

The Navy and Marine Corps Magazine for Afloat and Shore Safety

SEA & SHORE

WINTER 2008-09



IN THIS ISSUE:

Focus on

Hearing Conservation

... plus features on

- ▶ **ORM**
- ▶ **Well-deck ops**
- ▶ **Gasoline safety**



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

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Letter to the Editor

Re: "Airsoft—It's Not for Softies," Fall 2008, pgs. 24-25

I noted many tips in the article on practicing this sport safely, which is important because military people make up a large percentage of airsoft enthusiasts. However, you didn't mention one of the most important safety tips: Follow the legal responsibility of maintaining an orange tip on the muzzle of a firearm replica.

Title 15 of the USC, specifically part 1150, denotes that any BB gun or other imitation firearm must have the orange tip, must be entirely transparent, or must be entirely of a solid, bright color in order to be imported into or transported within the United States. I've come to believe that the spirit of the law is to identify immediately to observers, especially law enforcement, that the weapon is non-lethal. The law doesn't specifically say the coloration/markings must remain after import, and it's common practice for airsofters to remove the markings before use. After all, an orange tip is highly visible and easily could give away your position during a match.

As an avid airsofter, I've had a few close calls with law enforcement. The problem is that most citizens—and some police, too—don't immediately recognize the guns are non-lethal, even with the orange tip.

I once found myself on the wrong end of a 9-1-1 call during an airsoft match. The police came roaring in with real weapons pointed at me, with the safeties off. Since that time, I've adopted the practice of keeping the orange tip on, and if the match calls for it, I'll cover the orange with black tape or a plastic muzzle cover.

Not behaving recklessly or threateningly with an airsoft weapon is a must. Always carry your weapon out of plain sight, play only on remote properties with owners' permission (notifying the neighbors also may be a good idea), and never point or brandish a weapon at a person who might not know it's an airsoft weapon. If any sort of law enforcement arrives, immediately comply with their demands. Put the weapon down and don't touch it again until they leave.

You also need to know there may be local community, state or military-installation regulations regarding airsoft. Many bases require that airsoft devices be stored at a unit or base armory and that they be registered, much like a normal, personally owned firearm. Some states mandate the colored markings at all times. Research of local laws absolutely is essential.

Finally, you need to be aware that many cases exist of people committing crimes with airsoft weapons painted black, and when they get caught, they don't get off the hook just because they were using a fake gun. A first-degree robbery charge may get reduced to second-degree robbery if it's proven a fake gun was used. However, the weapon still "appears" to be real, a felony still is involved, and the crime still is punishable by up to 15 years in prison.

Brandishing a weapon, even if it's obviously fake, can be a real mistake in the heat of the moment. Most cops won't hesitate to apply lethal force in such a situation. In Florida, for example, a sheriff's deputy shot and killed a 15-year-old boy who pointed a plastic pellet gun at him. The responsibility is on you, the airsoft owner or player, to be safe and to be legal.

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FRONT COVER

A Sailor watches an FA-18F Super Hornet climb steeply after takeoff.
Photos by PHAN Milosz Reterski and Andrew Clarke,
Manipulation by Patricia Eaton

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Noise Control

A 100-Year-Old Problem

By Mark Geiger, M.S., CIH, CSP,
OpNav Safety Liaison Office

Noise is the most prevalent occupational health hazard, affecting millions of people in various work locations. It has been known at least 100 years that excessive noise exposure can result in permanent hearing loss. Noise-induced permanent threshold shifts affect 10 to 20 million people in the United States alone. Approximately 600 million people worldwide are exposed to occupationally hazardous noise levels. As an example, construction work commonly exceeds the noise levels that require use of hearing protection, thus creating a risk of permanent hearing loss in unprotected workers.

Relationship between noise exposures and hearing loss. A clear association has been established between unprotected noise exposure and the probability and severity of permanent hearing loss. Literally millions of industrial workers and thousands of test subjects around the world have demonstrated this

relationship. Studies show a dose-response relationship between the noise exposure of unprotected populations and their rate and severity of permanent hearing loss.

Military noise exposures and associated hearing loss. The Department of Defense is among the world's largest industrial-maintenance operations. All the noisy operations common to shipyards, aviation depots, and vehicle and facility maintenance are performed by military, civilian and supporting contractor personnel. Additionally, operation of military vehicles, ships, aircraft, and other equipment creates a variety of noise exposures.

Weapons firing both during training and combat operations add significantly to potential personnel exposures. The short but intense "impulse" noise has different occupational exposure criteria from continuous "steady state" noise exposures common to opera-

An aviation boatswain's mate directs the launch of an AV-8B Harrier.



Navy photo by PH3 Angel Roman-Otero



Navy photo by PH3 Erik K. Siegel

Outfitted with Mickey Mouse ears, an engineman adjusts the No. 1 main-propulsion boiler aboard an amphibious assault ship.

tions of machinery or vehicles. Special care in using protective equipment is essential during exposures to weapons firing because of the potential for acute injury to eardrums and the potential for damage to the hearing mechanism in the inner ear, resulting in a permanent reduction on sensitivity to sound.

The range of exposures common to Navy and Marine Corps operations show that many exceed the level of sound attenuation provided by currently available protective equipment.

Special issues in military settings. These factors create particularly intense exposures in military settings:

- The range of industrial maintenance and support operations.
- Weapons firing and explosives/ordnance use.
- Lack of consistent attention to noise controls in design requirements.
- Limited time for “quiet” periods (without exposure) for shipboard personnel, where long-duration work shifts and noisy berthing areas may limit the opportunity for recovery.
- Silence (or at least relative quiet) retains its military importance and has contributed to major

technology investments that surface ships can use with limited additional cost or development.

Military and civilian populations exposed.

Military personnel in deployed/operational settings, particularly in aviation, shipboard and combat support roles, are commonly exposed to high levels of noise. The overall rate of significant threshold shifts recorded for personnel in the hearing-conservation program via the DOEHRS-HC (Defense Occupational and Environmental Health Readiness System-Hearing Conservation) database is approximately 15 percent, although significantly higher rates of reported hearing loss may exist in specific occupations.

Veterans Administration (VA) compensation indicates extent of problem. Tinnitus (ringing in the ears) and hearing loss are the No. 1 and No. 2 diagnosed impairments for the VA. The combined bill associated with all services in 2006 was approaching \$1.4 billion. Although the eligibility for hearing aids is



Navy photo by PH3 Jordon R. Beesley

These Sailors are required to wear both goggles and hearing protection for a weapons-familiarization fire.

relatively lenient, the degree of functional disability linked to eligibility for compensation is significant. The threshold for 10 percent VA disability and a related limited compensation is a bilateral hearing loss of more than 56 dB—approximately the sound level of a normal conversation. Financial impact, though, doesn’t reflect the human effect of hearing loss. A person who qualifies for this type of compensation, or the civilian equivalent, almost always is greatly impaired in their ability to communicate with those around them (especially in a crowd or presence of background noise), to enjoy the subtleties of music, or just to listen to the sounds of nature. ■

Initiatives To Address Noise Exposures and Hearing Loss

By Mark Geiger, M.S., CIH, CSP,
OpNav Safety Liaison Office

Progressive quieting (to control ship noise, both for tactical reasons and for control of occupational exposures) has been applied to the Navy fleet over many years, often at great expense. Expertise in “signature” detection and control, developed in the submarine and parts of the surface community, has created resources that can be applied throughout many fleet areas. Technologies developed for civilian applications can and should be adapted for use in military settings. (See the Naval Safety Center website—www.safetycenter.navy.mil/acquisition—for a discussion of the technologies relevant to shipboard noise control.)

The Army Center for Health Promotion and Preventive Medicine and others throughout DoD have worked for years to convey the military importance of noise control. The combat arms earplug, which can be used alternatively to control steady-state or impulse noise, was one result of such R&D efforts.

Development of improved equipment, such as communications earplugs (a miniature microphone encapsulated by a compressible earplug, which can be inserted into the ear), improves communication and provides for double protection when combined with circum-aural ear muffs. This overcomes the need to increase comms-system levels greatly to communicate. These earplugs soon may be approved for certain Navy applications, (e.g., usage in combination with standard aviation helmets).

Another technological advance is active noise cancellation, which involves use of rapid-response electronic devices, coupled with in-ear microphones that insert “negative” (opposite) sound pressures to cancel incident sound sources. This technology sounds like science fiction, but it is usable in some applications and will be a feature for advanced hearing protection to be deployed for aviation-support personnel to use during aircraft-carrier operations.

The joint strike fighter program is collaborating with NavAir (PMS 202) to develop and deploy advanced hearing protection for aviation-support



Noise-level readings are taken in the machine shop aboard an aircraft carrier.

Note: It appears both people here are wearing ear protection; if not, they should be. According to a subject-matter expert at NavSafeCen, the lathe being used should have a machinery guard. The IH (in white shirt) should not be standing directly in the plane of rotation of the material at the cutting surface.

personnel (see “When Pigs Fly: A New Cranial Coming in 2010” later in this focus section).

The NavAir propulsion directorate has been exploring technology to reduce jet-engine noise. The current focus is on retrofitting existing jet engines with exhaust-nozzle fins, which have the potential to reduce noise levels by 50 percent. NASA, FAA and civilian academics and industry have collaborated in this and other projects. Long-term research will be needed to integrate noise-control technology into future designs.

