CROSSFEED

Cdr. Al Stephens
Head, Aviation Maintenance and Material Division
allen.stephens@navy.mil

ADCS(AW) Gary Dennis
Editorial Coordinator
gary.dennis@navy.mil

MAINTENANCE MANAGEMENT

A Gray World: The Practical Man's Guide to ORM

By CWO4 Donald Borkoski

If everything were in black and white, we wouldn't need a decision process. Everyone simply would follow the book! Most people think aviation is just that clear. An unambiguous approach is our goal, but every maintainer worth his salt knows that our world is made up of varying shades of gray.

How do we operate in a gray world?

We all know the easy answer is to follow the black-and-white rules found in NATOPS, MIMs, instructions, or TPI. What happens when the book isn't clear? That's when the fun starts. For example, can you safely release an aircraft with a popped hydraulic delta-P? The book doesn't say!

We have a tried-and-true process to help make decisions: operational risk management (ORM). For the old skeptics in the fleet, yes, it is a fancy term for what you always have done. We have found that many successful, old skeptics make decisions this way. The ORM process and its steps are designed to help determine where on the gray-scale any hazard falls, so you can make the right decision.

The five steps are a common-sense approach, but, if you skip just one step, you may not make the "success roster."

1. **Identify hazards:** There's a popped hydraulic filter.
2. **Assess hazards:** It resets, it's a bypass filter, good turn check, and good patch test.
3. **Make risk decisions:** Let it fly.
4. **Implement controls:** Write a MAF, tell the aircrew, check it upon return, and check it on the daily and turn-around.
5. **Supervise:** See if it fails again, check for secondary indications, and evaluate the need for closer scrutiny.

Many commands have adopted these ORM techniques, but others have not received the word. OPNAVINST 3500.39A/MCO 3500.27A mandates ORM as our primary decision-making process, and these documents have stated this requirement since 1991. The enclosures in these instructions describe the process in detail.

Everyone in your command should know at least the first and most critical step is to identify hazards—not only at work, but also off duty. Safety always should be first, and everyone should help to identify hazards and to take necessary action.

Put out the word! Give your troops or fellow shipmates the critical-thinking and decision-making tools needed to protect themselves and you. Our world already is full of gray areas; teach and practice ORM to keep 'em flying!

Warrant Officer Borkoski is assigned as the avionics, and ALSS branch head at the Naval Safety Center. He recently reported from AIMD, USS Kearsarge.

For more info…

Visit our ORM website at www.safetycenter.navy.mil/orm/default.htm.

The Naval Safety Center is dedicated to reducing mishaps by 50 percent in two years.

Can You Hear Me Now? Good!

By CWO4 Don Borkoski

Too often, Sailors visit medical and find out in an audiogram their hearing has degraded. Did you know that hearing loss is cumulative and once lost never can be regained? Who is supposed to protect your hearing? The right answer is you!

Your ears are sensitive devices. The outer ear collects sound and channels it to your ear drum. The drum vibrates with the sound and rattles three small bones: the hammer, anvil and stirrup. These items change sound waves into mechanical vibrations in the middle ear. Your inner ear is the most sensitive part of your hearing device. The small bones of the middle ear squish the fluid around inside semicircular canals. The fluid then flows through the cochlea where little hairs called cilia wave around with the fluid motion.

The cilia are full of very sensitive nerves that change that fluid motion into nerve impulses that travel through your auditory nerve to your brain, and your brain then senses *Emme & Emme* with an amplified subwoofer thump.

So what's the problem you ask (Good to hear you're using ORM step 1: identify hazards). The problem is that cilia are very sensitive, and, like seaweed in a storm, they permanently can be bent or broken. When they break or bend, the more hearing you lose. Unfortunately, they don't grow back, and you suffer permanent loss.

Two basic types of noise exist: continuous (sound over a prolonged period of time) and impulse (sound that starts and stops abruptly). Depending on the loudness and duration, both can be harmful.

