

# Mech

Winter 2013-14

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**Bravo Zulu**

*Risk Management Checklist Pullout*



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**RDML Kenneth "K.J." Norton, Commander, Naval Safety Center**  
**Col Glen Butler, USMC, Deputy Commander**  
**CMDCM(AW/SW) Paul Kingsbury, Command Master Chief**  
**Derek Nelson, Head, Communications and Marketing**  
**Naval Safety Center (757) 444-3520 (DSN 564)** Dial the following extensions any time during the greeting

**Publications Fax (757) 444-6791**

**Mech Staff**

**Jack Stewart** Editor-in-Chief  
jack.stewart@navy.mil Ext. 7257  
**AMC(AW) Richard Kersenbrock** Associate Editor  
richard.kersenbrock@navy.mil Ext. 7293  
**Allan Amen** Art Director  
allan.amen@navy.mil Ext. 7248  
**John Williams** Graphic Artist  
john.williams1@navy.mil Ext. 7254

**Analysts**

**LCDR Richard Thousand** Aircraft Maintenance and Material Division Head  
richard.a.thousand@navy.mil Ext. 7265  
**Capt David King** Asst. Aircraft Maintenance and Material Division Head - Safety Survey Coordinator  
david.a.king1@navy.mil Ext. 7223  
**CW05 Daniel Kissel** Avionics/ALSS Branch Head  
daniel.kissel@navy.mil Ext. 7278  
**CW03 Bruce Asberry** Aircraft Maintenance Branch Head  
bruce.a.asberry@navy.mil Ext. 7258  
**AFCM Cory Speer** Aircraft Maintenance Assistant Branch Head  
cory.speer@navy.mil Ext. 7269  
**MGySgt Arthur Hagans** System Maintenance Assistant Branch Head  
arthur.hagans@navy.mil Ext. 7276  
**MSgt Royce Downing II** Airframes/Hydraulic  
royce.downing@navy.mil Ext. 7285  
**AMC Richard Kersenbrock** Airframes/Hydraulic  
richard.kersenbrock@navy.mil Ext. 7293  
**ADCS Timothy Figallo** Power Plants  
timothy.figallo@navy.mil Ext. 7190  
**ADC David Cook** Power Plants  
david.f.cook@navy.mil Ext. 7219  
**MSgt Steve Dell** Power Plants  
steve.dell@navy.mil Ext. 7291  
**GySgt John Ayo** Logs and Records/TD/CTPL  
john.ayo@navy.mil Ext. 7239  
**AZC Marcus Fuller** Logs and Records/TD/CTPL  
marcus.fuller@navy.mil Ext. 7222  
**AECS Daniel Eborn** Avionics  
daniel.eborn@navy.mil Ext. 7280  
**GySgt John McKay** Avionics  
john.mckay@navy.mil Ext. 7292  
**AECS Shannon Walker** Avionics  
shannon.d.walker@navy.mil Ext. 7256  
**PRCS James Adams** ALSS/Egress/Environmental  
james.l.adams@navy.mil Ext. 7290  
**AMEC Samuel Dixon** ALSS/Egress/Environmental  
samuel.dixon@navy.mil Ext. 7208  
**ASCS Angel Santos** Aviation Support Equipment  
angel.a.santos1@navy.mil Ext. 7187  
**AOCS Richard Holmes** Ordnance  
richard.d.holmes@navy.mil Ext. 7171  
**GySgt Daniel Devine** Ordnance  
daniel.d.devine1@navy.mil Ext. 7140  
**LT Tracy Mackey** Facilities Branch, Fuels, CFR/ARFF, Bash  
tracy.mackey@navy.mil Ext. 7281  
**ABCM Tyrone Roseborough** ALRE/Air Terminal  
tyrone.roseborough@navy.mil Ext. 7218  
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Mishaps cost 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 magazine's goal is to help make sure that personnel can devote their time and energy to the mission. We believe there is only one way to do any task: the way that follows the rules and takes precautions against hazards. Combat is hazardous; the time to learn to do a job right is before combat starts.

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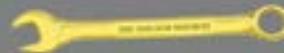
A plane captain affirms that doing things by the book will give the aircrew the best aircraft.

By AE3 Michael Goicoechea

### EDITOR'S NOTE

### WHERE IS THE GOLDEN WRENCH?

Following the lead of our flagship magazine, *Approach*, we have hidden a wrench icon within the cover design. The hidden icon may be smaller than the wrench pictured here, in previous issues it was navy blue and on the TOC page. We hope you enjoy this issue. Thank you for submitting your BZs, stories and articles that are invaluable to the Navy's safety-program management.



Front Cover: Bravo Zulu, GySgt Chris Gundlach, USMC, VMA-231. Photo by Kahlar Photography.

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Aviation Machinist Mates assigned to VP-45, work through the night to install a propeller onto the P-3C Orion aircraft. Navy photo by MC1 Michelle Lucht.





## MO's Comments

LCDR Richard Thousand, Aviation Maintenance Officer, Naval Safety Center

As I review the mishap stats for the end-of-year reports, I'm disappointed in how we did in FY13. The first key number that caught my attention is the nearly 10 percent increase in maintenance-related Class B and

C mishaps. While the overall trend has been encouraging in recent years, this mishap-rate increase is a concern we need to analyze and correct.

We flew almost 100,000 flight hours less than the previous year. Less flying should mean less maintenance and fewer mishaps. No, I'm not that naive. I understand that less flying means more time to get to those gripes you never seemed to have time for. Shouldn't there have been less pressure on maintenance with the reduction in flight requirements? Whether you're in high-tempo or low-tempo operations shouldn't dictate the quality of your work. Do the job right — everytime! Everyone depends on you.

One thing that didn't change this past year from previous years was the top causal factors. We're again targeting human factors as our primary weak area. Let's improve the way we do business by using the pubs, following procedures and checklists, and communicating. Supervisors need to get away from the desks. Supervisor is a job, not a title.

Thanks for all the inputs from the fleet. Enjoy this issue of your *Mech* magazine.

Very Respectfully,  
LCDR Richard Thousand

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# Maintenance Causal Class A Flight Mishaps

Of the last 34 Class A mishaps in FY-12 and FY-13

12% (4) were maintenance related

- MH-53E engine in-flight fire, aircraft destroyed.
  - Human factors: Maintenance personnel used unauthorized intermediate-level maintenance publication versus organizational-level maintenance publication, and improper tool to torque fuel-boost-pump inlet line.
- MH-53E engine failure during takeoff, aircraft destroyed.
  - Human factors: Maintenance mismanagement caused the release of an unsafe aircraft. Multiple issues revealed improper fueling, improper fuel sampling, lack of communication in maintenance department, A-sheet incorrect, inconsistent MAF generation and FOD.
- FA-18E engine in-flight fire, engine damaged.
  - Human factors: Fleet Readiness Center maintainer failed to properly install engine anti-ice valve Rosan fitting O-ring.
- FA-18E engine damaged during low power turn.
  - Human factors: Maintainer failed to properly seat the turn screen, bottom inboard quick-release pin during installation, and failed to check the security of each pin prior to entering the cockpit.

## Maintenance Class B/C Mishaps

63 Class B/C Mishaps, totaling \$15.5M in FY-13

### 1. Failure to follow pubs/supervision (44)

- \* 9 Class B (\$7,730,000 with 2 pending and 1 injury, (permanent/partial disability (PPD))
- \* 35 Class C (\$5,900,000 with 3 pending and 1 injury, (permanent/partial disability)
- \* Common factors: Improper completion of special/conditional inspections, lack of QA/CDI/SUP involvements/supervision, not heeding NOTES/CAUTIONS/WARNINGS, lack of knowledge/experience, panels blown overboard, improper daily/pre-flight inspections, poor communication/pass down, complacency.

### 2. Low power/high power turn up (6)

- \* 1 Class B (\$520,000)
- \* 5 Class C (\$450,000 with 2 pending)
- \* Common factors: FOD, damage to aircraft spoiler and panels, flaps cycled with doors open.

### 3. Towing evolutions (6)

- \* 6 Class C (\$880,000)
- \* Common factors: Towing without a full move crew, rushing to complete task, failing to ensure proper clearance around obstacles.

### 4. Maintainer slipping/falling (6)

- \* 6 Class C (2 wrist fractures, two ankle fractures, fractured leg, injury)

### 5. Tool control (1)

- \* 1 Class C (\$62,150)

**Total Cost = \$15.5 million**

**Total Injuries = 1 PPD and 6 others**

### Total by platforms

FA-18A-F	22	AV-8B	2	F-35	1
EA-6B/EA-18G	7	C-2A	2	F-5E	1
H-53	7	CH-46E	2	KC-130	1
H-60	7	P-3C	2	T-6B	1
MV-22	5	C-40	1	UH-1Y	1
		F-16	1		

# Missing a Step Puts Marines in Harm's Way



Photo by GySgt Daniel Devine, USMC

By Sgt Justin Kenney and Cpl Derrick Ybarra

**H**MLA-167 had a section of two AH-1W Super Cobras scheduled for launch to a nearby forward-operating base (FOB). Both aircraft took off, but one had problems with a 20 mm cannon shortly after departure, so it returned to base. The pilots landed and ordies dearmed the aircraft. The pilots rolled to the backup aircraft and continued their mission.

As the aircraft were returning to base, Maintenance Control announced over the radio that one of the AH-1Ws in the returning section had a 20 mm cannon that wouldn't fire. The ordnance line team prepared to dearm both aircraft. Knowing that the

ordnance maintenance team would be working on the discrepancy, Maintenance Control told the team to download all remaining rounds from the linkless feed and gun systems.

After both aircraft were dearmed and shut down, the team began the download, supervised by the quality assurance safety observer (QASO). The QASO then visually inspected the gun and feed chute for mechanical issues.

The QASO cleared the area immediately forward of the aircraft but didn't use the established checklist to visually inspect the feed chute, feeder, and gun for any remaining rounds. He started to duplicate the discrepancy.