The recently updated Navy System Safety Policy (OpNavInst 5100.24B) has guidelines for noise control in new systems and equipment. Noise-control technology has the potential to increase stealth (make hostile detection more difficult), reduce environmental impacts and costs, improve communications critical to warfighting effectiveness, and protect the long-term health and morale of military and civilian personnel. ■

Properties of Sound

By Mark Geiger, M.S., CIH, CSP,
OpNav Safety Liaison Office

When we hear sound, our ear is responding to very small changes in air pressure, typically created by moving airstreams or vibrations of solid objects that create rapidly changing positive and negative (oscillating) pressure waves. The pressure changes associated with most sounds are much smaller than the units we typically use to measure other pressure forces, such as the pressure inside a vehicle tire, blood pressure, or even changes in air pressure linked to shifts in the weather.

Hearing basics. The range of frequency (pitch) perceived by a person with normal hearing ranges from about 20 to 20,000 cycles per second. Many animals can hear sounds at frequencies higher or lower than humans.

Human hearing is most sensitive at those frequencies (pitches) that tend to be more useful to our activities—speech perception, for example. Hearing sensitivity is greatest (we can hear sounds of lowest intensity) at approximately 1,000 cycles per second, equivalent to middle C on a piano. Sensitivity to sounds of higher or lower pitch is less and drops off gradually until a normal person cannot hear any sound at frequencies above 20,000 or below 20 cycles per second.

How to tell if it's too noisy. Few people report to work with a sound-level meter. However, some general indications can be used to identify noise-hazardous situations and equipment:

- Is the area, operation or equipment posted as noise-hazardous in accordance with DoD/Navy regulations? Certain locations, such as the exterior of combat vehicles, are likely to be noise-hazardous without being posted. (Bright, orange signs are inconsistent with good camouflage.) However, relevant manuals and the guidelines that follow should provide good indications.
- Is it necessary to significantly raise your voice to communicate at approximately arm's length (about 1 yard/1 meter)? If so, the sound level likely is in the range of 84 dBA or higher. Use of protective equipment is warranted.
- Do you or your colleagues notice symptoms of acute noise exposure/temporary threshold shift during



Navy photo by MCSN James R. Evans

The industrial hygiene officer aboard an aircraft carrier in overhaul shows the sound-level-meter reading he's getting on the ship's flag bridge.

or immediately after work in the area? Symptoms may include ringing in the ears, difficulty in communication, and raised voice levels.

Speech range and why frequency matters. Most human speech occurs in the range of 500 to 4,000 cycles per second (hertz, Hz). The fundamental frequency of men's voices tends to be lower in the range, whereas women and especially children tend to project in the upper end. Regardless of the fundamental frequency, the components of individual speech sounds play a vital role in communication.

Vowel sounds (a-e-i-o-u) and some consonants/consonant combinations (such as r-g-gr-h-k) tend to be at the lower pitch range. If you say these sounds while gently feeling your throat, you may feel a low-pitched vibration. On the other hand, most of the consonants might be called “soft” or “windy” sounds because they are formed by subtle air movements across the tongue and teeth. If you listen while forming sounds such as those represented by the letters th-s-f-t-p-ts, you will notice that these are both higher pitched and formed in the front of the mouth. The “windy” consonants often are the sounds that help differentiate one word from another (examples: hiss vs. his, that vs. sat).

Effect of noise exposure. Noise exposure above occupational limits is associated with creating a shift in hearing acuity, typically measured as the softest sound audible at a given frequency (pitch). Initial shifts likely are to be temporary, and subjects typically recover all or most of their hearing after a certain period of time. A ringing in the ears and/or increase in the lowest level of sound detected during and immediately after unprotected noise exposure is a common symptom of temporary threshold shift. Change in voice volume immediately after exposure (typically as noticed by observers with less exposure) or a change in the volume of a car radio after work exposure also are likely indications of a temporary threshold shift. (See if the volume on your car radio seems very high when you drive to work the day following significant noise exposure.) However, initial temporary threshold shifts in hearing acuity likely will be followed by a permanent change in acuity, described as permanent threshold shifts.

Initial changes in hearing loss (temporary threshold shifts) are likely to become permanent unless further exposures are controlled. There is no medical treatment or cure for permanent noise-induced hearing loss.

Monitoring audiograms (hearing tests) typically is done without noise rest to determine if the hearing of a noise-exposed individual is being affected. Follow-up audiograms are conducted after 14 or more hours without noise exposure to rule out the effect of temporary threshold shifts, or are repeated after a threshold shift is measured to verify the shift is permanent.

The rate of hearing loss depends on factors such as the **intensity** of noise, its **duration**, the opportunity for quiet rest periods (audiological recovery) between exposures, and individual sensitivity. Reduce the noise exposures where possible, and ensure people use hearing protection when noise control is not possible or fully effective.



A Sailor takes his annual hearing test.

Regardless of the frequency spectrum of noise exposure, noise-induced hearing loss usually occurs first in a frequency of approximately 3,000 to 6,000 cycles per second. The extent of noise-induced hearing loss will progress and affect other frequencies unless exposures are controlled. Because initial hearing loss occurs at frequencies at the higher end of the speech spectrum, changes in these regions serve as initial indicators before communication is impaired severely.

Noise-induced hearing loss also is often accompanied by tinnitus, a sound perception often described as “ringing in the ears.” The mechanism of tinnitus isn’t fully understood but appears to be a neurological response associated with damage to components of the inner ear. Tinnitus takes the form of a high-pitched whining, buzzing, hissing, humming, or whistling sound in some patients. It also sometimes is described as a ticking; clicking; roaring; crickets, tree frogs, or locusts tunes or songs; or beeping. Some have described it as a whooshing sound, as of wind or waves.

Tinnitus may be temporary or a permanent condition, in which the ringing sounds never stop, even in quiet environments. Unlike hearing loss, which results in a lack of sensitivity to sound, tinnitus can become an incurable, continuous, 24/7 reminder of past noise damage that **never** goes away.

Steady state versus impulse noise. Most common noise sources are described as “steady state,” or fluctuating relatively slowly in volume. Most machinery noise is described as “steady state.” Some noise sources, particularly gunfire, explosive blasts, or impacts occurring rapidly, are considered impulse noise because of their rapid increase in intensity and

quick decline. In general, noise sources with sharp peak levels occurring less often than once per second are considered as impulse noise. Occupational exposure limits are different for impulse and steady-state noise. It is, if anything, even more important to use hearing protection in the vicinity of impulse noise, such as gunfire, because of the risk of permanent hearing loss associated with even a few unprotected exposures to high levels of such noise.

Other impulse noise effects. Very high transient pressures can create effects beyond those produced by relatively less intense impulse noises. The most common effects of noise exposure are on the hearing mechanism within the inner ear. However, intense blast impacts physically can damage or even rupture the eardrum. Unlike other noise-induced hearing effects, a ruptured eardrum typically is acutely painful. Luckily, an eardrum, unlike other components of the inner ear's hearing mechanism, may heal, or, like the ossicles, can be repaired.

Other effects of noise—general stressor. Noise is considered a general stressor, with other physiological impacts besides hearing loss. Effects may include increased distraction (impaired task performance), increased blood pressure, sleeping problems, and a general increase in stress. The Canadian Center for Occupational Health (<http://www.ccohs.ca/oshanswers/>

[phys_agents/non_auditory.html](#)) provides a layman's review.

Off-duty and recreational noise exposures.

Noise exposures on and off duty are interactive in their potential impact on hearing loss. Recreational activities such as hunting, target practice, and listening to excessively amplified music create noise exposures that may contribute to hearing loss. Additionally, noise exposure during work may contribute to a temporary threshold shift that stimulates users of MP3 players or even car radios to increase the sound volume to potentially hazardous levels. Even more hazardous is the use of headsets at very high volumes to drown out surrounding background noise. The same common-sense approaches should be used to limit both recreational and on-duty noise exposures:

- Limit the volume where feasible. Users should be sensitive to the volume of amplified music and pay attention to the same warning signs that suggest excessive volume in the work environment (ringing in the ears after use, speech interference, and sound intensity that distorts the quality of music). Consider purchasing relatively quiet tools and equipment for such appliances as lawnmowers and power tools.
- Use protective equipment where the sound level can't readily be limited. Activities likely to require use of personal protective equipment include the use of lawnmowers, chainsaws, and recreational shooting. ■

Myths and Misunderstandings

By Mark Geiger, M.S., CIH, CSP,
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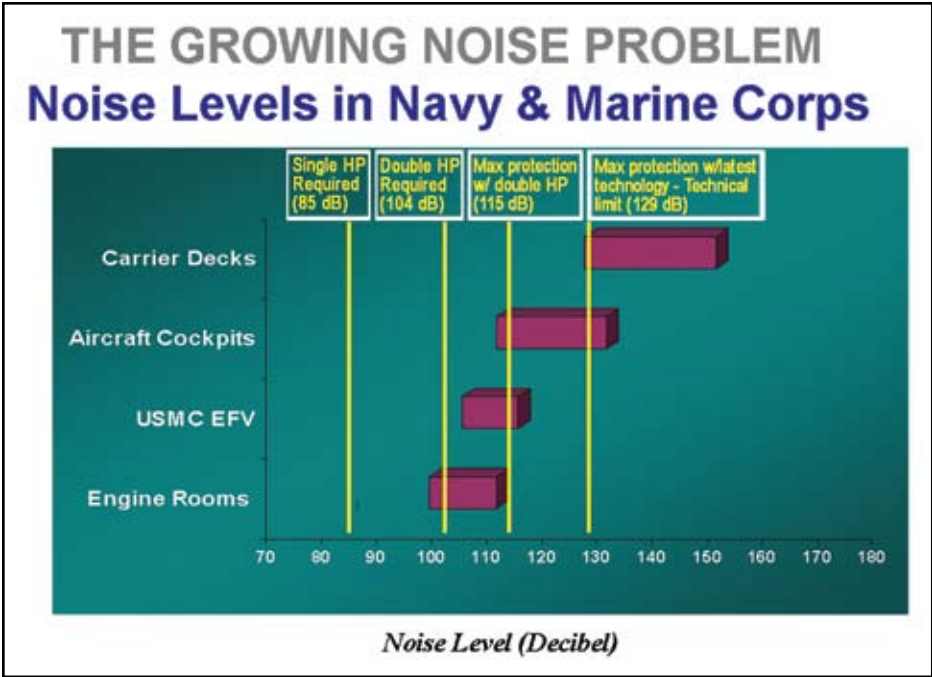
There are many common misunderstandings about noise, hearing conservation, and measures to control noise exposure. Any effective educational program needs to confront these unrealistic impressions, as well as other stereotypes, directly and honestly.

