learn from my lesson.

Airman Brackeen works with VFA-25.

Crash During a

By AM3 Kawin Gilliam

I was finishing my second detachment to Bahrain as part of HSC-2, Det 2, the "World Famous Desert Ducks," who, at the time, still were flying the tried-and-true UH-3H Sea King. It was three days before I was scheduled to leave, and I would be lying if I said I wasn't thinking about going home. The day, however, would end with my wishing I had concentrated on work!

The morning started off like countless others: a 0645 muster at the NSA Bahrain gate for the ride out to the Bahrain International Airport where we operate. I had plenty of sleep that night and even dreamed about being back in the States. The workload started off normally enough, with an ATAF (all tools accounted for), workload reports, maintenance meeting, etc. The detachment was planning a two-bird launch up to the North Arabian Gulf to drop off passengers, mail and cargo to U.S. and coalition ships operating in support of Operation Iraqi Freedom.

As normal, we went out to the line to prep the birds, get them ready to fly, and check servicing before

Mundane Task

the pilots walked for their preflight. After the aircraft were ready, we moved one bird from our assigned parking spot to the JBD (jet blast deflector) spot. It was around 0850 when the pilots arrived to preflight and get ready for the launch.

As the pilots arrived, the cargo and mail personnel arrived, too, with the boxes of cookies, bags of mail, and CASREP parts for the ships. As usual, the maintainers helped the aircrew load the aircraft to expedite the launch. Standard operating procedure on the flight line, in the blistering heat of Bahrain, is to ensure that our CamelBaks are full of water at all times. With the balmy 42-degree-Centigrade temperature and the heat index hovering around 125 degrees Fahrenheit, our CamelBaks quickly were going empty.

When the first bird was loaded, we were running low on water. The pilots finished their preflight, strapped in, and launched without a problem. After the first launch, half the maintainers walked into the shop to refill their CamelBaks with some cool, refreshing H_2O. I stayed out to help load the second bird. When most of the maintainers made it back to finish up, I took it upon myself to jump on a tow tractor and drive back to the shop to refill my CamelBak. Once I was topped off with water, I drove the tow tractor back to the line to help with the launch.

To get where the bird was parked, I had to drive around the perimeter of the flight line on a paved access road. This trip can take a couple of minutes, so I hurried. I could tell the bird really was close to pushing out because I could see the No. 1 engine was online, and people were standing around waiting to disconnect and move the NC-10.

Everyone was waiting on the tow tractor and me. I got around the back of the JBD and was looking to get to the bird as fast as I could, but I had to make one final, no fuss, no muss, left turn to cross the access road and drive out onto the line. I was focused on the bird and the need to move the NC-10. As a result, I failed to look straight ahead to see if anybody was coming down the opposite side of the road. As I turned left, a little Toyota pickup appeared right in my face. We hit almost head-on. I wasn't hurt, and the tow tractor wasn't damaged, except for a couple of small scratches on the nose.

The local Bahrain Airport Services employee in the Toyota wasn't hurt either, but the truck didn't fare so well. The damage was significant, and it couldn't be moved without help of a tow truck. Needless to say, the launch went late, and I was speechless. The detachment had to borrow a tow tractor, and I began what turned out to be a very long day.

After explaining everything to my chief, the maintenance officer, the police, and my OinC, I had the opportunity to explain what had happened one more time to the airport manager himself. In short, my focus and concentration on launching the bird, mixed with some end-of-deployment get-home-itis, caused me to lose situational awareness. This otherwise simple maneuver totally went awry. While no one was hurt, it easily could have ended differently. Trucks and pride can be fixed; I'm simply glad a person didn't need to be repaired.

Petty Officer Gilliam works in the airframes shop at HSC-2.

Sailors and Marines Reducing Mishaps

BRAVO Zulu

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AD1(AW) Mark Hudson
HSL-44 Det 8

Petty Officer Hudson discovered fuel leaking from the No. 1 engine of Magnum 440 during a hot-section wash. Further inspection revealed a missing O-ring packing in an area that leads from the overspeed and drain valve into the accessory gearbox, causing fuel to leak during normal operation. Petty Officer Hudson's keen attention to detail allowed him to initiate timely repairs and break the mishap chain, making MAGNUM 440 immediately available for the tasking from the Carrier Strike Group deployed in the Arabian Gulf.