**After clearing the area immediately forward of the aircraft and incorrectly visually inspecting the feed-chute, feeder, and gun for any remaining rounds, the ordnance maintenance team QASO started to duplicate the discrepancy.**

Finding no obvious problems, the QASO determined the system to be mechanically sound. The QASO then discussed the discrepancy with the ordnance maintenance team's QASO, seeking potential causes. They decided that the discrepancy stemmed from something electrical. They agreed that the next step should be to replace the firing volts cable, which splits into two plugs; one plug provides voltage to the feeder and the other provides voltage to the gun to fire the rounds.

Before retrieving the replacement cable, both QASOs disconnected the linkless feed chute from the ammo-can end, the booster motor cable and all three ends of the firing volts cable. They retrieved the new firing volts cable, and the ordnance-maintenance team headed back out to the aircraft to begin troubleshooting. With a different section of aircraft inbound and requiring dearm, the ordnance-line team headed to the opposite end of the ramp.

While the ordnance-line crew took care of the returning aircraft, the ordnance-maintenance team proceeded with troubleshooting the gun "no fire" discrepancy.

After clearing the area immediately forward of the aircraft and incorrectly visually inspecting the feed chute, feeder, and gun for any remaining rounds, the ordnance-maintenance-team QASO started to duplicate the discrepancy. Thinking that the aircraft had been downloaded and that the firing volts cable had been disconnected, the QASO began to isolate the electrical problem. This process included plugging in the feeder to verify whether the gun would cycle with burst and sustained trigger pulls.

Shortly after leaving to dearm the other section, the ordnance-line team heard a rapid series of loud bangs coming from the direction of the ongoing troubleshooting. The ordnance-line team finished

dearming a UH-1Y Huey and headed toward the ordnance-maintenance team. When they arrived, they saw nine 20 mm semi-armor piercing, high-explosive-incendiary (SAPHEI) cartridge casings lying beneath the gun, along with a large hole in the HESCO barrier positioned about 30 feet directly in front of the aircraft.

Within seconds, Marines swarmed to the site, fearing someone had been injured. Because required safety backstops had been in place, and the area forward of the gun had been cleared, no one was injured.

It turned out that the ordnance-line crew had missed an important step in the checklist: cycling a dummy round through the entire feed chute and gun system.

The linkless feed system may have had a gap between rounds in the feed chute, possibly created by loading rounds too quickly during ammunition storage-unit loading. Because of the gap, and during the download process, the ordnance-line crew assumed they had reached the last round, but actually had left rounds in the feed chute.

Both QASOs missed the rounds during their visual inspection because the area above the turret is difficult to inspect. The checklist specifically

directs that a dummy round be cycled through the feed chute, through the feeder and through the gun, partly because of the difficulty of the visual inspection. If this step had been followed, the system would have been clear of all ammunition. This step had been skipped in its entirety.

The ordnance-line crew could have avoided the incident by following established downloading and troubleshooting procedures. The crew did not insert one dummy round in the feed chute on the ammunition storage end unit, did not connect the feed chute to the feeder, and did not rotate the barrels until the dummy round cleared the system and exited the gun. The correct procedures are found in NAVAIR 01-H1AAC-75-17-1 (Checklist, AH-1W, 20 mm Gun Linkless Feed System). ■

*Sgt Kenney and Cpl Ybarra are with HMLA-167 Ordnance Line Crew.*

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*Attention to detail and strict adherence to procedures is absolutely necessary, especially for high-tempo, combat-support operations in austere environments. These events occurred aboard Camp Bastion, Afghanistan and dramatize the importance of following every step in publications and checklists.*

*Submitted by GySgt Danny Devine*



# CROSSING THE LANDING AREA

By AD2 Christopher Wagner

**A**s a Petty Officer Second Class Aviation Machinist's Mate, I was participating in one of the many days of flight operations onboard USS *George H. W. Bush* (CVN 77). At 1800 one of our E-2Cs went down for maintenance while still on the deck. I was pulled off the catapults from launching aircraft and sent to find a test set that was needed to troubleshoot the problem.

I was told to hurry and find this gear before flight-deck control moved the down aircraft to the elevator so it wouldn't impede flight operations. I found the test set on elevator four — it was being used on another aircraft. I returned to the landing area to request clearance to cross. I turned to the right to communicate to our flight-deck observer and then looked left to request clearance to cross from the arresting-gear officer. The arresting-gear officer made a familiar hand signal. I proceeded to cross the landing area and made my way to elevator four. I didn't pay attention to where I had crossed the landing area.

I made it to the port side of the ship only to find out I had crossed the landing area forward of the 3-wire. I was confronted by the flight-deck officer and subsequently brought to flight-deck control. They formally retrained me on how and when to

cross the landing area on the flight deck. I had been in the squadron for more than 18 months and had participated in five carrier-qualification evolutions, so I knew how to cross the deck. However, this incident clearly illustrates how complacency crept in and prevented me from taking the time to make sure I followed the correct procedure.

The carrier deck is one of the most dangerous workplaces in the world, and there is no room for complacency. I could have lost a limb or my life. As a result, I decided to write this article with the hopes that others will benefit from my mistake. The result could have been much worse. I was taken off the flight deck during the remainder of that evolution.

Be mindful of complacency at all times by taking the time to ask yourself, "What am I about to do?" This forces you to direct your attention and energy to your next action and prevents you from acting based on habit. That is the best defense against it.

We, as humans, rely greatly on muscle memory and our subconscious recollection of actions that are familiar to us. This is a good thing when using your blinker to signal a lane change or instinctively looking both ways to cross a street. But it can be a bad thing on the flight deck where deliberate actions and thought are required. ■

*AD2 Wagner is with VAW-120.*



# THE TURN

By AD3 William Borges

I never thought I'd be the guy who crunches a door during a night turn. Well, I did it — door 64L on an FA-18C Hornet during a night turn. When it was all over, the door was hanging by a cannon plug, the trailing-edge flap was damaged, and I had a lot of explaining to do.

I am a Third Class Petty Officer and a qualified plane captain (PC). I had been working night check for the past couple of months. My squadron had just returned from COMPTUEX. Our workload was heavy during the work-up cycle, and we were turning multiple aircraft nightly to keep our combat-ready aircraft functioning at a high level.

On the night of the incident, the mechs and I had just re-installed the portside motor into Ragin' aircraft 301. It was 0230 on a dark, hot and humid night with thunderstorms brewing. Everyone on night check was tired from the long work hours. The turn brief was conducted on the flight line, but it wasn't thoroughly planned. We basically identified who was going to be assigned to each required task and headed to the aircraft.

I was appointed as the turn PC. This was to be a non-pilot turn-up. We would start the right motor with the APU and cross bleed to start the left motor.

The turn started with door 64L open, while the mechs

inspected their work on the engine and fuel system. Once both engines were online and after the turn work had been inspected by the CDI, the inspecting mech walked passed me as I stood on the port side of the aircraft. The turn operator in the aircraft gave me the signal to move to the other side of the aircraft. I wasn't sure why, but I followed his instruction. This put me on the starboard side of the aircraft, where I couldn't see what was going on with door 64L.

I watched as the turn operator discussed procedures with a trainee on the leading-edge extension. He was talking and moving the flashlight around within the cockpit. I then thought that I saw the turn operator signal to me that he wanted to move the flaps before shutting down the engines. But, because of his light signals in the cockpit, it wasn't clear to me what signal he was giving. I perceived he wanted to move the flaps, so I looked under the aircraft to make sure it was clear. I also saw maintainers moving out from underneath the aircraft.

I assumed that the work had been complete on the port side and that door 64L was secure. I gave the hand signal to open half flaps, thinking that's what the turn operator was asking for. I should have known better, because we normally go to full flaps if we are shutting down an engine. That should have raised the hair on the back of my neck



and alerted me that something was wrong. Before I could do anything else, the flap surfaces started moving. The confusion and mixed signals caused the turn operator to move the flaps to half, because that is the signal I showed him. Then the crunch. We heard a terrible sound as door 64L was ripped from its hinges. The damage was done, and there was nothing I could do to take that back.

captain, CDI, safeties, and a fire-bottle watchman. No brief continues without these personnel present. The brief must take place in an area that allows effective communication. We conduct our briefs at the Maintenance Control desk, where it's relatively quiet, and people can ask questions. During the brief, the turn officer will discuss the type/reason of turn and what the evolution will include. We also cover the

ordnance safe position and how the aircraft is going to be secured. This step eliminates any confusion out on the flight line when outside factors such as the noise associated with an aircraft turning, bad weather and poor visibility.

In the tac-admin portion of the brief we discuss, as pilots would in a flight brief, the tactical portion of the evolution, the moving of parts and control surfaces, positioning of people, and hand signals or communication. The PC will be identified to everyone present, and we reinforce that all information will go through the PC first before the turn operator acts. The mode of communication during the turn is discussed. For example, it's as simple as saying, "This will be a night

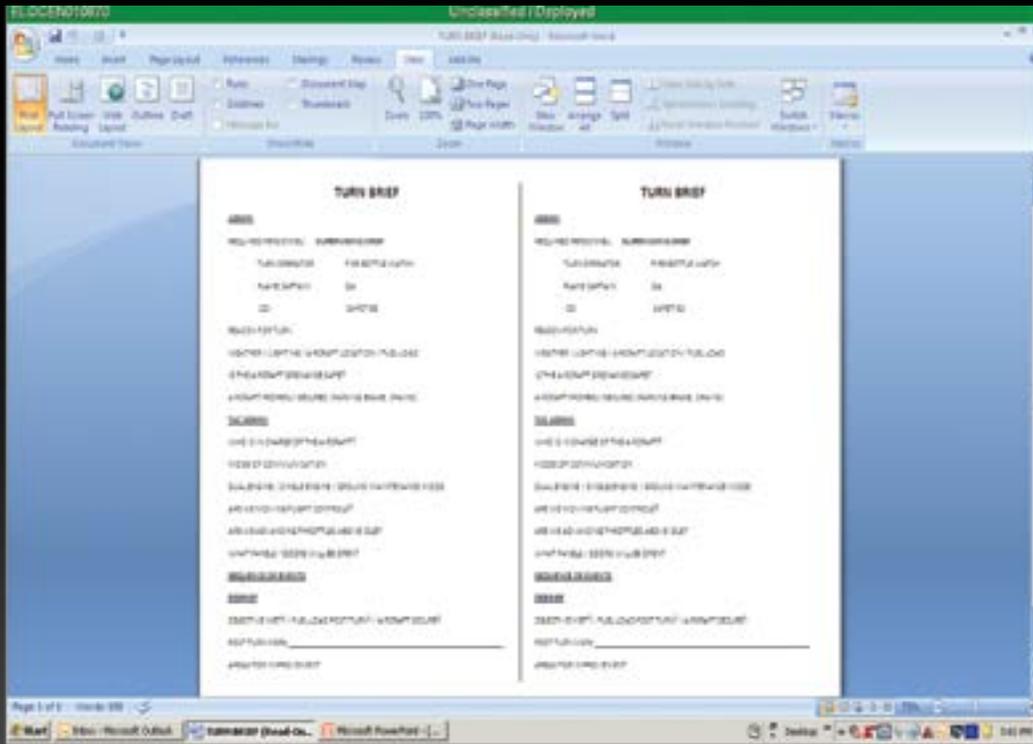
turn, wands are required for PC and safeties, and we will be using hand signals."