Myth 1: “You get used to noise exposure.” The exposed individual **doesn't** get used to the exposure. The loss of hearing simply increases the threshold of hearing perception, distorts clarity of communications, and thus reduces the apparent intensity of noise exposure. Hearing loss continues as exposure is sustained.

Myth 2: “Hearing aids will correct hearing loss—just turn up the volume.” This is not true because of the distortion in the spectrum and clarity

of sound reception that accompanies noise-induced hearing loss. Also, tinnitus, or ringing in the ears, (as discussed in preceding article, “Properties of Sound,”) often accompanies noise-induced hearing loss and has no known treatment.

Details. Hearing loss affects the threshold of sensitivity at 3,000 to 4,000 Hz (cycles per second), regardless of the frequency spectrum of the noise to which a person is exposed. The threshold at this range continues to increase as surrounding frequencies become affected. Noise-induced hearing loss also is accompanied by a distortion in the clarity of sound, as well as reduced capability to differentiate between multiple sound sources. The consonant sounds that differentiate one word from another (s-t-th-f) are



much improved by protective equipment.

For individuals with normal or near-normal hearing, the use of hearing-protection devices (HPDs) actually will make listening easier because the high-intensity distortion will be lessened.

In specialty applications, where sound attenuation with minimal change in frequency distortion is necessary, custom molded earplugs may be required. As an example, members of the service bands are fitted with custom molded earplugs to protect hearing but preserve certain frequency characteristics.

at the upper end of the speech frequency and are affected before the broad “flat” vowel sounds (a, e, i, o, u).

Social effects. A person with occupational hearing loss often will have difficulty distinguishing between words. Such distortions are thought to account for some of the difficulty that people with hearing loss have in separating conversations in the presence of background noise—the so-called “cocktail party effect.” A common complaint among victims of hearing loss is that “I can hear the sound but can’t understand the words.” Simply turning up the volume won’t solve that problem. Many people with hearing loss complain of social isolation and the inability to understand and communicate with their children or grandchildren who, of course, speak in a higher pitched range.

While hearing-aid technology has advanced greatly in the last few years, no artificial system can replace the marvelous, intact hearing mechanism.

Myth 3: Hearing protection will impair monitoring of surroundings, communication, and reception of warning signals.

Fact: Hearing protective equipment will modify the frequency of sound heard by the listener. Those with a significant amount of hearing loss will experience a change in how sounds are perceived. The sounds of operating machinery and detecting changes that signal possible trouble require some on-the-job experience. There may be some degree of relearning required when hearing protection initially is used. However, the ability to keep hearing these sounds is

The ability to detect faint sounds in a combat situation may be critical to survival. This fact has discouraged use of hearing protection in the past. However, development of the combat-arms hearing earplug permits virtually unimpeded sound detection, while providing protection against impulse noise (e.g., explosions).



Even a powerful hearing device like this one can’t replace the marvelous, intact hearing mechanism.

Myth 4: Protective equipment is more effective and economical than engineering controls.

Even safety-conscious managers and engineers often overestimate the effectiveness of using protective equipment to manage occupational exposures. The limitations of relying on protective equipment as a primary means of noise “control” must be confronted because of common misunderstandings related to the effectiveness of this approach. The high rate of hearing loss among military and associated civilian workers, despite the organizational presence of an aggressive hearing-conservation program in DoD, highlights why we can’t rely solely on protective equipment, educational support, and medical-monitoring programs. Numerous studies have documented that the “real world” effectiveness of hearing-protective devices

are considerably less than the optimal noise-reduction rating obtained in laboratory settings on manikins.

Use of protective equipment requires constant training, reinforcement and continuous procurement, and program-management requirements (SOPs, instructions, and all the other onerous paperwork necessary to support any compliance-oriented program). It also requires medical monitoring and time-consuming involvement of human resources that no manager has in sufficient quantity. Procurement and selection of protective equipment often provide inadequate or even wrong types of gear. (This is somewhat less true of hearing protective equipment than other categories of PPE because of the tighter management and logistic controls imposed to address past problems.) Engineering controls require some maintenance but tend to be relatively permanent. ■

Where Do We Go From Here?

By Mark Geiger, M.S., CIH, CSP,
OpNav Safety Liaison Office

Fleet representatives must continue to raise issues associated with noise exposure, as well as other safety and health concerns, through appropriate channels, with support of safety and medical communities. The need for quieter systems and equipment needs to be communicated and supported in the requirements for design/acquisition of new systems and equipment as a necessary capability.

The medical and scientific community must communicate the relevance of noise exposure, hearing loss, and related communication effects in a language that has relevance to the operational military. Sometimes, reformulation of the communication, e.g., “translation” from medical effects to an explanation of military significance is needed.

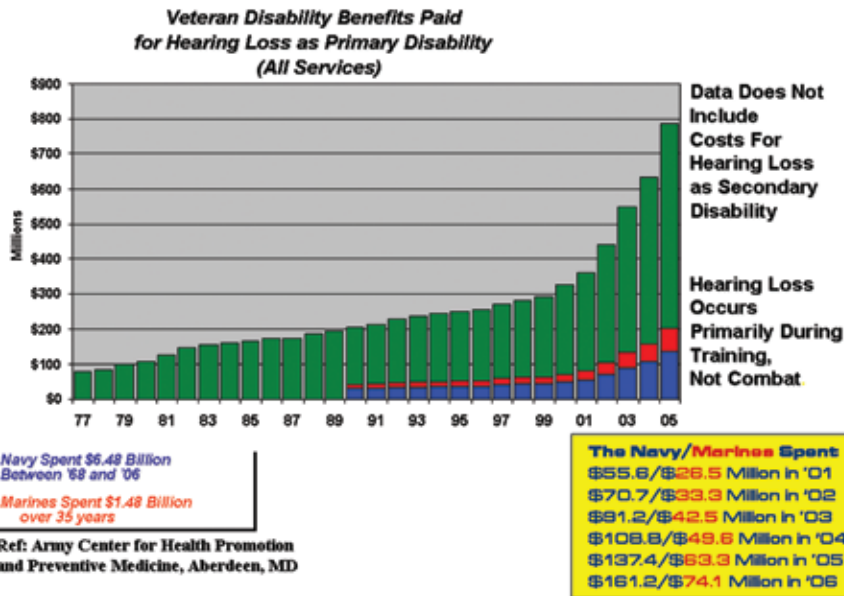
Designers and developers of new military systems



“The need for quieter systems and equipment” —not just applicable to the silent service.

Navy photo by PH1 Robert R. McRill

Steps Must Be Taken to Reverse the Trend



and equipment must consider noise control as a necessary performance capability and a part of the systems-engineering process.


Personal responsibility for self-protection (use of existing systems and equipment) will retain a critical importance for the foreseeable future. Simple measures are critical to maintaining the effectiveness of protective equipment. Here are some important aspects to include:

- Replace worn seals on earmuffs, and perform routine maintenance on items such as the aviation cranial or flight helmet.
- Keep your personal hearing protection serviceable. Replace disposable hearing protection after one or two uses, pre-molded plugs on an annual basis, and custom plugs as necessary. Check and replace the seals on mickey-mouse ears when they become hard or cracked. Typically, HPDs should be checked in association with audiometric (hearing) testing.
- Insert earplugs correctly. Disposable earplugs must be rolled/compacted before inserting. Follow the instructions that accompany the individual plugs, making sure they fully seal the ear canal.
- Encourage shipmates to use and maintain protective equipment as part of readiness, comfort and long-term health.

A strong leadership role in supporting hearing-conservation programs contributes to readiness and protection of personnel. Navy leaders up to the CNO level have demonstrated their commitment. At the

fleet level, support for hearing conservation is a managerial responsibility. It should be demonstrated by measures such as using protective equipment during inspections of various noisy work areas, ensuring that assigned personnel have and use protective equipment, and supporting attendance and training and medical monitoring.

Communication for life on and off the job (role of family and friends). The sounds around us are vital to communication with the outside world. Hearing loss creates subtle impact on the ability to hear and understand communication from those around us, both on and off the job, particularly with family members and friends. In fact, family members

often are the first to notice the impact of hearing loss on persons with occupational noise exposures. Because hearing loss progresses with age and continues even after noise exposure ceases, communication problems continue to affect older persons most significantly. Protecting your hearing now will help maintain contact with those around you for life. Family and friends can help protect those closest by reinforcing the importance of protecting hearing on and off the job. 

Hearing conservation in the military continues to be critically important toward ensuring force health protection and preserving hearing readiness of DoD personnel.