PO2 Reagan Payne
USCG Air Station, Clearwater, Fla.

While in support of recovery operations for Hurricanes Katrina and Rita, Petty Officer Payne was completing an hourly engine inspection on a Sikorsky HH-60J search and rescue helicopter. Using a state-of-the-art borescope, Petty Officer Payne found several hairline cracks in the No. 1 engine high-speed shaft flex pack.

Petty Officer Payne's strict attention to detail most certainly prevented a major catastrophic failure of the No. 1 engine high-speed shaft, avoiding possible damage to the airframe and, most importantly, averting a potential mishap.

AD3 Richard Bailey and AM2 Brian Rimler
VAW-124

Petty Officer Bailey was positioned next to the main entrance hatch of an E-2C Hawkeye as a safety observer. His shipmate was doing an internal aircraft final inspection before launch. When exiting the hatch, the shipmate turned the wrong direction and headed toward the aircraft's rotating propeller. Petty Officer Bailey immediately grabbed the individual, preventing a catastrophic loss of life.

Petty Officer Rimler acted with commendable courage while stationed near the catapult shot line as a final checker. He recognized a member of the ship's catapult crew unknowingly break the propeller safety chain, which was composed of squadron personnel.

AM3(AW) Jeremy Pavlosky
VAQ-139

Acting as the port-exhaust safety observer during a night launch, Petty Officer Pavlovsky observed a ship's V1 director climb out of the catwalk and up the ladder in direct line of the turning EA-6B exhaust. Ignoring Petty Officer Pavlovsky's waving flashlight, the director proceeded to climb the ladder. As the director reached the flight deck, the EA-6B exhaust nearly knocked him from the ladder and over the side of the catwalk.

Petty Officer Pavlovsky reacted quickly, pulling the director by his float coat onto the flight deck and out of the line of the exhaust.

AM3 Bradley Lawson
VAW-124

During a day launch of Hawkeye 600 while on deployment on board USS *Theodore Roosevelt*, a young plane captain from another squadron was following his aircraft up the "street." The individual ducked underneath the rear of the FA-18, stepping through the prop-arc safety chain and heading straight for the prop. Petty Officer Lawson immediately grabbed him and knocked the individual out of the way mere inches from being hit by a propeller.

Petty Officer Lawson's quick actions and safety mindset prevented a tragic mishap.

AM2 (NAC) Brian Gillespie and AM3 Kathryn Cayer
VR-62

During engine start-up for a routine training mission, the second loadmaster, Petty Officer Gillespie, and plane captain, Petty Officer Cayer, were positioned in front of the aircraft to observe the start. They noticed the inboard, life-raft-compartment door on top of the starboard wing momentarily spring open and then return to a normal position. They immediately notified the aircraft commander, who terminated the start.

Upon further investigation, squadron personnel found that the life-raft-compartment latches had released, allowing the propeller wash to blow open the door.

Petty Officers Gillespie and Cayer caught a fleeting glimpse of a problem that could have resulted in an in-flight deployment of the life raft, which could have jammed the flight controls and caused serious damage to aircraft and the possible loss of the aircrew.

AT2(AW) Shannon Strickland
VX-20

A P-3 was sent on a logistics mission to deliver mission-capable parts for a detached squadron aircraft. Upon arrival and after securing the engines, the ground crew began to download the parts and associated gear.

Petty Officer Strickland noticed hot brakes on the port side of the aircraft, immediately stopped the download evolution, and then cleared everyone away from the explosive hazard that existed.

AN James McClure
VFA-14

On a routine day during WestPac 2005 on board USS *Nimitz*, everything was going according to plan. Camelot 200 had just recovered and was taxied to a spot in the corral. Airman McClure was the plane captain and had just returned from 90 days TAD on the mess decks. The aircraft director turned over the aircraft for shutdown. After securing the port engine and while waiting for the pilot's signal to shut down the starboard engine, purple shirts arrived to fuel the aircraft for the next launch.