Loudness is measured in decibels, which is recorded as db. Your cilia can handle impulse noise up to 85db and continuous noise at 85db for eight hours without hearing loss. Any sound or noise louder or for longer durations break or bend the cilia, causing permanent hearing loss.

Did you know that almost daily everyone loses part of his or her hearing? Most lawn mowers, vacuum cleaners, and stereos generate noise from 85 to 95db. Chain saws, power tools, car horns and Harley-Davidson motorcycles with straight pipes range from 110 to 120db. Worst of all, gunshots, jet aircraft, and amplified stereos with high-power subwoofers make noise that exceeds 140db!

Although hearing loss usually is permanent, it is preventable. At home and work, hearing-protection devices and reasonable volume levels on the stereo can dampen continuous and impulse noise to levels that will not damage your cilia.

Hundreds of hearing-protection devices exist and will help. Disposable devices are convenient, but reusable ones work best when you constantly take them in and out. Ear muffs are more comfortable, permanent and best used for double protection. NAVOSH requires double protection for any exposure over 140db.

The best hearing-protection device is the one you'll use. Most devices attenuate noise about 20 to 30db. When two devices are used, the noise is attenuated almost 60db. So it makes sense to keep different devices on hand. A good goal is to use protection to lower the noise level below 85db. An industrial-hygiene survey will tell you the noise levels in different areas. Look for posted signs. Or better yet, just listen. If the noise sounds loud or hurts, you need protection! Keep your cilia up; abstinence is best, but, at least, use protection, and turn that damn stereo down.

Warrant Officer Borkoski is the avionics and ALSS branch head at the Naval Safety Center.

Class C Mishap Summary

By ADCS(AW/SW) Gary Dennis

From May 23, 2003 to Aug. 21, 2003, the Navy had 26 Class C's that involved 28 aircraft. The damage total was $1,297,744.

● An FA-18E was scheduled for a loads test flight. The external fuel tanks on wing stations 4 and 8 were full for this mission. When the flight was done, and, as the plane prepared to return to base, the pilot started to transfer fuel from the external tank to the internal tanks. The airfield was nearby, so all the fuel did not transfer before landing. The aircraft was not refueled after shutdown.

Civilian maintainers had to remove the external fuel tanks to prepare for a modification. The contract team leader knew the aircraft had not been refueled. The external tank on station 8 was about one-quarter full, and a team of six maintainers pre-

pared to download that tank. Two people were on each end, and the plan was to lower it onto the ground-handling lift trailer (GHLT). The maintenance team leader supervised the procedure, and a contractor quality-assurance safety observer prepared to release the tank.

The maintainers on the tank linked arms to support the external fuel tank to lower it approximately six inches to the GHLT, which was extended to its maximum height. As the external fuel tank was released, it fell onto the GHLT.

The maintenance team failed to follow proper procedures outlined in the loading manual, which required them to open the filler cap and to visually check the fuel level. They chose to do a tap test.

This incident damaged the external fuel tank and the GHLT and cost $32,000.

● A P-3C crew was doing multiple approaches to an outlying field. During the third approach and immediately after selecting landing flaps at 300 feet AGL, the mission commander heard a loud bang, and the aircraft's right side began to vibrate. The mission commander took control of the aircraft and went around. After visually checking the No. 3 and No. 4 engines, the observer reported to the flight station that something looked different on the No. 3 propeller, but he wasn't sure what it was. The engine instruments were normal, so, after reaching pattern altitude, the flight engineer went to the navcom to check out the problem. He saw that the No. 3 nacelle was shaking abnormally, and a gap appeared in the No. 3 propeller's arc.

The flight engineer went back to the flight station and saw the No. 3 propeller rpm was fluctuating from 101 to 102 percent. After discussing possible malfunctions and procedural options, the mission commander decided to leave the prop and engine running and to land immediately. He briefed the NATOPS emergency-landing procedures, including steps to follow in case he had to shut down the bad engine on approach or landing.

Aircraft handling was normal throughout the approach and landing, but it changed on the landing ground roll. At about 80 kts, while smoothly reversing with engines No. 1, 2 and 4, the No. 3 engine and nacelle violently began to shake and affected aircraft controllability on the runway. The mission commander called for the No. 3 E-handle and secured the engine. The shaking immediately ceased, and the aircraft taxied to parking without incident.