Resources:

- Naval Safety Center acquisition website, www.safetycenter.navy.mil/acquisition (see sections on noise and shipboard ventilation)
- Navy and Marine Corps Public Health Center, <http://www-nmcphc.med.navy.mil> (click on "Hearing Conservation Home Page")
- U.S. Army Center for Health Promotion and Preventive Medicine, <http://chppm-www.apgea.army.mil/hcp/default.aspx>
- NASA, <http://ohp.nasa.gov/topics/hear-cons/index.html>
- Acoustical Society of America, <http://asa.aip.org>
- Transactions of the 2001 Military Noise Conference, Baltimore, Md., April 24-25, 2001, http://chppm-www.apgea.army.mil/imnc/Hearing_Consevation/HC_Presentations.html

From Dual-Purpose Protection to No Protection



Some Marines were issued a \$7.40 pair of these double-sided combat-arms earplugs (CAEPs). However, they weren't told how to use them. The result: Some cut the plugs in half, while others used the wrong sides, making the devices nearly useless.

CAEPs are designed to provide two types of hearing protection in modern military environments. They ensure that neither mission performance nor individual hearing capability is compromised. Insert the yellow end of the plug into your ear for use with weapons fire/explosions in the dismantled mode. Insert the olive drab plug into your ear for use with steady noise, such as aircraft, vehicles and watercraft.



If You Don't Know, Ask Someone!

Your Only Chance for a One-Time Good Deal

By Tom Hutchison, MA, MHA,
N&MC Public Health Center

Are you interested in doing something that could increase your effectiveness, improve your chances of survivability, reduce the stress in your daily life, and help preserve your quality of life—now and in the future?

Relax. I'm not making a pitch for an enhancement drug; there's no medication involved. I'm talking about what you can do to avoid becoming one of the more than 30 million Americans who are affected by hearing loss. Besides its undesirable distinction as the most common occupational disease, hearing loss also is the second most self-reported occupational injury in the country.

The Four Ps

Perhaps you're one of those who seem to hear fine when it's quiet, but as soon as two or three people start talking, it's like you've been transported to the cantina in that pirate city on the planet Tatooine. You begin missing out on what's said, and you feel left out. Maybe you also notice that, after being around loud sounds, a ringing develops in your ears—one that progressively takes longer to go away, or doesn't go away at all. It's also possible that family members and close friends complain that, despite your other fine qualities, you keep the volume on the TV or radio too high, or you talk too loudly.

If any of these symptoms sound familiar, and if you have a history of noise exposure, you may be developing or already have a noise-induced permanent *threshold shift*, or NIPTS, as many call it. A threshold shift is just a fancy way of saying that the quietest level at which you once could hear (your threshold for hearing) has changed significantly—for the worse. It's important to understand the condition is *painless*, *progressive* and *permanent* but, fortunately, **preventable!** To keep it from worsening, you need to take action—now.

A single event, like being near a gunshot or an explosion—hopefully not on the receiving end—can

cause hearing loss, discomfort or even ear pain. Most hearing loss from noise, though, involves no pain and occurs gradually. When people with normal hearing are overexposed to noise, they might experience a feeling of stuffiness in their ears, reduced hearing, and a ringing sound called tinnitus. At first, the ears experience a temporary threshold shift (TTS). Such a change in hearing usually clears up after a period away from the offending noise—the next day, in most cases. The problem is that, with repeated overexposures, you recover less and less, and the loss no longer is temporary. The amount of hearing damage and how fast it develops depends on three things: loudness of the noise, length of the exposure, and individual susceptibility.

The lack of discomfort found with a gradual hearing loss is unfortunate because most people don't notice and/or heed the more subtle signs (e.g., stuffiness or ringing in their ears). By the time they recognize a significant change, it's too late to reverse what they've lost.

Most of the noise that damages hearing is at a level that might be described as loud, but many might not consider it to be hazardous, even though it may be. A good rule of thumb to protect yourself around noise is to observe the **3-foot rule**: *If you have to significantly raise your voice to be heard and understood at arm's length (3 feet), then the noise potentially may be damaging. You need to block the noise or get away from it.*

Two things happen with both temporary and permanent threshold shifts. You lose sensitivity in the higher frequency range that gives so much meaning to speech, and you lose overall loudness. Both are needed to make sense of what one hears. Consider this example: “-i-- -re ---n -rom --ore.” It doesn't make much sense, right? The reason is that removing the high-frequency letters from words is like removing the high-frequency sounds from speech; you need more clues. When you put back the high-frequency letters (high-frequency sounds), the meaning becomes clear right away: “*Fish are seen from shore.*”

Now, take the same limited information, “-i- -re ---n -rom --ore” and reduce the intensity, as well: “-i- -re ---n -rom --ore.” This example shows you what it’s like to listen to speech with a high-frequency hearing loss. Add an increase in competing background noise to the reduced information and volume, and you have a situation similar to trying to read the preceding smaller sentence fragment on a computer screen in bright sunlight.

Hearing: An Important Survival Mechanism

Many after-action reports demonstrate reduced performance and loss of command and control due to poor communication. The ability to hear clearly is a lot more than just a convenience in our everyday lives. It can be invaluable in a life-threatening situation. Good hearing is critical to protect yourself and your team members. It’s important that you protect yourself from both temporary and permanent changes in hearing. *[See the accompanying chart that shows what happens when a hearing loss is introduced into a simulated combat situation.]*

How Noise Relates to Stress

Sudden loud noises trigger a “startle reflex,” referred to as a fight or flight response. This reaction provides a higher state of awareness, adrenaline release, increased respiration, etc. The response helps us confront or avoid an imminent threat, but it also can stress the body. Studies of general populations indicate that some people tend to have shorter, more stressful lives if they live with chronic noise exposure. The World Health Organization and others who have studied noise and its effects on the body have found routine associations with elevated blood pressure, increased irritability, and headaches.

Hearing Worsens As We Grow Older

We also have to concern ourselves with what happens to our hearing as we age. According to the National Association of Deafness and Other Communication Disorders, approximately 30 to 35 percent of adults between 65 and 75 years of age have a hearing loss; above 75 years, 50 percent have some loss

Marine Corps photo by Cpl. Chris Lyttle

A Marine shields his ears from the blast during a firing exercise. A single event like this seldom does much more than cause temporary discomfort or pain. Continued exposure, however, can cause permanent hearing changes.



Hearing Loss Degrades Combat Performance— Word Intelligibility

Effect on Simulated-Combat Performance Tests	Good Hearing	Poor Hearing
<i>Time to Identify Target</i>	40 sec	90 sec
<i>Incorrect Command Heard by Gunner</i>	1%	37%
<i>Correct Target Identification</i>	98%	68%
<i>Enemy Targets Killed</i>	94%	41%
<i>Wrong Target Shot</i>	0%	8%
<i>Tank Crew Killed by Enemy</i>	7%	28%

Ref: Tank Gunner Performance and Hearing Impairment
(Garinther & Peters, Army RD&A Bulletin 1990, Jan-Feb 1-5)

of hearing. Hearing loss due to aging is a condition known as presbycusis.

Premature aging of hearing is accelerated by unprotected or under-protected exposure to high-intensity noise. Many young adults have noise-related hearing loss that matches what those in their 70s or 80s have. In the prime of life, they are experiencing all the problems of someone much older, and as they age, their ability to hear will grow much worse much faster.

What To Do

The way to avoid both temporary and permanent noise-induced hearing loss is to protect yourself. Avoid high-intensity sounds when you can, and try to find ways to quiet the noise you need to be around. Maintain equipment to reduce vibrations, squeaks and squeals. Implement or suggest ways to modify operations to eliminate unnecessary noise. Use appropriate, well-fitted, well-maintained hearing protection every time, all the time, when you can't avoid loud sounds. Even if you already have hearing loss, protective devices will keep it from getting worse. Get your hearing checked and complete follow-up testing if you do have a change.

Consult your local audiologist or hearing-conservation technician for information on hearing testing and hearing protection. An excellent source of information on hearing protection and the noise levels you may be exposed to is your safety officer or industrial hygienist. See your medical officer for any ear pain or pressure, dizziness or stuffiness. S

Resources:

- Navy Occupational Audiology and Hearing Conservation, http://www-nehc.med.navy.mil/ocmed/index_audiology.htm
- Hearing Conservation Program Lesson Guide #2, <http://safetycenter.navy.mil/presentations/training/shore/sourcefile/hearing.ppt#256,1>, Hearing Conservation Program Lesson Guide #2
- System Safety Implications and Applications of Noise Evaluation and Control in Military Ships, <http://safetycenter.navy.mil/acquisition/noise/ship-noise.PDF>
- Hearing Conservation Program, <http://safetycenter.navy.mil/presentations/training/afloat/sourcefile/hearconserve.ppt>
- Acquisition Safety—Noise, <http://safetycenter.navy.mil/acquisition/noise/default-old.htm>

When Pigs Fly

A New Cranial Coming in 2010

By Jim Janousek and Valerie Bjorn,
Staff, NavAirSysCom

“Good enough” often becomes the basis for “the way things always have been done.”

In the case of the current flight-deck cranial, what was good enough for maintainers’ heads and hearing protection in the 1950s no longer is good enough to keep them safe in 2009.

The first generation of today’s flight-deck cranial was designed by Capt. Ralph L. Christy, Jr., a Navy flight surgeon, and David M. Clark, of the David Clark Company. That original cranial-helmet system used “Mickey Mouse” earmuffs to protect against the twin Westinghouse J34 turbojet engines of the F2H-2 Banshee. Each engine was capable of producing 3,140 pounds of thrust.

As time progressed—53 years, to be exact—so did naval aircraft. Enter the FA-18s, which carry two General Electric F404-GE-402 afterburning engines, each capable of producing 18,000 pounds of thrust and up to 150 decibels (dB) of noise. Unfortunately, for the maintainers of these powerful and capable aircraft, time nearly has stood still. Modern aviation-maintenance crews wear almost the same head and hearing protection as their Banshee brethren.