One of the purple shirts attempted to untangle a grounding strap and unknowingly walked directly toward the starboard intake. He was dangerously close to the intake when Airman McClure grabbed his float coat and pulled him to safety.

Sgt. Michael Blua and LCpl. Joshua Gomez
VMAQ-1

While supporting 24-hour combat flight operations, Sgt. Blua and LCpl. Gomez were investigating engine irregularities on one of the squadron's EA-6B Prowlers. LCpl. Gomez was first to discover a small crack in the port inlet casing, which was visible only from inside the inlet. He suspected the crack would be larger underneath the surface. After NDI, the crack was found to be more than six inches long. Had the aircraft been flown, it is likely that catastrophic engine failure would have occurred from FOD.

Sgt. Blua was convinced the port engine still wasn't running properly, so he insisted on having the engine borescoped. His attention to detail paid off when the results showed a first-stage turbine stator had been burned away to less that half its normal size. Continued operation of this engine would have resulted in failure of the stator and possible FOD damage.

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Maintenance Management

Inspection Paperwork Crucial to Safety

By AZCS(AW) Stephen Miller

Since being attached to the Naval Safety Center, I've done a number of safety surveys and have found a common trend across all aircraft platforms. The problem area concerns the logs-and-records portion of NALCOMIS OMA not being up-to-date or correctly maintained—specifically, scheduled inspection reports.

All too often, I find critical errors while checking the NALCOMIS Scheduled Inspection Reports. They have erroneous "Next Due" inspection dates and times or other errors. These problems are easy to fix, but it does take a little attention to detail—something that appears to be missing.

When an aircraft is received, the logs-and-records clerk must make sure that the special inspection base dates and times are checked. The problem appears to be that AZs (6030 MOS for Marine Corps) are taking the dates listed in NALCOMIS verbatim and not verifying the base dates and times for calendar and hourly inspections with the miscellaneous history section of the logbook.

I also have found many inspections missing re-base entries in the miscellaneous history section for inspections issued earlier than the three-day rule for calendar inspections and the 10-percent rule for hourly inspections.

Simply verifying data in NALCOMIS against logbook entries can eliminate the majority of these discrepancies. Not catching re-basing entries shows that maintenance control and the logs and records clerks lack attention to detail and pose a safety issue. Take action immediately upon accepting an aircraft, fix any errors, and keep these problems from spiraling out of control.

Senior Chief Miller is a maintenance analyst at the Naval Safety Center.

2005: Crossfeed, The Year in Review

By AMC(AW) Paul Hofstad

During CY05, maintenance analysts assigned to the Naval Safety Center traveled to all corners of the globe, doing surveys and giving maintenance malpractice and khaki risk management presentations (MMPs and KRMs) to Sailors and Marines in the fleet. I asked my survey-team shipmates to send me things that "hurt their heads" during surveys in the past year.

We did a total of 85 surveys and 167 MMPs, reaching 19,379 Sailors and Marines; 63 KRMs, giving vital statistics to our senior leadership; and publishing 20 Crossfeed articles in *Mech*, which distributed 69,485 copies to the fleet. On average, we spent 137 days on the road. Where is this information leading? Well, to the "top 10" discrepancies that we helped supervisors identify during the course of the year!

No. 1: Errors in logbooks, including aircraft, engine and AESRs. The discrepancies ranged from incorporation of technical directives to something as

simple as accuracy of dates within each logbook. It is imperative that the logbook tells an accurate story of our aircraft and components. To do this, "attention to detail" is the key to success. Our analysts know the logbooks inside and out and carry with them over 30 years of experience. They are meticulous when it comes to reviewing them.

No. 2: Dirty and FOD-filled toolboxes. Let's face it; they get used extensively in the repair of aircraft. So put a person in charge of their cleanliness on a weekly basis and get our junior people into the habit of taking care of them. That approach will pay dividends in the long run.

No. 3: Improper storage of lithium batteries. It already has been proven that these batteries will explode. By simply storing these batteries by themselves in an approved storage locker away from other hazardous and combustible materials will alleviate the need to rush one of our shipmates to the emergency room.