Other options will be discussed such as whether it will be a single engine, dual engine or ground mode turn. We'll cover which flight controls will be moved and when, and if the throttles will be advanced above idle. We brief which doors and panels will be opened during the turn and when they will be closed.

We then discuss the sequence of events. We walk through how the turn evolution is going to occur. This stems from the common practice that aircrew refer to as "chair flying." They will actually sit down in a chair and mentally step through each element of the flight to ensure they know the plan.

Lastly, we talk about when and where we will debrief. We discuss if the objective was met, what the final fuel load of the aircraft is, how it was secured after the turn, and if there are any post-turn gripes or MSP codes present. We also cover areas for improvement. ■

*AD3 Borges is with VFA-37.*



Added NATOPS requirements to the back of the Wing Turn Briefing Card.

Following this event, there were many discussions on how we might have avoided this situation. As we all know, the Navy is continually striving to find new ways to keep our Sailors safe and our equipment functioning. Sound safety practices actually increase our mobility. One of the things that we developed in an effort to prevent similar mistakes is a new and improved turn brief card.

Above is the new turn brief card that our aircraft division officer and maintenance officer implemented. It mimics what pilots use on every brief before and after each flight. We printed this information on the back of a standard Strike Fighter Wing instruction turn card. This card allows a framework for us to brief and debrief each turn. It ensures that we discuss the whole evolution and identify possible hazards, so that all turn personnel are on the same page and don't have any questions.

The admin portion of the brief includes a meeting at the maintenance desk, which includes a supervising chief, turn operator, QASO, plane

# SEAHAWK ROTOR

By LT Sam Laurvick

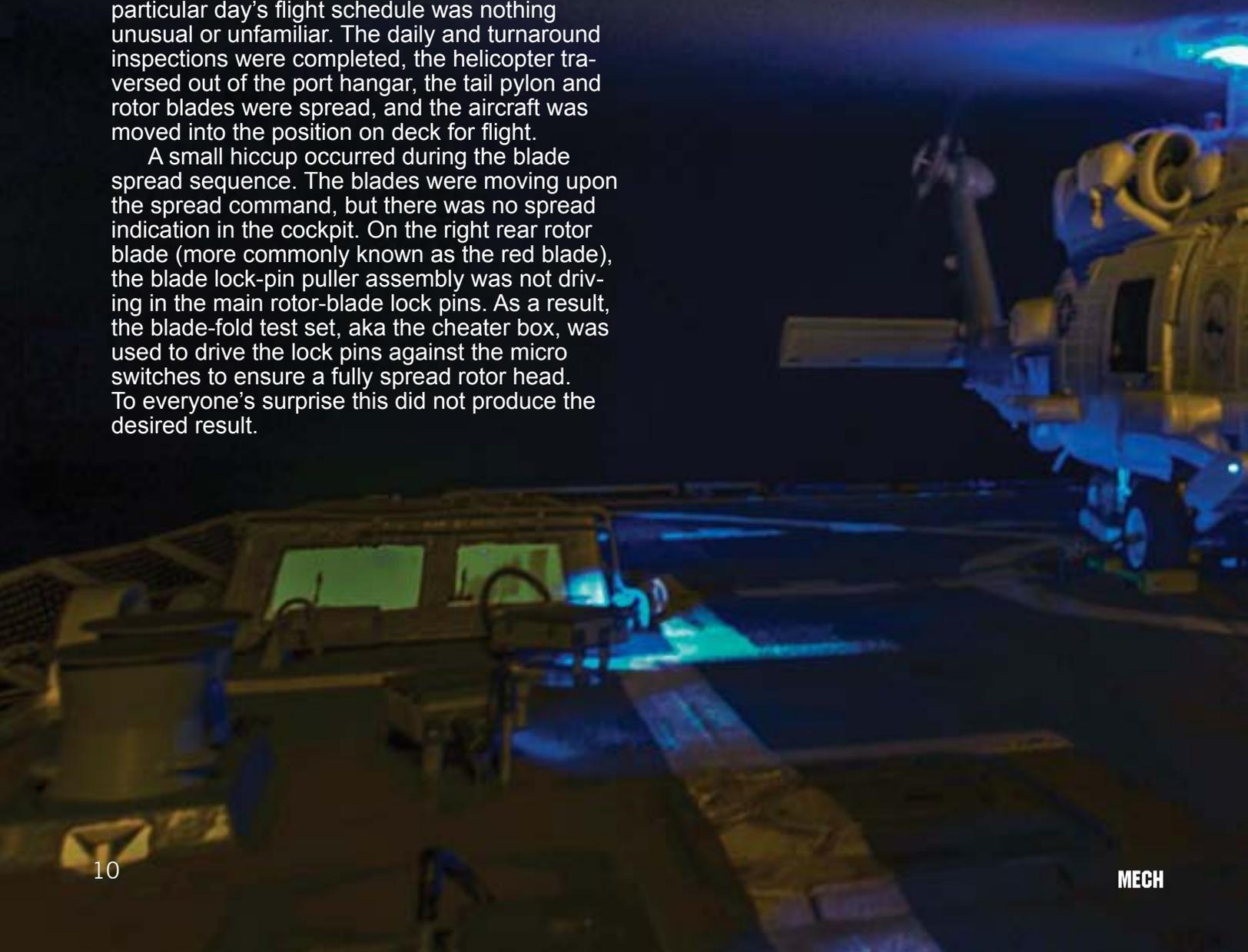
Every pilot, maintainer, and deck handler hopes for successful and safe deployment operations with no glitches or delays. The reality is that deployed operations include triumphs and dilemmas. When a problem surfaces, decisiveness and sound judgment minimize the risk of injury to personnel and damage to equipment. The actions taken must be sound and precautionary, especially when they are non-standard.

We were almost seven months into deployment on a Flight IIA DDG with two MH-60Rs operating in 6th Fleet. The preparation for this particular day's flight schedule was nothing unusual or unfamiliar. The daily and turnaround inspections were completed, the helicopter traversed out of the port hangar, the tail pylon and rotor blades were spread, and the aircraft was moved into the position on deck for flight.

A small hiccup occurred during the blade spread sequence. The blades were moving upon the spread command, but there was no spread indication in the cockpit. On the right rear rotor blade (more commonly known as the red blade), the blade lock-pin puller assembly was not driving in the main rotor-blade lock pins. As a result, the blade-fold test set, aka the cheater box, was used to drive the lock pins against the micro switches to ensure a fully spread rotor head. To everyone's surprise this did not produce the desired result.

The next option was to manually drive the blade lock pins by performing old fashioned wrench turning — victory. A spread light came on in the cockpit. Our maintainers walked away with a triumph over the machine, but learned they would later have to fix a faulty blade lock-pin puller. The aircraft was set to commence the scheduled flight operations, and troubleshooting would be conducted at night after the last flight had shutdown.

The orchestra of recovering, hot-pumping, hot-seating, and launching the rest of the day went without errors. Once the day was over and



# BLADE DOWN

the helicopter was shut down, the water wash was done on the engines. No problems there. It was time to get the aircraft tucked away in the hangar for the night. The wing-walkers took their positions, the blade fold sequence commenced, and again a problem with the red blade lock-pin puller caused only three blades to move.

At first we thought that reversing the sequence to fold the three blades and then respread them might initiate the process on the fourth blade. This plan did not work. The same blade fold motor that had trouble at the beginning of the day appeared to have failed completely.