The HGU24/P and HGU-25(V)2/P, commonly and collectively known as the cranial, have withstood the test of time. However, they fail to meet nearly every modern safety standard for hearing and impact protection and electri-



Navy photo by PH3 Tyler J. Clements

cal-shock prevention. They also fail to support several key 21st century mission scenarios.

Among the first to report hazardous shortcomings of the current cranial was ABHCM(AW/SW) Wynn Young, ComPhibGru3 command master chief. He led a team of chiefs to develop a point paper, which highlighted the cranial's failure to support NavAir 00-80T-106 (LHA/LPH/LHD NATOPS Manual). This paper reported potential hazards related to the "can do" spirit of fleet maintainers. It also noted the incompatibility of night-vision devices (NVDs) when attached to cranials (e.g., non-standard mounting, poor fit, lack of eye protection, and cracking of impact shields).

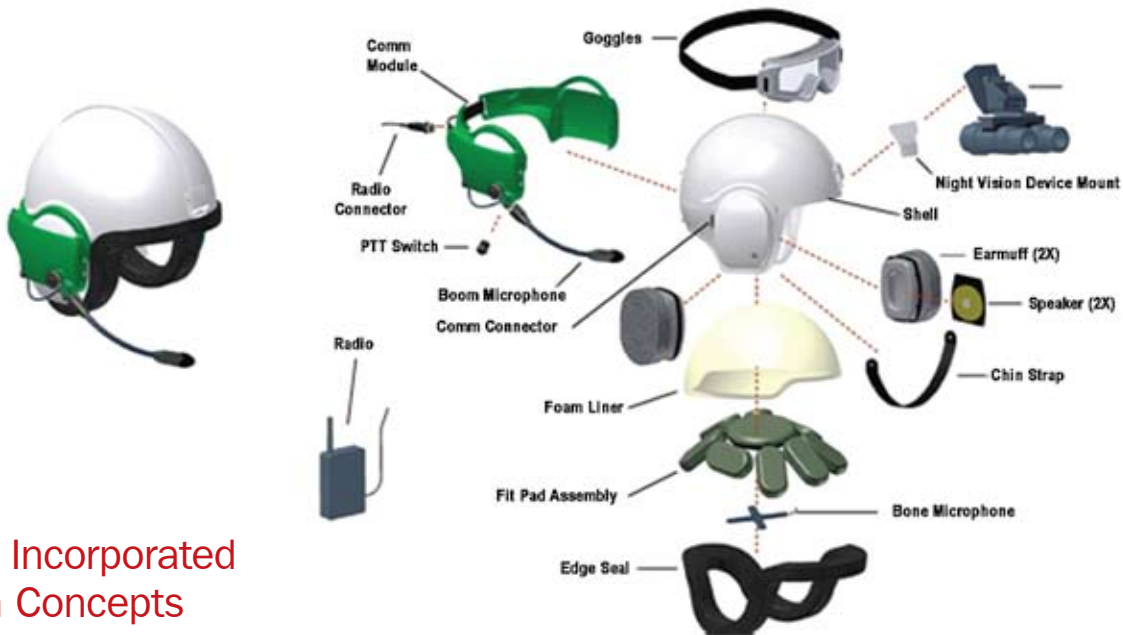
Another problem highlighted in the point paper was the effect outdated cranials have on mission-critical communication among flight-deck personnel. Maintainers working in extremely high-noise environments without proper hearing protection have contributed to the rise in hearing-loss claims being filed by Navy and Marine Corps personnel.

As a result of these reported problems, NavAir's human-systems department surveyed more than 1,000 flight-deck personnel on board CVNs, LHAs, LHDs, and across fleet squadrons. The survey included a

detailed assessment of cranial-helmet fit and maintenance condition (e.g., earmuff-headband tension, earcup foam and cushion integrity), earplug use and insertion depth, and head-size measurements. Worn without earplugs, the cranial provides about 21dB of noise attenuation when correctly fitted, worn and maintained.

All survey subjects reported wearing a cranial helmet with earmuffs, but 75 percent of the subjects had been issued a questionable size (most wore the largest of four sizes available). Forty-one percent of the earcup cushions and foam inserts also were deteriorated, hardened, creased, or missing. Many maintainers who wore even the largest of the four cranial sizes reported being in severe pain after only five minutes of use, mainly due to the spring tension of the earmuff band.

A detailed analysis found that the cost to build, maintain and replace the old cranial wasn't a good value. Survey data showed approximately two hours are required to build one complete cranial system from scratch, with 45 more minutes needed to configure NVDs. Maintenance averaged an additional 25 to 45 minutes per cranial.



Creare Incorporated
Design Concepts



ATI Incorporated Design Concepts

From 2000 to 2004, about 750,000 individual cranial parts were purchased, averaging 187,500 parts per year. Today, up to 22 individual parts are ordered to configure a cranial, not including NVDs and mountings. These results strongly supported a decision to develop and field a new state-of-the-art cranial.

NavAir worked with two vendors, Adaptive Technologies, Inc. (ATI) and Creare, Inc., to develop new FDC (flight-deck cranial)-design concepts. Both vendors developed prototypes designed to meet or exceed initial performance requirements. The Naval Safety Center then hosted multiple open forums with the fleet to gather firsthand feedback on the ATI and Creare prototypes and to iron out key performance requirements. These fleet inputs, together with NavAir technical requirements, were approved in early March 2008. The 65-page performance specification for the FDC was approved as PMA202-000/R-0.

This performance specification establishes minimum performance and validation requirements for a modular FDC helmet to be worn by aircraft handlers and maintainers in, on and around military aircraft positioned throughout global-climate ranges shipboard and ashore. The FDC will meet OpNav-Inst 5100.19 and 5100.23 safety requirements and will provide improved hearing protection (about 43dB), speech intelligibility, ANSI Z89.1-compliant impact

protection, electrical-shock protection, a stable NVD-mounting platform, and will be compatible with CBR protective clothing.

The FDC will be modular in design to allow tailoring to various work environments and to reduce maintenance-labor man-hours and logistical burden, including a FOD-free design (no clips to remove) and pre-applied reflective tape by the vendor. The plan is to offer the new FDC system as an individually issued item to improve sizing fit, comfort and hygiene.

In late March 2008, the FDC program was authorized to move into the systems design and development phase. In this phase, both ATI and Creare will conduct laboratory-performance validation testing and initial fleet assessments, which are planned for third quarter FY09. A milestone "C" decision to field the FDC is scheduled first quarter FY10. ■

Resources:

- Noise and Advanced Hearing Protection, [http://www-nehc.med.navy.mil/downloads/occmcd/hctoolbox/Toolbox_files/NAVAIR%20Advanced%20Hearing%20Protection.ppt#257, 1, Slide 1](http://www-nehc.med.navy.mil/downloads/occmcd/hctoolbox/Toolbox_files/NAVAIR%20Advanced%20Hearing%20Protection.ppt#257,1,Slide1)
- Flight-Deck Cranial Status Brief to the NESB, [http://safetycenter.navy.mil/ESB/Meeting9/briefs_4-08.ppt#266, 10, Flight%20Deck%20Cranial%20Status%20Brief%20to%20the%20NESB](http://safetycenter.navy.mil/ESB/Meeting9/briefs_4-08.ppt#266,10,Flight%20Deck%20Cranial%20Status%20Brief%20to%20the%20NESB)

Are You Deaf?



“My ears always hurt when I was on the flight deck... and a Tomcat went into afterburner... That was a good thing, though; it meant I still could hear.”

By Capt. Chris Plummer,
OpNav Staff

That’s what my wife jokingly used to ask me anytime I watched TV or listened to the stereo.

I’d reply, “No, I just like stuff louder.”

The jokes about my minor physical disability stopped, though, when the flight surgeons readjusted my baseline for an annual hearing test. I had become good at the standard tricks for passing the test but realized the only person I was fooling was myself. Now I’m working hard to conserve the hearing I have left after many years as a naval aviator aboard aircraft carriers where loud noise is a recognized occupational hazard.

You couldn’t tell I had a problem to look at me, but the junior officers and Sailors in my squadron

always knew it when they talked to me. My wife and kids knew it, too, when I watched a blaring TV. More importantly, I knew it every year when I stepped into an audiology booth for my annual flight physical. My hearing was lousy, and it hadn’t been that way when I joined the Navy. The loss had been a slow, almost imperceptible process—one that didn’t have to happen.

After flight school, I always wore double-hearing protection in the cockpit—a combination of those little yellow foamies you wad up and stick in your ears and a flight helmet. Aboard an aircraft carrier, though, it’s not enough just to wear hearing protection while



Navy photo by PH3 (AW) Jayme Pastorio

flying airplanes off the flight deck. Any cruise veteran will tell you how painfully deafening it is to be caught unaware on the 03 level under the arresting gear while an aircraft lands or under a catapult when an aircraft goes to full power. The ship abounds with incessant and traumatic assaults on your ears, and it's not only during flight operations.

I'm convinced the noise level from daily maintenance in some areas of the ship is harmful. Here is my common-sense approach: If it hurts your ears, it's too loud. There also are lots of background noises. Even the ship's ventilation system produces an annoying hum. You get so used to these noises, though, that you stop hearing them.

I'll never forget returning home from my first cruise and finding my boom-box as I unpacked. I plugged it in and cranked the volume to my standard "cruise" setting,

which turned out to be earsplitting. At that point, I realized how loud life is aboard ship.