No. 4: Our next discrepancy is near and dear to my heart. I wrote my first Crossfeed article on this very subject. It is conducting drills and quarterly training on emergency reclamation. Conducting ERT drills are as important as conducting flight-deck drills. If one of your airplanes gets soaked with AFFF, you quickly learn how important your ERT team is. Not holding drills only increases the reaction time it takes to get your aircraft back up.

No. 5: Failure to follow standard operating procedures (SOPs) governing the selection, care, issue and use of respirators. SOPs set the groundwork for a command to both monitor and manage respirator use. SOPs are required and should be posted in the immediate area where maintainers work. More times than not, they are found in the program manager's binder. This is OK if you don't mind folks rummaging through your binder on a day-to-day basis. It is much easier to post them near the location where paints are mixed (for example, a bulkhead or bench). Outside the paint booth is another good place. People need to see the SOP continually so that respirator use, cleanliness, and storage become second nature.

No. 6: Respirator cartridges aren't changed regularly. Some instructions state to change the cartridge if a person senses "break through" of a component, meaning when a chemical is smelled or tasted through a respirator. We recommend cartridges be changed every eight hours. Some commands will change them out at the end of the shift. That is fine, too. The key is to change them and to have the manager or coordinator spot-check to ensure compliance.

No. 7: Improper inspection, cleanliness and storage of respirators. This problem area is related to No. 5 and No. 6. A command can have a good SOP and cartridge swap-out schedule, but improperly stored, inspected, or cleaned respirators defeat the benefits of the other items.

No. 8: Improper identification of multi-piece tools. Without getting into great detail, we see improper identification on combination squares and rivet cutters. Countless times we have looked at the combination square and asked an airframer where the scribe is that goes with the set? Typically, the answer is, "I didn't know that a scribe was supposed to be there." Read the *Mech* article, "I Didn't Know That," which identifies the problem with multi-piece tools in the fleet. The bottom line is that six pieces exist, vice the two that normally are accounted for on inventory sheets. With a rivet cutter, squadrons often will identify it as a one-piece tool, when, in fact, it has eight leaves, a bolt, a nut, and the piece itself—nine pieces to account for.

No. 9: Lack of neutralizing agents for an electrolyte spill. Commands are required to have six ounces of sodium bicarbonate dissolved in one gallon of water for lead-acid spills, or one quart of distilled white vinegar distilled in one gallon of water for nickel-cadmium spills. These neutralizing agents are priceless should electrolyte spill on someone.

No 10: Work centers do not have industrial hygiene (IH) surveys available. Organizational squadrons are required to have IH surveys completed every two years. AIMDS/MALS are required to have IH surveys done annually. These surveys are useless unless the folks actually doing the work know about the contents of the survey. Unfortunately, this information usually is kept in the safety petty officer's filing cabinet, rather than handed out to work centers. This survey is an important document, and everyone in the work center should read and understand its contents. It gives the shop and its workers a written record of hearing and respirator requirements in the work area, to name a few. Work centers don't need the entire survey, only the portions that relate to their shop and the parts their personnel should review.

That's the top-10 list of discrepancies, but I have an honorable mention that comes from Senior Chief Phil LeCroy. It's an old favorite and

continues to be a nagging problem: the improper storage and recordkeeping for tie-down chains. They are required to be stored in homogenous lots, as per CNAFINST 4790.2 series. That statement means TD-1A and TD-1B chains cannot be stored together. They also must be stored in lots of 10, and the records (/51 cards) should reflect preservation and de-preservation, 30-day inspections, and must give accurate information about what chains actually are stored.

We had 154 Class C mishaps during CY2005 that cost the Navy and Marine Corps $9.5 million. The common theme in these mishaps was lack of attention to detail. We certainly can do better and need to use operational risk management (ORM) in every task, even the most trivial ones. Overconfidence in doing a mundane, repetitive job often leads to mishaps. Pay attention to the surroundings and understand that maintainers work in an environment full of risks…no matter how small. How we identify and manage those risks is the key to completing our mission and doing it safely.