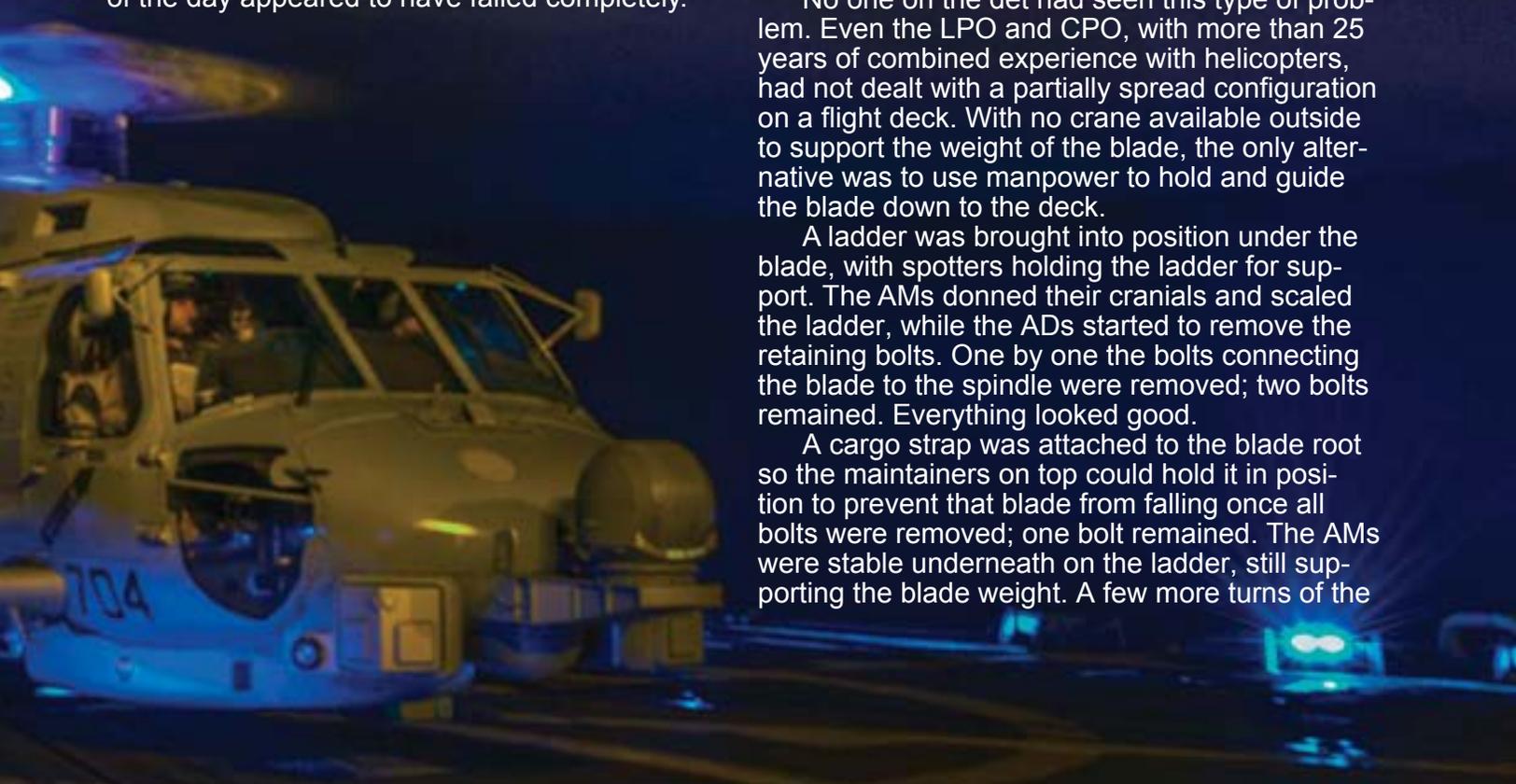
The helicopter could not go inside the hangar until all the blades were folded.

To be sure of the nature of the failure, the lead AD removed the lock-pin cover to inspect the pins and gears. During manual rotation of the lock pins, the motor should spin freely. This motor was not moving — clear verification that the motor was seized. The night check concluded that they would have to remove the blade without mechanical assistance because the hoist in the hangar that is normally used for this process was unusable from their position on the flight deck.

No one on the det had seen this type of problem. Even the LPO and CPO, with more than 25 years of combined experience with helicopters, had not dealt with a partially spread configuration on a flight deck. With no crane available outside to support the weight of the blade, the only alternative was to use manpower to hold and guide the blade down to the deck.

A ladder was brought into position under the blade, with spotters holding the ladder for support. The AMs donned their cranials and scaled the ladder, while the ADs started to remove the retaining bolts. One by one the bolts connecting the blade to the spindle were removed; two bolts remained. Everything looked good.

A cargo strap was attached to the blade root so the maintainers on top could hold it in position to prevent that blade from falling once all bolts were removed; one bolt remained. The AMs were stable underneath on the ladder, still supporting the blade weight. A few more turns of the



**Even the LPO and CPO, with more than 25 years of combined experience with helicopters, had not dealt with a partially spread configuration on a flight deck.**



wrench and the bolt released from its place and the blade was free.

The root was being held by the maintainers clutching the attached strap. Shortly after the blade came free, the heavier leading edge caused a rotation. The mechs lost control, and the blade began to fall. Impact with the deck was imminent. The maintainers immediately scrambled to get clear of the area.

Whack! The blade came crashing down with the tip cap hitting the flight deck (the root end still was being supported by the cargo strap). When the blade was settled to the deck, the look of surprise was replaced with relief when the maintainers realized that no one had been injured. Everyone positioned near the ladder had managed to stay clear and safe.

The blade was removed. The other three blades were folded, and the aircraft was brought into the hangar. After the aircraft was inside, the maintenance work began. The blade fold motor had completely seized. The blade that fell to the deck had a damaged tip cap, leaving it dented and

cracked open. Along the trailing edge, midway down the blade, there was de-lamination and separation. The blade-inspection-method (BIM) indicator still was white, meaning the nitrogen filled spar had not ruptured. Spare parts were taken from the PUK and installed on the helicopter.

We were reminded that day that what seems to be a normal day of operations can quickly turn into a challenging and dangerous environment. Just because the blades are not spinning or the engines are off, your awareness can't slacken.

The maintainers on the det were aware that the blade fold actuator motor was not working at 100 percent. However, none of them knew, nor could have predicted, that they would be faced with the challenge thrown their way.

Without set procedures to work from, the only option is to take a step back before acting, collectively decide what needs to be done, and take that action in the safest manner possible. ■

*LT Laurwick flies with HSM-74 Detachment One.*

# WHEN COMPLACENCY

# MEETS SCARY

By AE3 Michael Goicoechea

**A**s a plane captain, I have many critical duties that can become routine. With repetition and currency, it can be easy to take these duties for granted and allow complacency to creep in. The key to safety and success is strict adherence to publications and training. I'm reminded of this because I recently learned a hard lesson.

At the beginning of my shift, I was asked to perform a daily inspection on one of our EA-6B jets, so I walked out to the line to get started. When it came time to check the ducts, for some reason that I can't quite explain, I cut corners by not diving the ducts, inspecting the blades, and ensuring that the intake was debris free.

Later that morning when it came time to launch, I started my preflight inspection with the pilot. Almost immediately he noticed that there were large chips in the first-stage compression blades of the port motor. After closer inspection of the blades, we determined that the engine had ingested debris, causing significant damage. We downed the jet and cancelled the flight for foreign object damage (FOD).

I was embarrassed. My complacency posed a serious safety issue for the people working on the line, and an even greater safety issue to the aircrew assigned to fly the jet that day. Had the damaged blades not been noticed, one or possibly both engines could have been lost to fire, seizure or catastrophic failure. We could have lost a jet that day. Even scarier is that we could have lost aircrew. These situations could have been avoided by doing things by the book and not being lazy.

Complacency, laziness, and not adhering to correct maintenance practices in my shop or in the maintenance department are unacceptable at any time. Aircrew and their families put their trust in us to bring their loved ones back by making sure we give them a good product to fly. This is why there are publications for everything we do and the reason we follow the proper steps in their entirety.

To prevent complacency, great care and respect must go into every task we perform, and with any certification or qualification one may hold. Along with correct training, mistakes made in the past and the consequences must be shared. Always keep in mind what might happen if we let complacency creep into the maintenance department. Do things by the book, and always make sure you are giving aircrew the best aircraft. ■

*AE3 Goicoechea is with VAQ-134.*





The calibration-laboratory onsite team was reassured it had been tagged out and were shown the danger tags hanging and signed by all required personnel.

# Immediate Changes

By AT1 Sherman Goodwin

Every maintenance action performed onboard a Navy ship involves safety precautions to protect the Sailor. These precautions have been established from years of lessons learned and unfortunate mishaps. Effective communication can help mitigate risk in any evolution. This was evident after routine maintenance while deployed to the Arabian Gulf onboard USS *Nimitz* (CVN-68).

The onboard calibration laboratory is responsible for the calibration and repair of all quantitative-measurement equipment. Common maintenance actions are onsite calibrations performed in reactor and engineering spaces to minimize the time that critical systems are taken offline. These tasks involve isolating and tagging out equipment to prevent damage and to ensure the safety of the Sailors.

Our process began to break down in early August, when an onsite calibration for a pressure switch was scheduled in main machinery room No. 1. We had to connect a portable pressure calibrator to an isolation valve that allows pressure and vacuum to be applied remotely to actuate the pressure switch. Multimeter leads are connected to electrical contacts inside the

pressure switch to indicate an open or closed circuit. As per the Maintenance Requirement Card (MRC) and Calibration Required List (CRL), the pressure switch is tested to make sure the proper set and reset points are within tolerance. During the initial scheduling, a date is set on an onsite request form that is filled out by the gage calibration petty officer. This form states, "All equipment has been tagged out, tags are properly hung and work is ready to commence on *[this date]*."

When we were ready, the Cal Lab personnel were escorted to the reactor space to begin the calibration. As with every maintenance action, two personnel were present: the maintainer or technician and a qualified supervisor or collateral duty inspector (CDI). As per local command procedures, a representative knowledgeable about the equipment being calibrated was also on hand. The subject-matter expert was asked if all equipment was tagged out. The calibration-laboratory onsite team was reassured it had been tagged out and were shown the danger tags hanging and signed by all required personnel. Preliminary steps for the calibration were started by the maintainer, while the subject-matter expert and CDI verified values in the publications.

During the preliminary setup before the actual calibration, the maintainer removed the front faceplate from the pressure switch and connected alligator clips from the multimeter to the electrical contacts inside the switch. His finger inadvertently made contact with an energized portion of the switch, and he received an electric shock. The technician immediately notified the on-scene CDI, and the maintainer was escorted to medical to receive an EKG as a precaution. The technician was released by medical with no issues or follow-up required.

Following the electric shock, several procedural deficiencies were noted. The onsite calibration team had commenced work upon verbal confirmation from the subject-matter expert that the equipment was tagged out and authorized on the work-action form. However, the authorizing authority and subject-matter expert had failed to notify the onsite team that the equipment was still energized due to a misunderstanding of the term “tagged out.” Electrical-safety guidelines are identified in several instructions, noting the requirements for working on energized equipment. Other indications to the onsite calibration team that the switch was not deenergized were the lack of a protective boundary and the lack of an authorization from the commanding officer to work on this equipment while energized. Had the onsite team been made aware that this equipment was still energized, the maintenance action would have been stopped and the electric shock would not have occurred.