My ears always hurt when I was on the flight deck with my hearing protection on, and a Tomcat went into afterburner on the catapult. That was a good thing, though; it meant I still could hear. I wore earplugs at night when I hit the rack and when flight ops were going on. Sleeping directly below a catapult, I knew if the noise was painful when I was awake, it also would damage my ears when I was asleep. I stopped waiting to climb into the cockpit before putting on double-hearing protection. I put it on before stepping onto the flight deck and walking to my aircraft.

When on the flight deck for FOD walkdown, a jog, or just to check on the maintenance when flight

ops were secured, I had a pair of foamies with me. There are a thousand ear-piercing noisemakers on the flight deck and all over a ship just waiting to get you when you're least prepared. You never know when a helicopter is going to arrive on the roof, or a huffer is going to turn in the hangar bay. As an extra precaution, I even started taking a pair of foamies to the gym because it was right below the 1-wire.

I started taking precautions at home, too. I became perhaps the biggest nerd in my neighborhood. If I mowed the lawn, I wore hearing protection. If I used a power tool, like a drill, I wore hearing and eye protection. I took no chances and operated in a max-conserve mode. When I was around my kids, I turned down the stereo because I didn't want to pass on my problem to the next generation. None of these things could help me regain any of my hearing loss, but they helped me hold on to what I have left.

It's really too bad you can't take a picture of hearing loss. There are some real eye-grabbing photos for people who smoke, chew tobacco, or don't wear eye protection. Nearly everyone in the fleet has seen the poster of the poor fellow whose ring degloved his finger. I removed my wedding band the very day I first saw that gruesome image and haven't worn it since. If there had been an eye-arresting Kodak moment to depict the misfortune of hearing loss, I perhaps would have been more cautious.

I miss hearing all the high notes of a violin concerto, and it annoys me that telephones don't ring very loud any more. It's also a nuisance to constantly lean forward and cup my ears during a normal conversation. Take heed young Sailors; become believers right now, and leave the Navy with the same ears you entered it with. I wish I could. **S**

The author was assigned to VAW-117 when he wrote this article for the former Fathom magazine.

Resources:

- Navy Medical Breakthrough Could Repair Hearing Loss, <http://www.defenselink.mil/news/newsarticle.aspx?id=41836>
- Acquisition Safety—Noise Control Aboard Ships, http://205.85.32.3/acquisition/noise/noise_ctrl_ship.htm
- Easing the Torment of Tinnitus, <http://archives.seattletimes.nwsourc.com/cgi-bin/texis.cgi/web/vortex/display?slug=tinnitus25&date=20070625&query=tinnitus>

Music: To Your Ears, It's Just Another Kind of Noise

By Chuck Almond,
Naval Safety Center

It's 1630, and a hard day at work finally has ended. You're off to the parking lot to get your car and crank up the CD player. Soon, you're rockin', hip-hoppin', or rappin' your way down the highway, but at what cost? Ringing in the ears (also known as tinnitus) or permanent hearing loss (by degrees) can happen off the job, as well as on.

Have you ever had dinner in a restaurant where the noise was so loud you had trouble having a conversation across the table? Remember the 3-foot rule? You likely should have been wearing earplugs, just as you would have done had you been on the job.

When you're cutting the grass, hunting, or watching a NASCAR race from the grandstand, there may not be anyone around saying, "You really should be wearing earmuffs." That's why it's so important for you to recognize when you're at risk and to do whatever it takes to protect yourself.

You rarely notice your sensitivity to sounds diminishing because it usually happens ever so slowly. Then, one day, the realization hits home when a friend or your significant other yells, "How about turning down that TV? Are you deaf?"

Mobile Deafness Chambers

Car-stereo installations, like the ones in the accompanying photos, clearly are over the top in terms of power capacity and proximity of the





speakers to vehicle occupants. The units most people listen to hopefully are more realistic. However, it's not uncommon for such systems to produce sound-pressure levels far exceeding the same limits for workplace noise—even as much as 100, 120 or 130 dB peak or more.

No music is worth the damage that occurs to your ears when exposed to those levels for extended listening sessions. Regardless of the source, if you experience actual pain, tingling or ringing in the ears, or if you notice a slightly muffled sound sensation after listening to music, you likely have been overexposed.

It's a fact of life that hearing ability usually declines with age. However, it's abnormal for young people in their teens, 20s or 30s to experience permanent shifts in hearing. The means to prevent that loss is under your control.

Portable MP3 or Other Music Players

The growing popularity of portable CD and MP3 players has caused sales of these electronic devices to skyrocket in recent years. What's lacking is research to determine the effects of this increased usage. In other words, no one really knows if we're creating a whole future generation of hearing-impaired. Do we really want to wait to find out the answer?

What We Know

A variety of portable music players, as well as several different styles of portable headphones and inserts, is available today, each with its own set of characteristics.

Nine different portable digital players, coupled with 20 different headphone or earbud-insert com-

binations, were tested in a 2006 Canadian study (*Keith, SE, Michaud, DS and Chiu, V; Journal Acoustical Soc of America, 2008 Jun; 123(6): 4227-37*). This study gauged the maximum sound output of each setup. Output levels ranged from 101 to 107 dBA at the maximum volume setting. Estimates of actual listener sound levels could range from 79 to 125 dBA, depending on a number of factors. Among these factors are the recording level of the music; headphone type, fit and earphone seal on the ear; player-output voltage; and earphone sensitivity.

A similar study of portable players by a number of different manufacturers, using different styles of headphones—insert type, supra-aural (rests on the ears), and circumaural (completely covers the ears)—found maximum sound levels from 91 to 121 dBA (*Fligor, BJ and Cox, LC; Ear and Hearing, 2004 Dec; 25(6): 513-27*). When compared to the NIOSH-recommended standards for occupational noise, a maximum noise dose would be reached within one hour of listening, with the volume set at 70 percent of the maximum! The insert (earbud) style headphones produced higher sound output (7 to 9 dB) when compared to the stock headphones provided by the manufacturer, possibly due to direct insertion in the ear canal and a tighter ear seal.

Types of Headphones

Here's what is available today:

- *Stock portable and insert type.* These earphones insert into the outer ear; they don't tend to reduce distracting outside noise and are best when used in low-noise environments.



- *Earbuds and “isolating type.* These mini, bullet-shaped earphones insert into the ear canals and provide a tighter seal. While testing indicates these devices may be capable of generating higher sound output than other types, they tend to reduce unwanted ambient noise to some degree. As a result, wearers may be less inclined to crank up the volume.



- *Supra-aural headphones.* These devices rest on top of the outer ear and may be open-air or closed-style muffs.



- *Circumaural headphones.* These earmuff-style headphones completely cover the entire ear. Such closed-type devices may tend to limit outside noise.



- *Active noise reduction (ANR) headphones.* ANR technology aims to counteract high noise levels in the environment by electronically canceling out the noise with sound waves that are 180 degrees out of phase. By reducing competing noise, these headphones may reduce the tendency to increase volume settings to overcome external noise distractions.



Five popular MP3 players, with both stock and four other types of earphones, were tested, using five different musical genres, white noise, and pure tones. The results were similar for all five models and didn't vary greatly across all of the five musical genres (rock, R&B, country, dance, and top 40). Again, earbud-style

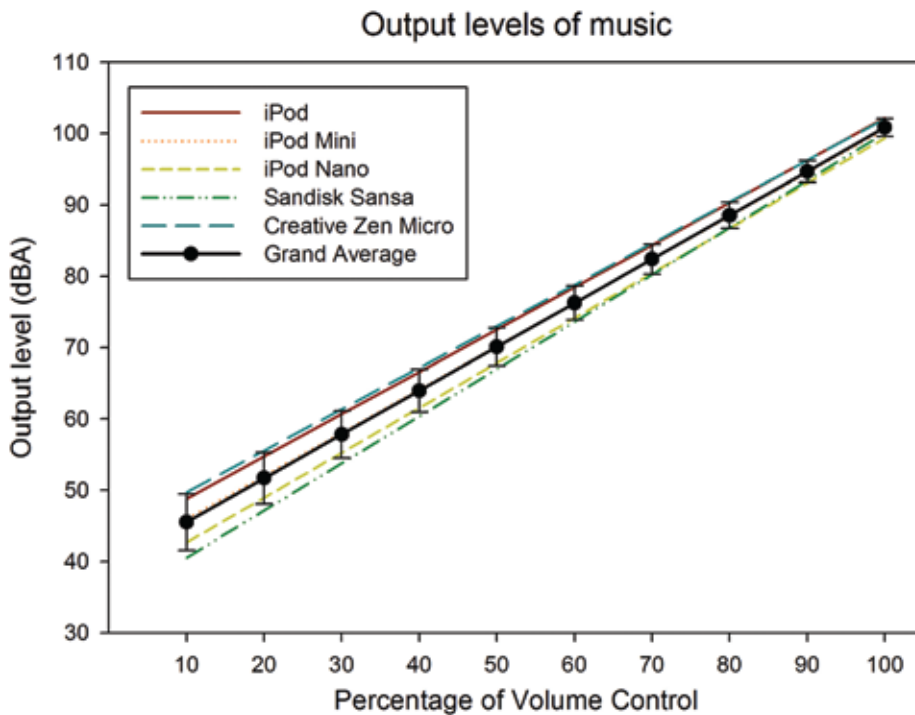


Figure 1. Free-field equivalent output levels of 5 MP3 players, using stock earphones, as a function of volume control settings. The Grand Average is the mean of all music genres across all players. Error bars represent 1 standard deviation around the Grand Average.