Chief Hofstad is a maintenance analyst at the Naval Safety Center and the coordinator of the Crossfeed section of Mech.

Support Equipment

Where Did All That Stuff Come From?

By ADC(AW) Gary Eldridge

During countless surveys around the world, I have found individual material readiness list (IMRL) inventory and accountability to be a challenge for commands. I have noticed an abundance of excess IMRL gear piled into conex boxes or tossed into a cage in a corner of the hangar bay. That's not how to handle, control or store the gear.

IMRL is a consolidated list of specified items and quantities of support equipment (SE) that a particular aircraft maintenance activity requires to do its assigned mission.

COMNAVAIRSYSCOM builds the IMRL for all Navy and Marine Corps aviation activities by extracting SE items from the support equipment resources management information system (SERMIS) database. IMRLs identify material requirements and provide a basis for SE procurement. This information also aids decisions on readiness, budget forecasts, procurement requirements, and redistribution of excess assets.

An important priority for an IMRL manager who has just taken over the position is the need to do a complete wall-to-wall inventory. That person must make sure that all assets are inventoried, the status of all assets is determined (A1, A2, F1, etc.), and all "found" items are "gained" into LAMS. Use an active transaction report (TR) to make sure that proper transaction codes are used for items gained or transferred. The manager also must make sure an SE acceptance/transfer inspection checklist is filled out and routed with each piece of gear identified as a "gained" asset. This form is used for transfers, too, and it ensures the proper acceptance and transfer inspections are done, the asset is gained (or removed) from either NALCOMIS for SE PMS tracking or into the Navy Metrology and Calibration Program (METCAL) for calibration.

If no PMS or calibration is needed, then the form is held in suspense to show an acceptance inspection was completed. The form also shows that all TDs, IRACs and changes have been incorporated on the asset. Without this tracking sheet, the asset could become lost in the system and not have any PMS, calibration or upgrades made to it, making it a hazard to aircraft, components and/or personnel.

With more than 37,000 assets in the system, no one can allow the management of these items to slide for a couple weeks. Someone must stay on top of the program.

Chief Eldridge is a maintenance analyst at the Naval Safety Center.

One Piece, Two Pieces, Three Pieces, Four…

By AMC(AW) Michael Malley

Sounds a bit like a children's book, doesn't it? But multiple-piece tools continue to be an issue in the airframes structural-repair toolbox. During a recent survey, 12 missing pieces were found on three different tools, and all were in one box.

Each box usually contains a 16-inch rivet cutter, combination square, and a multi-angle adaptor for the combination-square scale. During safety surveys, numerous issues with these three tools can cause an airframes supervisor unending headaches. We have found the missing leaves from the rivet cutter, springs, knurled knobs (replaced with a screw), and handles reversed. The combination square typically is found with a missing scribe, knurled-knob spring, and retaining cap for the level. The multi-angle adaptor often is missing retaining studs, springs and washers.

During tool inventories around the fleet, these multi-piece tools commonly are overlooked. These tools often are used only in the work center, yet the technicians fail to properly account for all the pieces.

The rivet cutter has the following count: two handles secured with a locknut (count as one), a spring, retaining stud and eight leaves (see photos No. 1 and No. 2) for 11 pieces. But a review of inventory sheets will list this as one piece. In one command, our team found three leaves missing.