The propeller EI noted that a visual inspection had revealed an intact anodized coating on the blade shank, but no evidence of foam was found on the blade shank. This condition indicated inadequate surface cleaning or preparation before the foam fairing was poured. Six years had passed since the last depot overhaul, so the reasons for the inadequate maintenance could not be determined. Depot reps stated this type of failure still occurs once every two years. They surmised that an error during the formation process could have weakened the blade-fairing and led to its inevitable failure. When it failed and separated from the No. 3 propeller, centrifugal force caused it to hit and to damage the No. 4 propeller and nacelle. This incident cost $139,583.

Senior Chief Dennis is a maintenance analyst at the Naval Safety Center, and he's the new editorial coordinator for Crossfeed.

I Just Took Over

By ATCS(AW/SW) David D. Clark

We have done quite a few surveys over the years, and the most repeated statement we hear with weak programs is, "I just took over and I'm trying to fix all that is wrong." The survey team will look at every program and can tell when one has been neglected. The team has seen cases where a turnover has just occurred—we check last month's monthly maintenance plan (MMP). We also have heard that excuse when it has been 10 months since turnover, and the program still is neglected.

We often make our first discovery of a weak program when it has more holes than Swiss cheese. We find program binders do not exist, record keeping is poor, and program compliance lacks oversight. It often is hard to understand how a program has existed for such a long time, yet QA has not audited it to force compliance. This phenomena is not limited to smaller programs, like electrostatic discharge program (ESD) or compass calibration, but affects major programs, like tool control, central technical publications library (CTPL), or FOD.

How can you fix this discrepancy? QA must

continue to audit required programs. They must accept nothing less than full compliance with the NAMP and all other pertinent instructions. They must do this using the computerized self evaluation checklist (CSEC) and the Naval Safety Center checklist. QA must note all discrepancies and route findings through the chain of command.

Program managers should fix all problem areas as soon as possible and continuously work all areas of a program to keep it up to date. When necessary, they also should request assistance from inside or outside sources to make their programs effective.

A QAR should follow up all discrepancies and make sure they are corrected, not just covered with a band-aid repair. This approach will prevent programs from going off line at a later time.

If the program manager has questions about his program and does not know where to start, one of the newest tools in their toolbox is something known as aviation maintenance, self-assessment tools. The three types of these tools are aviation program guides, intermediate and organizational maintenance checklists, and process observation evaluation checklists. The program guides cover over 50 NAMP programs and, in layman's terms, provide a tool that can be used to help establish and to maintain an effective program. This item also provides a glimpse at what the survey team looks for on surveys to measure program compliance.

The second item is the Naval Safety Center's intermediate and organizational maintenance checklists. These modified CSEC checklists have additional questions and references from the NAMP, Naval Occupational Safety and Health (NAVOSH), and other pertinent instructions. These tools offer a great way to check a program for compliance.

The third item is the process-observation evaluation checklist (POEC). These POECs are tools that enable squadrons and intermediate commands to self-evaluate during the execution phase of a process and to evaluate program compliance. The POECs also are great for incorporating operational risk management into any program.

These new tools are available for download at http://safetycenter.navy.mil/aviation/maintenance/selfassessment.htm. They will help to keep away the "I just turned over" blues.

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

No Secrets Here

By ATCS(AW/SW) David D. Clark

I don't know next week's lottery number--really, I don't! Nevertheless, the way people take notes when I talk during surveys tends to make me think I might be able to. I don't spout new information from obscure instructions and directives; I quote basic safety guidelines from OPNAVINST 4790.2H, NA 00-25-100, OPNAVINST 5100.23F, and OPNAVINST 5100.19D.

Nothing is new or secretive about these documents. Why do LPOs and supervisors write down every word I say, giving me the "WOW" look as if it's the first time they had heard about a program? The simple items are best. For example, I ask, "Did you know you have to sign for tools before and after each shift in a passdown log?"