In June 2008, the American Medical Association reviewed the available data and decided to maintain the focus of its recommendations on public education, rather than push for a campaign on restrictions. This focus was chosen for several reasons:

- The potential for damage to hearing is not dependent solely on the output of the devices but also on the length of listening time.
- There is very limited research evidence that defines the extent of the effect that such overexposures are having.
- As battery technology has improved, players are in use for more extended periods of time than ever before.
- There is great variability in the types and output of the many PMPs (portable media players).
- The recording level of the music being played differs from different sources.
- Personal listening preferences are a major factor in determining the potential risk.

% of Volume Control	Maximum listening time per day			
	Earbud	Isolator	Supra-Aural	Stock Earphones
10-50%	No limit	No limit	No limit	No limit
60%	No limit	14 hours	No limit	18 hours
70%	6 hours	3.4 hours	20 hours	4.6 hours
80%	1.5 hours	50 minutes	4.9 hours	1.2 hours
90%	22 minutes	12 minutes	1.2 hours	18 minutes
100%	5 minutes	3 minutes	18 minutes	5 minutes

Table 1. Maximum listening time per day using NIOSH damage-risk criteria. These listening times are the result of testing the output of specific music players and headphone combinations and are provided for information only. It is important to note that your electronic device may vary.

earphones averaged 5.5 dB higher than the supra-aural headsets, regardless of the kind of player being tested. (Source: Portnuff CDF and Fligor, BJ; Paper presented at NIH in Children Conference, Cincinnati, OH; 19 Oct 2006)

As we've mentioned throughout this issue's focus section on hearing conservation, damage to your hearing occurs over time. It's dependent on the level of noise that reaches your ears. So, minimizing the chance of hearing impairment can be achieved by reducing the volume of sound or limiting the time that you are exposed.

What We Don't Know

There are no current U.S. standards that regulate the sound output from portable music players.

What You Can Do To Protect Your Hearing

It's easy to see from this discussion that the risk of


hearing damage is very real, even from sources that we consider pleasure or leisure activities. Hearing loss and tinnitus are not conditions limited to older people. It can happen to you.

Be aware of noise present in your environment, and take actions to lessen your exposure (e.g., moving to a seat away from speakers in a noisy club).

Enjoy your personal music players, but set the volume at a reasonable level.

Limit the total time you're exposed.

When hazardous noise cannot be avoided (e.g., when operating power tools, mechanical equipment, or noisy recreational equipment), wear protective earplugs or earmuffs.

Protect yourself under all circumstances. You'll appreciate the effort later. 

Hearing-Conservation

(Circle the best answer to each of the following)

1. *What is the purpose of the hearing-conservation program?*

- a. To prevent occupationally related noise-induced hearing loss
- b. To promote healthy hearing for quality of life reasons
- c. To maintain good hearing in order to maximize operational readiness
- d. To reduce hearing-loss compensation costs
- e. All of the above

2. *Who is required to have an annual hearing test?*

- a. All military personnel
- b. All DoD civilians
- c. All military and DoD civilians
- d. All personnel who are exposed routinely to hazardous noise at work and are enrolled in the hearing-conservation program
- e. All personnel who complain of hearing loss

3. *The best definition of hazardous noise is:*

- a. >84 dBA and >140 dBP
- b. 90 dBA and 104 dBP
- c. 110 dBA and 144 dBP
- d. Any unwanted sound
- e. Long-term intense exposure to impulse noise

4. *What effect does long-term noise exposure have on individuals?*

- a. Permanent sensorineural hearing loss
- b. Isolation and withdrawal from social situations
- c. Progressive loss of communication ability
- d. Tinnitus
- e. All of the above

5. *True or False*

All personnel in the hearing-conservation program have the freedom to choose the type of hearing protection they prefer to wear from among the approved types available, unless contra-indicated, and are provided the hearing protection free of charge.

6. *True or False*

Non-occupational noise does not result in hearing loss.

7. *Noise-induced hearing loss is:*

- a. A known and acceptable result of exposure to hazardous noise
- b. A common side effect of tinnitus
- c. Often underrated because there no visible signs of injury
- d. The most prevalent occupational-health hazard in the military
- e. C and D

8. *Which frequency range of human hearing is most affected by hazardous noise?*

- a. 20-20,000 Hz
- b. 500-4,000 Hz
- c. 250-8,000 Hz
- d. 3,000-6,000 Hz
- e. 84 and 140 dB

9. *What two factors determine whether noise is hazardous to hearing?*

- a. Frequency and intensity
- b. Intensity and duration
- c. Impulse and impact
- d. Duration and spectrum
- e. Stimulus and response

10. *What part of the ear is damaged as a result of hazardous noise?*

- a. Outer ear
- b. Middle ear
- c. Inner ear
- d. Central auditory nervous system
- e. All of the above

11. *True or False*

The impairment caused by a noise-induced sensorineural hearing loss essentially can be reversed through the use of modern hearing aids.

Occupational Training Exam

12. True or False

Hearing loss can affect job retention and exclude workers from certain career fields.

13. Which of the following are elements of the hearing-conservation program?

- a. Noise-hazard identification
- b. Audiometric monitoring
- c. Hearing-protection devices
- d. Hearing-conservation education
- e. All of the above

14. Who provides hearing protection for personnel who routinely are exposed to occupational noise and who are enrolled in the hearing-conservation program?

- a. Noise-exposed personnel
- b. Unit or shop where the noise-exposed personnel are employed
- c. The medical facility that supports the unit or shop
- d. The local audiologist or hearing-conservation department
- e. The Veterans Administration

15. Annual hearing-conservation education is required for:

- a. All noise-exposed personnel in the hearing-conservation program
- b. All noise-exposed personnel in the hearing-conservation program and their supervisors
- c. Civilians enrolled in the hearing-conservation program
- d. Military personnel who are designated in a noise-hazardous job
- e. All of the above

16. Double protection must be worn when continuous noise levels exceed:

- a. 84 dBA
- b. 140 dBP
- c. 104 dBA
- d. 140 dBA
- e. The threshold of pain

17. Pre-formed earplugs:

- a. Must be disposed of after each use
- b. Are the universal protector
- c. Must be fitted by medically trained personnel
- d. Must be washed with warm, soapy water and air-dried before next use
- e. C and D

18. Which of the following might be signs of a noise-induced hearing loss?

- a. Frequently asking people to repeat themselves
- b. Turning the ear toward a sound or person speaking in order to hear better
- c. Losing your place in group conversation
- d. Routinely turning the volume on the TV or radio to a high level
- e. All of the above

19. What are the four Ps of occupational noise-induced hearing loss?

- a. Pain, patient, permanent, pathology
- b. Patent, performance, painful, progressive
- c. Pension, pentagon, penicillin, program
- d. Permanent, painless, preventable, progressive
- e. None of the above

20. What is the best type of hearing protection?

- a. Pre-formed earplugs
- b. Noise muffs
- c. Ear-canal caps
- d. Communication earplugs
- e. The one that is chosen by the individual from approved sources, meets the needs and requirements of the work environment, is comfortable, appropriately fitted, and worn consistently during noise exposure

ANSWER KEY: 1-e, 2-d, 3-a, 4-e, 5-t, 6-f, 7-e, 8-d, 9-b, 10-c, 11-f, 12-t, 13-e, 14-b, 15-a, 16-c, 17-e, 18-e, 19-d, 20-e

Higher Costs in the Offing This Winter

As if the recent (and likely to return) \$4-plus-a-gallon gasoline prices weren't enough drain on our pocketbooks, now we're heading into another home-heating season, which is going to place even more demands on our personal finances. On June 10, 2008, for example, the Department of Energy (DoE) estimated wholesale heating-oil prices to average \$3.32 in 2008, compared to \$2.06 a year ago. The DoE also expects the spot price for natural gas to average \$11.05 in 2008, up from \$7.17 a year ago.

Given this outlook, it's safe to bet Americans are going to be looking for ways to save on their home-heating costs this winter. One only can hope they won't risk being cost-conscious at the sake of being safety-conscious.

One of the main safety concerns, according to a National Fire Protection Association (NFPA) spokesperson, is that more people will turn to space heaters as a supplemental form of heating. "Sometimes, people bring these heaters into the bedroom, and the room gets nice and toasty," said the spokesperson. "When that happens, they may kick off the bedding, and if it lands on the space heater, it can set your house on fire." You can avoid this problem by making sure you keep everything that burns—paper, bedding or furniture—at least 3 feet away from heating equipment.

If you're planning to buy a space heater this year, look for models with an automatic shut-off switch that activates anytime the unit tips or is knocked over. Also make it standard practice to turn off the heater when going to bed or leaving the room—for any length of time.

There's also an expected increase this winter in the use of fireplaces and wood stoves, which leads to more fire hazards, as well as the added risk of carbon-monoxide poisoning and burns. Nationwide, about 480 deaths occur each year as the result of carbon-monoxide poisoning. Another 15,000 people are sent to hospitals after exposure to the odorless, tasteless, colorless gas. The way to protect yourself is to install a carbon-monoxide detector on the lowest level of the dwelling.

In 2005, heating equipment was involved in an estimated 62,200 reported home-structure fires, 670 civilian deaths, 1,550 civilian injuries, and \$909 million in direct property damage. Most home-heating fire deaths (73 percent), injuries (64 percent), and direct property damage (57 percent) involved stationary or portable space heaters. Chimneys and chimney connectors accounted for



Just one reason why you always should keep a portable space heater at least 3 feet away from anything that burns.



Fires like this one pose the added risk of carbon-monoxide poisoning and burns.

the largest share of home-heating fires (36 percent). To protect against home fires, install smoke alarms in every bedroom, outside each sleeping area, and on every level of the home. For the best protection, interconnect all smoke alarms throughout the home so that when one sounds, they all sound. Test these alarms at least once a month.