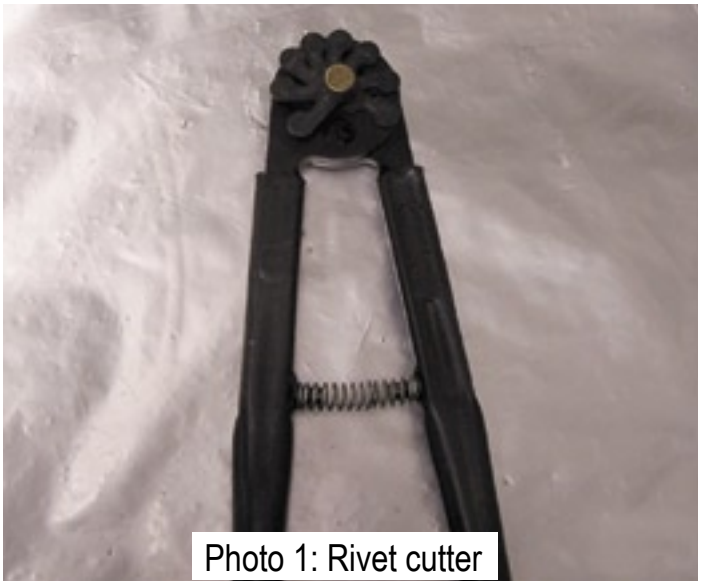


Photo 1: Rivet cutter

Photo 2: Closeup of the parts in a rivet cutter

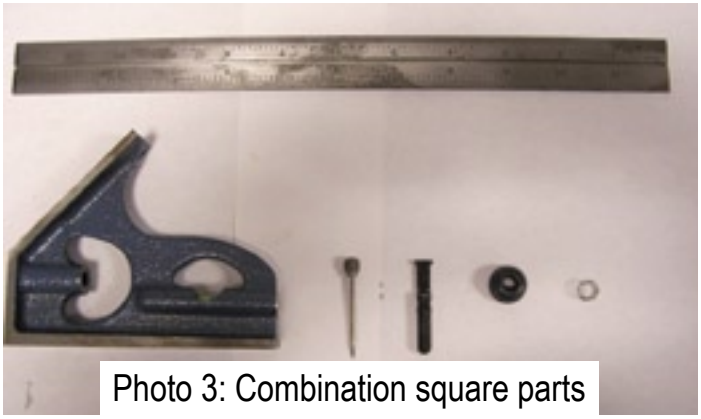


Photo 3: Combination square parts

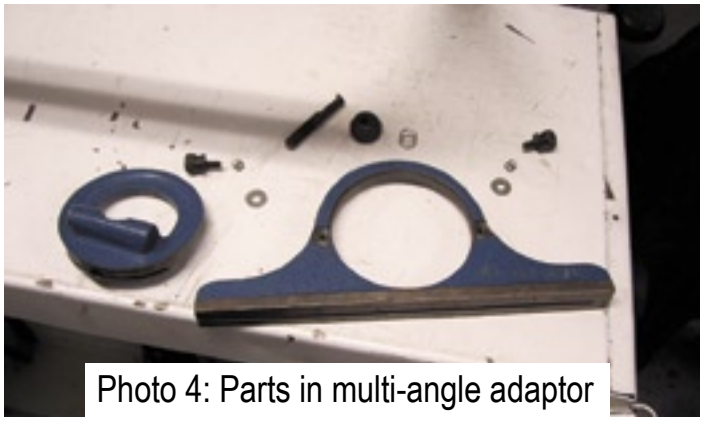


Photo 4: Parts in multi-angle adaptor

No one had used this tool in a long time, but, each morning and evening, all tools were signed off as accounted for. When did these leaves go missing? Why didn't anyone notice? Why aren't maintenance technicians familiar with the design of these tools? All these questions must be answered.

The combination square and multi-angle adaptor is another tool that technicians take for granted. The piece most often found missing is the scribe, which is located on the back of the combination-square frame. That item is 1.5 inches long and is secured with a roll pin on the back of the frame. This piece sometimes is removed before issue, but the tool-room supervisor frequently does not document that fact on master inventories. Another overlooked piece from the combination square is the tiny spring on the retaining stud. Container inventory sheets usually list this tool as two pieces and the adaptor as part of the item number. A few minutes and the stroke of a pen is all it takes to fix this problem.

When the combination square comes from the manufacturer, it has about seven pieces (see photo No. 3). Simply remove the spring, cap and scribe and this tool can be maintained in the toolbox as only four pieces (scale, frame, retaining stud, and knurled nut). Removing the other pieces doesn't affect the operation of the combination square, but it does remove a potential FOD source. Ensure that QA and the tool room are part of this process and the removed pieces are annotated as "removed due to potential FOD hazards." This step simplifies the inventory process and eliminates the worry about small, easily lost parts. I also recommend leaving the level in place and filling the holes with sealant to keep someone from questioning an empty hole. An inspector should come to the conclusion that an item was removed because of a potential FOD hazard and can follow the removal documentation.