The MRC outlining this maintenance lists electrical safety precautions to be adhered to in the event maintenance is conducted on an energized switch. However, the MRC does not mention the ability to omit any of these steps if the switch is deenergized. Therefore, PPE is required and safety precautions must be followed regardless of the condition of the switch. The CDI failed to make sure that the technician had the proper PPE (rubber insulating gloves, insulated floor mat and face shield) because he assumed the switch was de-energized. Wearing the PPE would have prevented the electric shock to his finger.

The NSTM 300 outlines the procedures for working on energized and potentially energized equipment. This

publication also details the PPE requirements and steps for ensuring that no voltage exists within a circuit prior to maintenance. An Initial Voltage Verification (IVV) shall be performed by a qualified electrician wearing all required PPE prior to this circuit being deemed deenergized.

As a result of this incident, the onsite calibration form has been revised to state that the equipment has been “deenergized,” as well as “tagged out” to eliminate any confusion. All required materials, tools and equipment from all 9802 series MIPs have been ordered and will be stocked by the calibration lab, instead of reliance from outside departments to provide the materials. Training was provided to all calibration laboratory personnel and to all gage cal petty officers on procedural compliance and proper maintenance.

An electrical safety video was filmed and produced for the ship’s crew to reinforce required electrical safety PPE and materials. For every onsite evolution, a qualified electrician is required to be on scene to perform IVV checks (in accordance with the NSTM 300), and to ensure all electrical connections between calibration standards and equipment being calibrated are within specification.

More changes will likely take place as we continue to evaluate our current processes and adjust our procedures to ensure the safety of our Sailors.

*AT1 Goodwin is the AIMD, IM-3 Division, Shop 4 LPO on USS Nimitz (CVN 68).*

PPE is required and safety precautions must be followed regardless of the condition of the switch.



# Aviation Maintenance Risk Management Checklist

## BEFORE THE TASK

1. Am I qualified, authorized, and confident to undertake the task?
2. Do I have people to assist, mentor, and supervise me?
3. Have I been thoroughly briefed on the task by my supervisor?
4. Have I told my supervisor of any physical or mental limitations that may impact my performance?
5. Have hazards been identified, reported, controlled, and documented?
6. Do I have a clear understanding of my responsibilities?
7. Has sufficient time been allocated to undertake the task?
8. Do I have the necessary authorized publications, procedures, and instructions?
9. Do I have the serviceable, authorized support equipment, and tools required?

MAINTAINER

## DURING THE TASK

1. Am I working IAW authorized policy, processes, and procedures?
2. Am I ensuring all in-process and mandatory inspections are being conducted?
3. Am I receiving adequate supervision for my level of experience?
4. Am I informing my supervisor of task execution and any concerns?
5. Am I monitoring and reporting hazards as work progresses?

**STOP**  
Any "No" answer increases the risk. This risk must be accepted by a person with the appropriate level of responsibility.



MAINTAINER

## AFTER THE TASK

1. Was the job done IAW authorized policy, processes, and procedures?
2. Were all in-processes and mandatory inspections conducted?
3. Did the work completed satisfy initial task requirements?
4. Have I accounted for/returned all tools and support equipment?
5. Is proper documentation (NALCOMIS/OOMA) complete?
6. Have I certified all work I have completed?
7. Do procedures exist for uncompleted and follow-on maintenance?
8. Have I debriefed the task to my supervisor?
9. Have all supporting maintenance tasks been documented?
10. Did I debrief issues/concerns to improve the task or process to my supervisor?

## BEFORE THE TASK

1. Am I qualified, authorized, and confident to undertake maintainer supervision?
2. Do I understand who I am supervising and what is being supervised?
3. Have I briefed those directly responsible for conducting the task?
4. Have I told my supervisor of any physical or mental limitations that may have an impact on myself or the maintainer performance?
5. Have all hazards been identified, reported, controlled, and documented?
6. Do I understand my responsibilities with respect to the task and supervision?
7. Has sufficient time been allocated to undertake the task?

SUPERVISOR

## DURING THE TASK

1. Am I supervising IAW authorized policy, processes, and procedures?
2. Am I ensuring all in-process and mandatory inspections are done?
3. Am I giving/receiving adequate feedback from/to personnel?
4. Am I informing my supervisor of task execution and any concerns?
5. Am I monitoring and reporting hazards as the work progresses?

**STOP**  
Any "No" answer increases the risk. This risk must be accepted by a person with the appropriate level of responsibility.

SUPERVISOR

## AFTER THE TASK

1. Was maintenance done IAW authorized policy, processes, and procedures?
2. Did I ensure that all in-process and mandatory inspections were completed?
3. Did the work completed satisfy initial task requirements?
4. Did I provide the appropriate level of supervision throughout the task?
5. Have I debriefed the task with the maintainer?
6. Have I documented all the inspections I was responsible for/or I conducted?
7. Have I confirmed that conditions exist for any follow-on maintenance?
8. Have all supporting maintenance tasks been documented?

OR

- 8. Does my team have the authorized publications, procedures, and instructions required?
- 9. Does my team have the required tools and serviceable support equipment required?

OR



OR

- 9. Have I articulated task turnover info via maintenance docs, logs, and verbal brief?
- 10. Have I briefed maintenance control on task revision details and the maintenance status of further task requirements?

### BEFORE THE TASK

1. Am I and my workforce qualified and authorized to do maintenance?
2. Has sufficient personnel/time been allocated to the tasks?
3. Have hazards been identified, discussed, controlled, and documented?
4. Do I understand my responsibilities with respect to maintenance management?
5. Do I have the authorized data, procedures, and instructions required?
6. Have I communicated task requirements clearly and documented?
7. Does the unit have the necessary serviceable support equipment and authorized tools?
8. Have I clearly communicated and documented task requirements?
9. Are there any factors that may have an impact on the physical or mental performance of personnel?
10. Have I been briefed on all maintenance to be conducted?

### MAINTENANCE CONTROL

### DURING THE TASK

1. Am I supervising IAW authorized policy, processes, and procedures?
2. Are all in-process and mandatory inspections being conducted?
3. Am I giving/receiving adequate feedback to/from personnel on task?
4. Am I informing my supervisor of the maintenance status and any concerns?
5. Am I managing risk(s) as the work progresses?
6. Am I monitoring personnel performance and reporting any concerns?

**STOP**  
Any "No" answer increases the risk. This risk must be accepted by a person with the appropriate level of responsibility.



### MAINTENANCE CONTROL

### AFTER THE TASK

1. Is maintenance certified IAW authorized policy, processes, and procedures?
2. Are in-process and mandatory inspections completed and documented?
3. Have I documented the inspections I performed and/or was responsible for accomplishing?
4. Have I confirmed corrective actions satisfy initial task requirements?
5. Have I debriefed the task with the supervisor?
6. Are maintenance actions documented for follow-up actions, if required?
7. Were all supporting tasks documented and certified?
8. Is task info (maintenance docs, logs, briefs) clear and concise?
9. Has the Commanding Officer been briefed on task revision details and the status of further task requirements?
10. Have I conducted my responsibilities with due diligence?



# *Is That Why They Call It the Hell Hole?*

By AM2 Rodney Saucedo

I'm an AM2 quality assurance representative (QAR) assigned to VP-4, and I work on P-3C aircraft. My story takes place when we were operating out of Djibouti, Africa. I had no idea this would be the scariest day of my life. How could anything go wrong while performing procedures that I've literally done dozens of times in my Navy career?

I was called out to the ramp to inspect a preflight discrepancy on an aircraft. Hydraulic fluid was leaking from the elevator and rudder-booster compartment (located inside the empennage section of the aircraft), also known as the "hell hole." Arriving at the aircraft, I spoke with the flight engineer about the discrepancy, and asked if he could have someone cycle the rudder-flight-control system while I troubleshot the leak. The flight engineer then notified the pilot to start cycling the rudder-flight-control system. I went up the maintenance

ladder to open the "hell hole" access panel and started to inspect the rudder-booster assembly for leaks while the rudder controls were cycled.

I saw hydraulic fluid coming from the manual-shutoff valve, which is part of the rudder-booster assembly. I wiped around the leaking component with a lint-free cloth as the pilot continued to cycle the rudder. While drying the manual-shutoff valve, my left pinky, ring, and middle fingers became lodged between the valve and the linkage.

I yelled to the flight engineer, "Tell the pilot to move the controls the opposite direction." I had to free my fingers.

It was difficult to communicate because of the noise from the auxiliary power unit (APU). We set up the intercommunication system (ICS), so the flight engineer on the ground and pilot in the flight station could talk. At the same time, the pilot notified the flight engineer that the rudder-control system was jammed, and I was unable to free my fingers.

I yelled to the flight engineer that my fingers were being smashed.

Maintenance control was notified of the situation and brought me a metal bar from an aircraft jack (rhino jack) to pry on the linkage to shift the rudder-booster package to the retract position.

I could feel the rudder-boost shutoff valve start to burn the bottom of my fingers.

The flight engineer brought me the rhino-jack bar, and I tried to pry the linkage but couldn't. The flight engineer asked if we needed to call emergency crews and I replied, "Hell yeah!"

It had been about 20 minutes and my legs were tired from standing on the ladder. I was trying to keep calm, but the thought kept running through my mind of passing out or having my legs give out. Understanding my concern, an Aviation Machinist Mate First Class Petty Officer (AD1) moved a B-5 stand to replace the ladder. This gave me more room to move my legs. I asked the AD1 to find a tool box

***I was trying to keep calm, but the thought kept running through my mind of passing out or having my legs give out.***

so I could try to remove some linkages. The tool box arrived about five minutes later. By that time, my fingers had been stuck, smashed and burning for roughly 25 minutes.

I tried to remove the linkages but was unable to do so with one hand. The AD1 tried to help, but he couldn't reach anything from his position because of the small size of the compartment. When I realized that I couldn't free my fingers, I was resigned to the fact that I could lose them. The pain got worse by the minute.

As I continued to look at the assembly to find a way to free my fingers, I noticed the rudder-control cables that went around a quadrant on the rudder-boost package were within arm's reach. I pulled on the quadrant and noticed that the boost package began to shift to the retract position, but this action also put more pressure on my fingers. Knowing I couldn't continue with this pain much longer and I had to get out, I pulled as hard as I could on the quadrant itself. There was intense pressure on my fingers for a couple of seconds, but the booster assembly shifted, and I was free.