This procedure is one of the basics steps of maintenance. Every maintainer should know it as a passdown item, through formal training, as a CDI or QAR, or even from tool-control training. Each person should have this step engrained in memory and always should follow it! The documents I've mentioned provide the reason and source for maintenance policies. Don't simply patronize me because I am in your squadron to do a survey, the supervisor wants to look good, or you want to seem on top of things. Put the guidance from these documents into practice, and your **actions** will convince me you're on top of your game.

Why do I find such furious note-taking? Sometimes it's because we have caught a shop with a lax attitude, but it occasionally is because a supervisor simply is unaware of a new requirement. One person never is solely to blame or at fault for these conditions, and the problems we see aren't only with tool control. Verbal and written passdowns from supervisor to supervisor need to occur on all items and at all levels within your workcenter. Doing inadequate training, ignoring the rules, taking the easy way out, or demonstrating plain laziness all contribute to what we refer to as a that's-how-we-always-have-done-it attitude in our maintenance-malpractice presentations.

Formal training provided through FASO, NAMTRA or NAVOSH schools address these

issues. The instructors at these facilities are not "making it up as they go along," and they don't know next week's lottery numbers, either. It is coming straight from black-and-white references, which is where most young or experienced maintainers first received maintenance training. CDI and QAR training requires compliance with a wing, ship or AIMD PQS syllabus before you can be nominated as a CDI or QAR. I find a large number of the problems with items in that syllabus. These steps are ones maintainers have to be familiar with, need to learn from, and must understand. Don't "gouge" it or get your buddy to "pencil whip" it. Break out the manuals and references, and learn from them. Take notes on what needs to be done, and make it happen!

Workcenter training POs need to document weekly, bi-monthly, monthly, and quarterly training. Keep your records up to date, but, more importantly, do the training. Make it realistic and current with the instructions, references, and command policy. The NAMP lists training formats and requirements. Many commands have instituted five-minute, impromptu training sessions that work quite well with small groups.

I don't have all the answers, but, if you read a little, you can solve your own problems. By the way, try 2-5-15-26-35-41 on the lottery, and be safe.

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

Grieving Families Care About Errors in Math

By SSgt. Van Jones

After numerous surveys at many different squadrons that operate a wide variety of aircraft, I have noticed a poor trend in how hours are totaled on the monthly flight summary (MFS) and equipment operating record (EOR) pages. These errors include flight hours, landings, catapults, and arrestments that are documented on end-of-the-month closeouts or when aircraft, engines, and other subassemblies are transferred and received. These simple math mistakes can lead to serious problems with high-time components and could end with the loss of an aircraft or aircrew.

Most logs-and-records clerks know these errors are not a new problem, but some may not be aware of several maintenance areas that are affected when these pages are inaccurate. Numerous high-time items are tracked in the NALCOMIS OMA database, and they are reviewed, inspected, removed, and replaced based on the times recorded on these pages. For example, an aircraft phase inspection is implemented or "baselined" in NALCOMIS from the flight hours listed in the time-since-new (TSN) column. If those flight hours are wrong in the logbook, NALCOMIS will calculate the wrong interval for the next inspection.

The same principle applies to other event-limited items, such as launch-related components, arresting gear, struts, APUs, guns, and other items not based on flight hours.

I have seen engine and aircraft records with 30-hour math errors, launch bars or arresting hooks off five or 10 hits, and guns off hundreds of rounds. The NAMP states the logbook clerk is responsible for updating and documenting logbook data. I highly recommend at least two different people review these records. A good choice might be an LPO, NCO, or another person with logbook signature authority. It also might be helpful to develop and to use a local spreadsheet for adding and calculating events on the MFS and EOR pages. This program, once initiated, also will make it easy to correct to these pages, and will reduce the possibility of human error.

The technique used to solve this potentially lethal problem isn't critical; just make sure the data on the MFS and EOR pages is accurate, so we can avoid overdue components, aircraft crashes, and dead shipmates.

SSgt. Jones is an analyst at the Naval Safety Center.