The same process can be used for the multi-angle adaptor (see photo No. 4). Remove the small springs, keep the washers and retaining studs, and count these pieces and mark the inventory sheet appropriately. Always ensure that the work center tool-container inventory matches the tool room's master inventory.

The key to multiple-piece tools is instant inventory. Don't make it harder than it needs to be. Here's a good rule of thumb: If a piece can be removed by hand, then count it. Don't take for granted that your technicians know how to use the tools in the boxes because they probably don't.

Chief Malley was a maintenance analyst at the Naval Safety Center. He has transferred to VFA-103.

Avionics

What Do You Mean We're Lost?

By ATCS(AW/SW) Denis Komornik

I'm sure everyone has said or heard those words, either out loud or muttered under a person's breath. It might have happened while driving around town and looking for a school, mall, car dealership or myriad other sites. Face it; we've all gotten lost before, and it's no big deal. Simply pull over and ask for directions. But what happens when it's an aircraft that's lost, and the pilot can't ask for help?

Take this scenario: A pilot is flying with a dual-embedded inertial-navigation system (INS) when, suddenly, all electrical power is lost, the aircraft is running low on fuel, and the standby compass isn't calibrated correctly. It's too late to pull over in the clouds, so what happens next?

The odds of this scenario happening is extremely low, but, if maintenance continues the way I've seen on my last few safety surveys, it could be more likely.

The disturbing trend I've seen involves commands that fly aircraft with dual INS systems. Some don't realize they still must do an in-flight verification (IFV) of the standby compass every 365 days, and, even when it's done, people often make mistakes calculating and recording the results. For example, during preflight briefs for the IFV, some squadron compass calibration program managers have told pilots, "If the standby compass is

within +/- 5 degrees of the heading (i.e., 000), it's good to go. Write it down, and move on to the next heading."

The problem is what gets recorded: The heading of the INS (000) or the actual heading on the standby compass (say 003) or corrective heading. What needs to be briefed to pilots is for them to "write down the corrective heading the standby compass reads for all heading points listed on the calibration card."

I have seen too many cards that have perfect standby compass readings (000, 015, 030, 045, etc). The probability of those perfect readings being "balls on" is less than the chance of winning the lottery.

The corrective-heading readings on the standby compass card is vital and will let the pilot know which direction to navigate should both embedded INS systems be lost. Should an emergency arise, the standby compass would be the only resource left to get the aircraft and crew home safely. Do your job, brief the right procedure, and give your crew a fighting chance to bring an aircraft back safely.

Senior Chief Komornik is a maintenance analyst at the Naval Safety Center.

Battery Safety

Where Are Your Lithiums?

By AEC(AW/SW) Matthew Cooper

Traveling around the world to do surveys, we have discovered a training deficiency in the battery-safety program. Specifically, the fleet lacks knowledge about the NAVSEA S9310-AQ-SAF-010—the lithium-battery publication.

These batteries can be dangerous and require specific handling and disposal, yet it seems the fleet does not use this publication at all. This manual is the most important link in the safe handling, storage and disposal of lithium batteries.

When we ask a program manager who in the command has lithium batteries, we usually get a "deer in the headlight" look. The reason is simple: No one is aware that lithium batteries are their responsibility. Managers often are unaware that the overall program even includes this type of battery.

This fact often leads us to an Easter egg hunt through the command to find all the places where these batteries are used. The flight-equipment shop has their share of them for PRC-149 radios and night-vision goggles. Some new avionics systems have several different backup batteries that are lithium.

Most of the time, we believe this problem simply is a lack of training, not a lack of desire. The lithium-battery publication gives specific guidance on the safe storage, handling and disposal of these types of batteries. People must get past the old habit of throwing these batteries in the trash. These batteries can be dangerous and shouldn't be mishandled. They can explode should people fail to follow procedures.

Lithium batteries must be stored in a separate area outside of a manned space or work center, and they cannot be stored with other types of batteries.