I took a deep breath and said, "Thank you, God."  
I rushed out of the compartment with much

relief, yet in so much pain. Once off the B-5 stand I was delivered by ambulance to the medical facility where I received treatment.

In the end, the injuries suffered to my hand consisted of third-degree burns to the bottom of my left pinky, ring, and middle fingers and five stitches on my middle finger.

Many factors played a part in this mishap: fatigue, complacency and lack of attention to detail. I should have talked with the flight station about stopping the movement of the rudder-boost package before placing my hands in the dangerous area around the moving flight controls. Having an ICS cord connected from the beginning of the evolution would have also improved communication and reduced confusion in an already complex evolution. Two parts of the rudder-boost package were damaged while trying to free my fingers.

When I returned to work the next day, I explained to my fellow shipmates how complacency negatively affects mission readiness, and how fortunate I was to not lose my fingers. I fully understand why the compartment is named the "hell hole." ■

*AM2 Saucedo is with VP-4*



# Maintainers in



Aviation Structural Mechanic 3rd Class Lakesha Clark, assigned to the HSC-6, adjusts screws for an MH-60S Sea Hawk helicopter aboard the aircraft carrier USS *Nimitz* (CVN 68). Navy photo by MCS Derek Harkins.



Aviation ordnancemen assemble a GBU-12 inert training round aboard the amphibious assault ship USS *Boxer* (LHD 4). Navy photo by MC3 J. Michael Schwartz.

Aviation Machinist's Mate 2nd Class Timothy Melton, assigned to the VFA-105, uses a bore scope on an engine to search for blockage or parts needing to be replaced aboard the aircraft carrier USS *Harry S. Truman* (CVN 75). Navy photo by MCS Emily Blair.



Aviation Boatswain's Mate (Handling) Airman Ericka Stewart, attaches an MK 105 pendant to a cargo net on the flight deck of the aircraft carrier USS *Harry S. Truman* (CVN 75) during a replenishment-at-sea. Navy photo by MC2 Lyle Wilkie III.



# the Trenches



GySgt Leonel Lora, middle, assigned to the 31st MEU, uses a bore scope camera to verify the engine of an AV/8B is serviceable while SSgt Steven Vladiff, left, observes and Cpl Justin Powers, top, turns the blades of the engine in the hangar bay aboard the USS *Bonhomme Richard* (LHD 6). Navy photo by MC2 Betsy Knapper.



Aviation Structural Mechanic (Equipment) 2nd Class Christopher Miller, rear left, Aviation Structural Mechanic 3rd Class Phillip Welch, front left, and Aviation Structural Mechanic (Equipment) 2nd Class John Dobson install new tires on an F/A-18C Hornet assigned to VFA-146 in the hangar bay aboard the USS *Nimitz* (CVN 68). Navy photo by MCS Eric Butler.

Cpl Bryan Swanson, assigned to VMM-266 (Reinforced), installs a hub in an engine of an MV-22 Osprey aboard the USS *Kearsarge* (LHD 3). Navy photo by MC3 Tamara Vaughn.



# The Canopy Wouldn't Budge

By AEAN Daniel Kaiser

It was a seemingly normal afternoon on USS *John C. Stennis* (CVN 74). As the day shift flight schedule was drawing to a close, the rest of the aviation electricians and I were enjoying the air conditioning in our shop when we received a call from Maintenance Control. Aircraft 106 could not electrically open its canopy, and the aircrew were still in the FA-18 with engines turning.

I grabbed my cranial and float coat and headed to the flight deck. Before I could reach for the tool log to sign out my PPE, Maintenance Control called again and said the troubleshooters had

grabbed my PPE and MSP code book and, along with my LPO, headed up to the flight deck.

When we arrived at the aircraft, the Hornet had been shut down. My flight-deck chief was sitting on the port leading-edge extension (LEX) manually cranking the canopy open. As my LPO and I waited for the aircrew to climb down from the cockpit, our gunner asked us what we thought the problem might be. “An actuator, or the breaker,” I replied.

With the aircrew on deck, everyone around the jet started to disperse. Wanting to return the jet to an “up” status as soon as possible, my LPO and I immediately walked over to its starboard side where I suspected the canopy-power circuit breaker would be popped. The panel that housed the circuit breaker in the starboard avionics bay was open with the canopy-power circuit breaker visibly out. I moved the circuit breaker side to side to make sure it wasn't damaged. Everything felt fine, so I pushed the breaker in to make sure that it would remain seated. It did, and I thought, “This gripe will be fixed in no time.”

I started to walk to the port side of the aircraft toward the boarding ladder. When I stepped out from under the jet below the port LEX, I heard a scream. I looked up, and to my horror, the plane captain (PC) trainee assigned to aircraft 106 was sitting on the LEX, pinned down against the windscreen by the canopy. The canopy was pushing down on his right shoulder while the rest of his body was on the LEX. Our flight deck chief (FDC) ran up the boarding ladder as I tried to use the external canopy switch to raise the canopy. The canopy didn't move, and even though my FDC was trying to lift on the canopy to allow the trainee to escape, it wouldn't budge.

I raced up the boarding ladder while yelling to my LPO to pull the breaker back out. Sure



A stuck canopy is not good—but there's something that will make it even worse. Read this article to find out what.

found a popped circuit breaker and not to worry about sending another AE to assist. I set down my gear and turned my attention back to the other members of my shop. After a few minutes, Maintenance Control called again and said that aircraft 106 was still having canopy problems. I

## When I stepped out from under the jet below the port LEX, I heard a scream.

that the canopy would move no further now that it had been electrically isolated, our FDC and I lifted on the canopy with all of our strength. The crowd that had gathered at port side of the aircraft tried to pull the trainee down. The canopy still wouldn't budge, and the PC trainee's yells were getting louder. Finally, another person came up the ladder, and with a combined three-man effort, we were able to lift the canopy enough to allow the trainee to slide down the port side of the fuselage to the personnel waiting below. When the three of us let go of the canopy, it didn't move at all, staying partially open at the exact width of the trainee's body. I was still trying to understand what had occurred, as I peered through the canopy and checked the front and rear cockpit canopy switches; both switches were in the correct hold setting.

As I climbed down to check on the trainee, many questions raced through my mind. How did this happen? When did the trainee climb up the ladder to pin the seats? Is this all because I pushed in the circuit breaker? When I climbed down, the trainee was sitting crosslegged. His arms and legs were shaking; my hands were also shaking. The trainee smiled and said he felt alright. Then the crash-and-salvage personnel and flight-deck corpsman arrived.

Our FDC asked me what had happened, and I told him that I had pushed in the canopy-power circuit breaker. He then told me that the canopy would not open either electrically or manually while the engines were turning. I was shocked!

After about five minutes, the PC trainee was taken to medical for X-rays and an assessment. I was left to talk with our MMCPD and FDC to try and figure out what had gone wrong. There were several failures noted in procedures, situational awareness, and the application of ORM.

First, aircraft discrepancies are constantly changing, and the failure to get a proper passdown from the shooters and FDC after the aircraft was shut down played a large role in this incident. I relied solely on the 20-second call from

Maintenance Control instead of investigating the gripe for myself. Had my LPO and I known that the canopy was closing uncommanded, we would have waited for everyone to clear the area completely before troubleshooting the discrepancy.

Second, with a situation that poses a high risk of personnel injury, there should have been a watch posted at the avionics bay door to ensure the breaker wasn't pushed in. Or, the breaker should have been tagged out until it was safe to troubleshoot. As electricians, we are taught that before performing any maintenance, we must ensure that all personnel are clear of hazards. Not only did I fail to inform the PC or the trainee that I was investigating the cause of the canopy malfunction, I didn't recheck to see if anyone was in the path of the canopy when I reseated the canopy-power circuit breaker.

Although I had no idea or reason to believe the canopy would actuate on its own, this incident could have been avoided by simply waiting for the PCs to pin the cockpit before troubleshooting the gripe. By failing to do so, I jeopardized the safety of my shipmates. Although the trainee escaped with only bruises and a sore back, this incident could have resulted in a severe injury or death. ■

*AEAN Kaiser is with VFA-41.*

This circuit breaker functioned as advertised—but there was more to the story, and it hurt.



# BRAVO

## Sailors and Marines Preventing Mishaps

### Zulu



**GySgt Chris Gundlach**  
**VMA-231**

After a functional check flight (FCF) because of an engine change, the engine performance numbers were calculated and the results were much lower than expected. The AV-8B uses relative hover (RHOV) and relative jet-pipe-temperature (RJPT) numbers to measure engine performance while accounting for the whole system (aircraft/engine) and expected degradation from the installation. The maximum allowable engine-performance degradation observed during a performance hover (PHOV) check is -2 percent RHOV and +20 degrees RJPT from the zero datum. This would indicate the engine is providing 2 percent less thrust than the average engine and/or operating 20 degrees Celsius hotter.

The results of this performance-hover check were low (-0.2 RHOV, -34 RJPT), but within NATOPS limits. During the post-flight debrief, the FCF pilot stated the aircraft felt notably underpowered and weaker.

GySgt Chris Gundlach, working in VMA-231's quality assurance division, talked with the Rolls Royce engineering team about this data. They discovered that the references listed in NATOPS were incorrect. The reference in NATOPS is based on average performance numbers for an engine that the AV-8B used in the past (F-402-RR-406 Pegasus engine) but that is no longer in use. The numbers in NATOPS have not changed since the induction of the F402-RR-408 engine, which produces approximately 2,000 pounds more thrust, and the datum is a minimum specification engine versus an average engine. When run on an engine test cell, a F402-RR-408 engine must pass minimum specification: no less than 21,550 pounds of thrust at 110.2 rpm while operating no hotter than 687 degrees Celsius. If an engine meets or exceeds this performance, it is then ready for issue (RFI). Rolls Royce and Boeing representatives indicate that, for the F402-RR-408, the maximum allowable degradation is 0 percent RHOV and 0 degrees RJPT.