When expended, lithium batteries must be treated as hazmat and must be bagged individually because, when stored loosely in a container, they can short and overheat, causing an explosion.

For these reasons, it is critical that the command's battery-safety representative be familiar with and use the NAVSEA S9310-AQ-DSAF-010 publication when dealing with lithium batteries.

Chief Cooper is a maintenance analyst at the Naval Safety Center.

Helping Sailors and Marines Help Themselves

Sierra Hotel

Commander, Naval Safety Center would like to thank the following aviation commands for their recent participation in safety surveys, culture workshops, and maintenance malpractice (MMP)/khaki risk management (KRM) presentations.

Safety Surveys

HMM-264	VMFA-115	VFA-143
HMLA-269	VMMT-204	VR-55
VFA-11	VP-9	VPU-2
HMM-162	VFA-34	VAW-120
MALS-31	VP-4	HSC-2
VAW-113	VX-30	MALS-31

MMPs/KRMs

VP-10	VR-53	MAG-29	AIMD Pt Mugu
VP-4	VR-55	MAG-31	VAW-120
VP-9	VX-30	HCS-28	AIMD Brunswick
VR-62	VPU-2	VFA-83	NAVAIR
VP-8	VPU-I	VFA-11	CPRW-10
VP-92	VX-1	VFA-86	AIMD PAX River
VX-20	VAW-121	VAQ-138	AIMD Norfolk
HC-2	VAW-126	CPRW-2	AIMD Whidbey Island
VC-6	VFA-131	CPW-5	CNATTTU

Culture Workshops

HS-75	VPU-1	HMM-161	VAW-125
VP-26	HS-15	VMFA-332	VAQ-129
VR-61	HMLA-369	HMM-764	
VS-31	HSL-46	NADEP NI	
HS-11	HSL-48	AIMD North Island	
VR-59	HMM-261	USS *Ronald Reagan*	

For more information or to get on the schedule, please contact:
Safety Surveys: Lt. Angela Domingos at 757-444-3520 Ext. 7274
MMP/KRM: ADC Gary Eldridge at 757-444-3520 Ext. 7218
Culture Workshop: Cdr. John Morrison at 757-444-3520 Ext. 7213

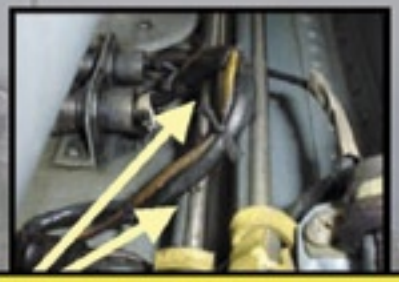
H-60 WIRING SYSTEM AWARENESS

PREVENTING WIRING SYSTEM FAILURE SAVES TIME, MONEY…

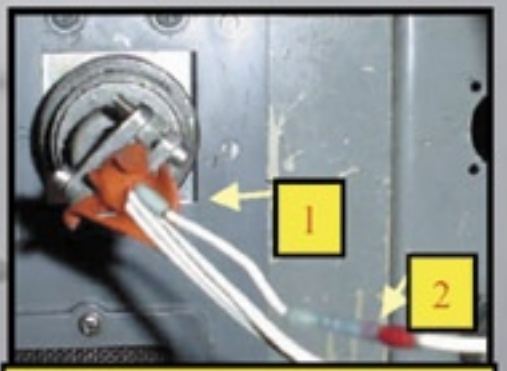
AND LIVES!

Flight-control tubes tied to wiring, inducing stress.

Shielding deteriorated, no longer provides EMI protection to system.



Harness chafing against flight-control hydraulic lines.



Worn tape at strain relief. Wire has two splices within inches of each other (should only have one splice).

ALWAYS MAINTAIN THE CORRECT WIRING SYSTEM CONFIGURATION !

Poster submitted by ATCS(AW) Bill Denenea and AOC(AW) Richard Burry at NAVAIR
For other wiring posters like this one, visit the Naval Safety Center website at: www.safetycenter.navy.mil/media/posters/categories/maintenance.htm

NAVAIR