With this information, GySgt Gundlach informed the squadron's Safety and Standardization Department. A NATOPS change recommendation was submitted to the AV-8B model manger. The squadron, along with Rolls Royce, informed the rest of the AV-8B fleet's quality assurance divisions of this information.

Rolls Royce also uncovered a calibration discrepancy with the engine test cell and suggested this particular engine was a "quality escape." After reviewing data from previous engine-test runs, Rolls Royce suggested the engine test cell was not calibrated correctly. As a result, the test cell was recalibrated and all of the affected engines have been identified and earmarked for retest.

The initiative and attention to detail by GySgt Gundlach and the squadron's quality assurance division identified a significant discrepancy in the aircraft NATOPS publication and an improperly calibrated engine test cell.



**AE3 Ryan Keyes  
VAQ-136**

While conducting maintenance on VAQ-136's aircraft 501, Aviation Electrician's Mate Third Class Ryan Keyes noticed the aircraft's battery was hot to the touch. He ensured that Maintenance Control was quickly informed and that the battery was disconnected from the aircraft. As AE3 Keyes continued to monitor the battery, he soon realized that a thermal runaway was occurring. When the fire department arrived, he further assisted in removing the battery from the aircraft. The battery was submerged in water for 12 hours, rendering it safe.



**AET1 Jorge McCormick and AET3 Brandon Dillard  
USCG Traverse City**

Coast Guard Aviation Electronics Technician First Class Jorge McCormick and Aviation Electronics Technician Third Class Brandon Dillard were investigating a possible fluid leak on a Coast Guard MH-65C.

Discovering that the fluid was water from a recent engine rinse, AET1 McCormick and AET3 Dillard continued checking the remainder of the aircraft for other leaks. They found a spot of fluid on the opposite side of the helicopter. This spot could have also been water from the engine rinse or fuel from a very recent fueling. AET1 McCormick and AET3 Dillard identified the fluid as fuel. Their extensive search eventually led them to a leak near the fuel/refueling system single-point receptacle.

Their efforts highlight the importance of setting aside operational pressures, making zero assumptions, and focusing strictly on safety when encountering a maintenance discrepancy.

**AWR2 Blaine Ondriezek  
HSL-37**

While conducting a hot-seat evolution on HSL-37's Easyrider 64, AWR2 Blaine Ondriezek identified a cracked, rescue-hoist-cable-guide assembly during a walk-around inspection of the aircraft. He immediately brought the discrepancy to the attention of the helicopter aircraft commander and maintenance personnel, who confirmed that the cable-guide assembly was severely corroded and required repair. Petty Officer Ondriezek's identification of this hazard allowed for repair before it became a larger and more extensive problem. Left uncorrected, the cracked cable guide could have caused the rescue-hoist cable to shear.



**AOAN Porsche Banks  
HS-11**

AOAN Porsche Banks discovered a downing discrepancy on the No. 2 engine of an HS-11 Seahawk. During a daily aircraft inspection on the SH-60F, Airman Banks discovered and quickly reported a bolt that had been sheared off from the engine's accessory-gearbox system.

Airman Banks' attention to detail, situational awareness, and quick response averted further equipment damage and possibly an aircraft mishap. Her actions illustrate how every person involved in aircraft maintenance serves an important role that directly improves safety and mission readiness.

**AZ2 Cory Lake**  
**VAW-120**

AZ2 Cory Lake received acceptance paperwork for a fuel-quantity test set from Fleet Readiness Center (FRC) Mid-Atlantic. Following the procedures outlined in the COMNAVAIRFORINST (CNAF) 4790.2b and local command procedures, he performed baseline verification. During the acceptance process he was unable to verify the status of the technical directive (TD) that had been issued for the fuel-quantity test set. The item did not have a CNAF 4790/51 record.

He immediately notified his workcenter supervisor and had the receiving work center verify the status of the TD. The TD had not been incorporated, which immediately made the gear non-RFI. The gear had been placed in the packout for the squadron's field-carrier-landing practice (FCLP) for the Jacksonville detachment.

AZ2 Lake's quick actions ensured that a non-RFI piece of support equipment was not issued and used for aircraft maintenance.



**AN Gwendolyn Middlebrook**  
**VAW-120**

Airman Gwendolyn Middlebrook was conducting a C-2A prelaunch inspection and discovered a loose washer and cotter pin stuck in the pilot's seat rail. She notified the flight-line coordinator and quality-assurance representatives. After the FOD was removed, the aircraft met its scheduled launch time. Airman Middlebrook's keen maintenance prowess and swift action averted a flight delay.

# A Little Wetter and A Lot Wiser

By ATAN James Serrano

It was zero dark thirty during the first day of deployment, and I had just woken up from a good night's rest. I carried on with my normal morning routine and proceeded to my work center. After turnover with night check, I gathered my tools, float coat, and cranial for duty as the hangar bay plane captain. I was informed that aircraft 200 would be coming down on elevator 3 sometime soon. "Roger that," I replied and proceeded to the hangar bay. Soon, as I stood next to the elevator, I heard the handler's voice over the 3 MC saying, "Lowering EL 3! Lowering EL 3!" As the aircraft came into view, it was positioned on the forward half of the elevator (closest to the bow).

The safety stations went down as the elevator came to a full stop. I proceeded to the FA-18F to act as a brake rider. After lowering the boarding ladder and opening the canopy, I noticed that one of the wing-fold pins was wrapped up and placed inside of door nine. I knew one of the wing-fold pins was not installed. Initially, I walked to the port side of the aircraft to check for a missing pin and found it properly installed. I then walked under the nose and proceeded to the starboard side. Unfortunately, the station nine pylon obstructed my view and the pitch-black sky prevented me from seeing the starboard wing-fold pin hole. Without realizing where I was standing, I took three more steps toward the wingtip to get a better look, and I walked off of the aircraft elevator.

There wasn't any Navy training that prepared me for what I was about to experience. The sheer impact of hitting the dark cold water after falling 30 feet, while the ship was steaming at 20 knots, not only left me in pain but in utter shock. I didn't know what to do first.

Scream? Yell? Blow my whistle? Inflate my float coat? After coming up for air, I realized that I had to swim away from the ship before a bad situation got much worse. Fortunately, my float coat functioned as advertised when it came in contact with the salt water. I was also extremely fortunate that several individuals witnessed me walk off of the elevator because the MOBI inside of my float coat did not activate. Their expeditious action and quick thinking undoubtedly saved my life. Otherwise, it could have been hours until my absence was noticed. Within a half hour, a blessing came in the form of AW2 Graham Harrison, a SAR swimmer from HS-11, who pulled me out of the Atlantic Ocean.

It's also worth mentioning that during my daily float coat inspection three days prior to this incident, I found that my float coat's CO2 cartridge was punctured. Although the cause of this remains a mystery, that daily inspection saved my life and allowed me to stay afloat until the SAR helo arrived.

I am very fortunate to have the opportunity to share this story with you, and I hope that you can take away a few lessons. I shared them not only with the 39 other plane captains and trainees in my work center, but with the entire air wing. First, inspect your float coat on a daily basis. Second, a "Stop, Think, Do" mindset could have prevented this incident from ever occurring. I should have had better situational awareness of my position on the elevator and applied basic ORM principles. Nothing "routine" ever occurs on the flight deck or hangar bay. Every evolution is a little different with unique hazards and risks. If I had thought about these things prior to this incident, it would have saved me from the Aquaman audition only one week into deployment. ■

*ATAN Serrano is with VFA-211*

# CROSSFEED

**Maintenance Officer**  
LCDR Richard Thousand  
richard.a.thousand@navy.mil

**Editorial Coordinator**  
AMC(AW) Richard Kersenbrock  
richard.kersenbrock@navy.mil

## Tools



## A Recipe for Disaster

By MSgt Steve Dell, USMC

While deployed for seven months aboard an LHD, the Air Combat Element (ACE) Quality Assurance (QA) division acquired 46 tools from the flight deck and hangar spaces. Some tools were collected during FOD walkdowns, while others were collected throughout the day in various spaces. The tools did not have identifying marks to trace ownership.

The Air Boss was briefed on the situation, and the FOD Board meetings got updates on a monthly basis. The ACE QA safety representative recommended at these meetings to implement a tool-control program. The program would require that tools have identifying information and that a check-out/check-in process to account for all the tools would be used aboard the ship. The concept would mirror the process used in naval aviation.

To be effective, the Board recommended that this program be applied to any work space that uses tools, regardless of where work took place. Part of the FOD Board meeting process is to revisit what was discussed the month prior and to communicate the ship CO's comments regarding discussions at the meetings. The briefer at the meetings never received any comments from the CO to share. This situation, while known to everyone, did not help

the process. Much can be speculated, including why those involved in the FOD Board meetings didn't voice their concern to the ship's CO.

It was mentioned at one meeting that the Air Department did not control ship's company. If this was a matter of crossing boundaries or stepping on someone else's toes, then the ship's CO could have mandated tool-control measures across all ship compartments. This problem should have been corrected on the spot when it was discovered during the first month of deployment. A severe deficiency was identified and communicated to appropriate personnel, but nothing was done to put proper and efficient controls into place.



The worst-case scenario is that a poor FOD program can result in injury or loss of life. A piece of debris picked up and projected by rotor wash or jet blast is preventable. The only way to fix this situation is to take action and get leaders involved. Simply talking about it didn't correct anything on the LHD. As maintainers, we must continue to keep a keen eye open for all foreign

objects and remove them from operational environments.

*MSgt Dell is a Power Plants Analyst with the Naval Safety Center.*

# Logs/Records



## The Resources Are There for You

By AZC Marcus Fuller

The implementation of OOMA/FAME (Organizational Level Optimized Maintenance Activity/FA-18 Automated Maintenance Environment) has led to a number of issues faced by Navy and Marine Corps Strike Fighter Squadrons. Fortunately, there are references and resources available to solve these problems.

Software and database resources and technical publications are two issues of concern. One of the greatest resources available to an OOMA/FAME command is located within the required software disks you use. On disk one of your latest IETM (interactive electronic technical manual) release is a “Help” folder that contains guides to help troubleshoot and maintain your database. Most of the problems faced by squadrons can be easily avoided or fixed using these resources. The FAME 1.0 Server Build Manual contains a daily check-

list, a deployment checklist as well as an actual build checklist.

Due to the operational tempo and lack of personnel, CTPL (central technical publication library) assignments are often given to our junior and less experienced maintenance administrators. It’s important to use all available resources to make sure the CTPL adequately determines which technical publications are needed to support the organization, controls receipt and distribution, and keeps publications current and in good condition. The NAVAIR 00-25-100 contains detailed information regarding establishing and operating a CTPL. It also describes the requirements, functions, and responsibilities of personnel assigned to maintain aeronautical technical publications.

*AZC(AW) Fuller is a Maintenance Logs & Records/TD/CTPL Analyst at the Naval Safety Center.*



# ORM

## Maintenance Trends



By AMC(AW) Richard Kersenbrock and MSgt Royce Downing, USMC

As you read through this issue of *Mech*, you’ll notice that we’re highlighting maintenance trends. We have several articles in this issue that discuss these themes, and if you review the mishap stats you’ll see what we’re talking about. Our concern stems from a lack of leadership/supervision and the use of publications.

In the past year we have received four Class C mishap reports of damage to Hornet 64L or 64R doors. This has been a problem for more than 20 years on this

platform. Yet, during this time we have not figured out how to protect the doors on the aircraft during a low-power turn.

By reading the mishap data collected here at the Naval Safety Center via the WESS reporting system, we have found several common causal factors. Those factors include problems with supervision, misuse of publications, improper tools/IMRL, and lack of operational risk management (ORM). Resources are in place to pre-

vent not only this maintenance trend, but all avoidable mishaps. Those resources take care of the causal factors just mentioned. If we had supervision or leadership on each evolution, we would make sure the publications and tools/IMRL were on the job.

Let's take things a step further and discuss the term ORM. We have deliberate checklists available via our website <http://public.navy.mil/navsafecen/>. Use the navigation tabs at the top of our web page and hover over the aviation tab, then select the maintenance safety link. You will find a link to our checklists to use as examples to help in this area. This includes our new

Maintainer/Supervisor/Maintenance Control ORM checklists. All this can be supplemented to help you along with any other required checklists to help you get the job done efficiently and safely.

Let's figure out what we need to do to prevent all avoidable mishaps. Let's stop living by the phrase, "We don't have time to do it right the first time, but have plenty of time to do it again."

*AMC Kersenbrock is an Airframes/Corrosion/Hazmat-Maintenance Safety Analyst and MSgt Downing is an Airframes/Hydraulic Analyst at the Naval Safety Center.*

## HAZMAT

# Globally Harmonized System Hazard Communication



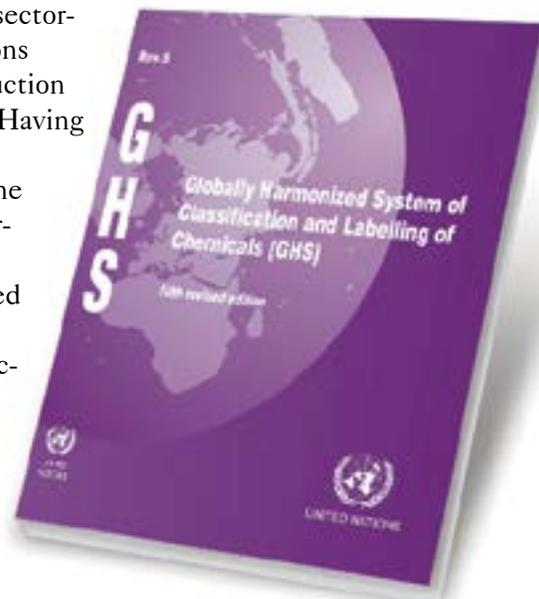
By GySgt John McKay, USMC

There is a new term hitting the streets: GHS. Get used to it, learn it, know it, and love it, because it is here to stay.

GHS stands for the Globally Harmonized System, which deals with the classification and labeling of chemicals. It is a system to standardize and provide a comprehensive approach to define health, physical and environmental hazards of chemicals. The system creates classification processes that use available data on chemicals for comparison with the defined hazard criteria. It also communicates hazard information, as well as protective measures, on labels and safety data sheets (SDS).

The GHS is not a regulation or a standard. The GHS document, also known as "The Purple Book," establishes hazard classification and communication provisions with explanatory information on how to apply the system. The elements in the GHS supply a mechanism to meet the basic requirement of any hazard communication system.

Chemicals directly affect our lives and are essential to aircraft maintenance. The widespread use of chemicals has resulted in the development of sector-specific regulations (transport, production and workplace). Having readily available information on the hazardous properties of chemicals and recommended control measures allows the production, transport, use and disposal of chemicals to be safely managed.



While existing laws and regulations are similar, they are different enough to require multiple labels for the same product within the U.S. and to require multiple safety-data sheets for the same product.

The basic goal of hazard communication is to make sure employers, employees and the public are provided with adequate, practical, reliable and understandable information on the hazards of chemicals, so they can take effective preventive and protective measure.

The table below summarizes the phase-in dates required under the revised Hazard Communication Standard (HCS).

What does this mean to the maintainer? You should already have received training on GHS. Some verbiage is different, and the forms have changed, but the end result should be a universally consistent way of identifying hazardous material and remedial actions should they become necessary.

consistent across manufacturers, and that labels and safety data sheets are more accurate as a result.

- **Labels:** Chemical manufacturers and importers will be required to provide a label that includes a standardized signal word, pictogram, and hazard statement for each hazard class and category. Precautionary statements must also be provided.
- **Safety Data Sheets:** These sheets will have a specified 16-section format.

The GHS does not include training provisions but recognizes that training is essential to effective hazard communication. You'll need to get the training for the chemicals you use.

For a side-by-side comparison of the current HCS and the final revised HCS, please see OSHA's hazard communication safety and health topics webpage at:

<b>Effective Completion Date</b>	<b>Requirement(s)</b>	<b>Who</b>
12-01-2013	Train employees on the new elements and safety data sheet (SDS) format.	Employers
12-01-2015	The Distributor shall not ship containers labeled by the chemical manufacturer or importer unless it is a GSH label	Chemical Manufacturers, Importers, Distributors and Employers
06-01-2016	Update alternative workplace labeling and hazard communication program as necessary, and provide additional employee training for newly identified physical or health hazards.	Employers

**The three major areas of improvement are in hazard classification, labels, and safety data sheets.**

- **Hazard classification:** The definitions of hazard have been changed to provide specific criteria for classification of health and physical hazards, as well as classification of mixtures. These specific criteria will help to make sure that evaluations of hazardous effects are

<http://www.osha.gov/dsg/hazcom/index.html>  
 This information is also available on our Naval Safety Center webpage at:  
<http://www.public.navy.mil/navsafecen/Pages/osh/GHS.aspx>

*GySgt McKay is an avionics analyst with the Naval Safety Center.*



## Application of ORM in Aviation Maintenance Trends

By CWO5 Daniel Kissel

For years, “big Navy” has tried to teach us Operational Risk Management (ORM) so we would apply it in our jobs and off-duty endeavors. However, in a study a few years ago, researchers found that ORM training has only been marginally effective at infusing risk management throughout all the different aviation communities, and maintenance was one of them.

I’ve listened to many ORM presentations, but I’ve never fully understood how to apply the methodology to my avionics expertise.

Maybe it was because we were instructed by pilots who could not relate daily ORM applications to aircraft maintenance. We used the term ORM loosely. When someone was asked about ORM, the most common reply was, “I ORM’d the process.”

But deep down, we knew the term was used to appease the person asking the question, rather than actually understanding what we were talking about.

Then a few months ago, I had an epiphany while reading an *Australian Safety Spotlight* (issue 02 2013) magazine. Finally, I found an article that explained ORM in our maintenance language, and it gave an easy-to-understand application of it. I saw that the concept

would fit nicely into our community with a few tweaks. Our Safety Center analysts set out to produce an ORM product that aviation maintainers could use on the job.

We’ve produced trifolds and posters [see the centerfold pages of this Mech for a pullout poster] that depict three areas of responsibility: worker, supervisor and maintenance leadership. Each product include actions relevant to each position. We’ve tried to depict (by position), how a maintainer can apply risk management on a daily basis

in their job. We are not reinventing or changing any ORM concepts or principles, but we are making ORM easier to understand and implement.

We don’t expect maintainers to memorize each breakdown area, but to be familiar with them

and train to them. We, as leaders, need to sow the seeds for these risk management steps and practices so they become second nature. By reading and understanding these basic questions and steps, we will increase our mission success and help prevent maintenance errors and mishaps.

*CWO5 Kissel is an Avionics Analyst with the Naval Safety Center.*





# Shore Safety Programs

[www.public.navy.mil/navsafecen/](http://www.public.navy.mil/navsafecen/)

Preventing mishaps and managing risks at work and off duty

## FEATURED CONTENT

- "Safety Sigma" Newsletter, Fall 2013  
From the School of Aviation Safety, this issue features several timely articles about the Safety Management System
- Winter Safety Campaign  
We just posted a wide selection of presentations, graphics, handout and brochures, and links to other useful resources for use in your local awareness efforts.
- NAVSAFENVTRACEN Course Schedule  
View course schedule including purpose, scope, pre-requisites and instructional settings (online or classroom)
- OSHA's Hazard Communication Standard Changes  
Check out our Globally Harmonized System (GHS) Toolbox.

## UPDATES, BLOG, PHOTOS AND VIDEOS

- Admiral's Safety Update  
6 December Issue
- E-Blast: November Issue
- Beyond the Friday Funnies: Blog #24: "Faster and Funnier"
- Photo of the Week #549 -- "Why I Hate Slogans"
- New Videos:  
RDML Norton Winter PSA  
Winter Safety Brief
- Impaired Driving Prevention  
Month resources from the Navy and Marine Corps Public Health Center

WESS



STATISTICS



ACQUISITION



ORM



MAGAZINES



VIDEOS



USMC SAFETY



ALSAFE

SafeTips

Photo of the Week

Friday Funnies

Posters



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