Here are some more tips designed to keep you from becoming a statistic this home-heating season:

- Don't use the kitchen range as a heating source, even in an emergency; it's not vented and could pose a carbon-monoxide problem if used continuously to heat a home.
- Portable kerosene heaters also are not vented and should be used only in a well-ventilated area. Check with your local building inspectors to see if kerosene heaters even are allowed where you live.
- Another effective way to make a home more energy efficient is to wrap hot-water pipes or heating

ducts. Make sure you use a flame-retardant material designed for such use; never use a wool blanket. When wrapping a duct, always start a few feet from the heating unit.

- When installing a wood stove, be sure the stove and its pipes have the proper clearance from the walls and combustibles. Stoves need to be placed on a non-flammable surface, such as a hearth pad—not wooden floors. Check your local building codes for other requirements.

- Other important considerations with wood stoves are the quality of the wood and size of the fire. Creosote is the product of wood smoke and moisture, and a chimney fire occurs when creosote buildup ignites and burns inside the chimney and stove pipes. It's always best to burn a fire "hot," which means not burning only a few logs; a larger fire is better. It's also generally recommended to let wood dry for a whole season to cut back on creosote buildup. **S**

One Way To Beat the Higher Costs

If the high prices of gasoline and home-heating fuel this winter are worrying you, there's a way to put some money back in your pockets to help pay those increased costs. It's called the transportation-incentive program, or TIP. This program originated with Executive Order 13150, which mandates that all federal agencies implement a transportation fringe-benefit program.

With TIP, qualified federal employees and active-duty people get help with commuting costs incurred through use of mass transportation and van pools *[owned and operated by a public transit authority or by a private vendor in the business of transporting persons for compensation or hire]*. Besides reimbursing Department of Navy (DoN) employees up to \$115 a month for transit costs (excluding parking fees), TIP helps reduce daily traffic congestion and air pollution. It also helps mitigate risks traveling to and from work; you ride in the HOV lanes, where the traffic is less congested and the chances of an accident are fewer.

Participants receive prepaid "fare media" (transit passes, farecards, or vouchers) for authorized mass-transit systems: commuter bus or rail, subway/light rail, van pool, and ferry (foot passengers only). People who carpool, drive their own vehicles, or who ride a motorcycle or bicycle to work don't qualify for the benefit.



Employees at the Naval Safety Center (NSC) know a good deal when they see it. As one van-pool rider remarked, "Why wouldn't you want to participate in a program that provides the vehicle and then pays you to ride in it? I see the situation this way: The money I save by riding the van pool helps keep my bass boat on the water every weekend." Six van pools currently operate daily to and from NSC, carrying 57 people.

To find out more about TIP, visit www.fmo.navy.mil/services/tip/tip.htm. **S**

ORM

Don't Leave Lunch Without It

By AM1(AW) Edward Knowles,
NAS Whidbey Island,
AME1(AW) Andrew Allaire,
VAQ-133,
and AO3 William Jansen,
VAQ-139

A squadron detachment to NAS Fallon, Nev., offers many challenges and opportunities—professionally and personally. When Sailors aren't on duty, they have a choice of many exciting and fun recreational sports.

This story involves a group of five squadron maintainers, including the three of us, who took a weekend to enjoy the Squaw Valley Ski Resort. It isn't a story of alcohol abuse and shenanigans. Rather, it's a story of the very real risks you face in an outdoor sport, especially when you exceed your individual skill level, without applying the principles of operational risk management.

We departed NAS Fallon at 0500 and headed to the mountains, arriving at the ski resort late in the morning. We then went skiing and snowboarding on the various mountain trails. After a mid-day break for lunch and some rest, we hit the slopes for more fun.

An AME1 who had been snowboarding all morning but had decided to switch to skiing went to his truck, retrieved his skis, and joined the rest of us. Our adventurous team had found a little trick park where other skiers were doing a variety of jumps on both skis and snowboards. We decided to warm up on smaller jumps until we were comfortable, then it was on to bigger jumps—correction, make that the **biggest** jumps. We were going for distance here, not form.

The AME1 remained motionless for a few minutes, while we went to his side.



The first four of us who tried the jump didn't have enough speed to clear the target. Our last intrepid distance jumper was the AME1 who had been snowboarding all morning. He had enough speed to clear the landing area, but, when he landed, his skis dug into the hillside and flung him out of his bindings.

The AME1 remained motionless for a few minutes, while we went to his side. He believed he had been knocked unconscious for a short period but was awake by the time we arrived. After getting up and taking stock of his parts, the AME1 decided to stop for the day and ski down to the lodge. We all figured we had had enough at this point, too, and joined him. We then headed back to NAS Fallon.

The AME1 still was experiencing pain in his head and neck when we arrived and, by the next morning, couldn't even move his neck. He didn't just have a stiff neck—it was immobile. Only then did he realize his injuries were serious. He called the squadron duty office and reported to branch medical. X-rays revealed the extent of his injuries—two crushed vertebrae; in other words, he had a broken neck.

The AME1 had to have surgery in Reno, Nev., followed by traction, a neck brace, and a transfer from the command because of his non-deployable status.

Alcohol wasn't a factor—none of us had been drinking. The problem was a breakdown in ORM. Originally, our group did a good job of using this process: We spent the morning skiing and snowboarding at our skill level, and we took a break when we got tired.

While jumping wasn't a "bad" idea—it's certainly a fun part of snow sports—we strayed off course by purposely working ourselves up to bigger jumps. We then compounded that problem by skipping the "bigger" jumps in favor of the "biggest" ones. That decision was the straw that broke the AME1's neck. Not seeking medical attention right away, even though the victim believed he was knocked unconscious, also was dumb.

The squadron lost a lot of man-hours and a highly qualified maintainer—all because, after lunch, ORM stayed in the lodge. ■

All three authors were assigned to VAQ-139 at the time they wrote this story.

Resources:

- Ski Safety, <http://sportsknee.com/sports.htm>
- ORM Resources, <http://safetycenter.navy.mil/orm/resources.htm>

From Ecstasy to Agony All in One Day



By AW2(AW/NAC) Richard Simmons,
VP-4

It was a gorgeous Saturday, with not a cloud in the sky, when I arrived at Dillingham Airfield on the north shore of Oahu. I was continuing my pursuit of a skydiving license. I followed all the procedures, double- and triple-checking my gear. With all the emergency procedures burned into my memory, I was ready to execute in case of a malfunction, but none occurred. It instead turned out to be one of my greatest skydiving days yet.

Things went downhill once I returned home. The problems started when I noticed my pocket bike (a miniaturized street bike), which I hadn't ridden in more than a year. "This will be lots of fun," I thought to myself as I pulled out the bike, dusted it off, and got ready to ride around the parking lot.

I guess it was the uneventful day of skydiving—of risking life and limb for a 45-second fall—that made

me forget about the little things that could harm me. For whatever reason, I didn't put on shoes or any other protective gear before starting to ride.

The pocket bike started a little weird, probably because it hadn't been ridden for a while, I reasoned. It had a bit more power than I remembered, and the clutch seemed to have worn out since the last time I had ridden it. Because the clutch didn't grab as hard, the RPMs were slightly higher, giving the bike more acceleration than normal.

I started off at almost full throttle, and the bike's front tire popped up like never before. In a split second, I was thrown off while going just 5 miles an hour. The asphalt didn't care how fast I was going; it took a good bit of skin off the center of the sole of both my feet—22 percent, to be exact, as determined by a subsequent trip to the flight doctor.

Besides being in extreme discomfort, I couldn't fly until the injuries had healed. In retrospect, I should have ORMed the entire day, not just the time I had spent skydiving. I should have been wearing shoes, gloves and protective head and body gear.

Learn from my mistake. Failure to take a mere 30 seconds to slip on some tennis shoes cost me about three weeks of discomfort and sleepless nights and diminished the readiness of my command. My advice to everyone reading this story is to use the ORM matrix (see http://www.safetycenter.navy.mil/ORM/downloads/probability_severity_new.pdf) in your daily decision-making process, both on and off duty. It may prevent you and your command a great deal of heart-ache. **S**

Note: Rider in photo is dressed in full PPE for racing pocket bikes.

Resources:

- Pocket Bike Safety Guide, http://news.car-junky.com/motorized_mini_bikes.shtml
- Pocket Bike Safety, <http://urbanscooters.com/cgi-bin/urbanscooters/pocket-bike-safety.html>
- Safety Tips for Pocket Bikes, <http://ezinearticles.com/?Safety-Tips-for-Pocket-Bikes&id=304718>

Just a Little Farther...

By AN Torelle J. Wilkins,
VAW-121

How many times have you found something just out of reach while working from a ladder? Sometimes we're able to extend ourselves that bit extra to reach whatever it is we're after. In other cases, though, we have to get down, move the ladder, and do things the safe way. Suffice it to say I'm one of those who had to learn his lesson the hard way.

It was a cool, calm day back in my hometown of Petersburg, Va. I was in town helping my stepdad wrap up some home remodeling in a nearby neighborhood. My stepdad already had installed new windows in the two-story home and had asked me to help him put up vinyl siding.

We were working with some very high ladders, and, to be honest, I was a little scared, so I was being extra careful how I moved. Time soon became an issue, though; we learned that rain was headed our way. My stepdad wanted to press on and complete most of the vinyl siding before day's end. This sense of urgency and the confidence I had built up while on the ladder made me more comfortable. As a result, I was getting bolder.


As we expected, drizzle soon started falling. It happened as I was working with one of the longer strips of siding. I had been having a hard time balancing the siding as I drove in the first nails. To solve this problem, I had started reaching out as far as possible to position the pieces, instead of doing the right thing and asking for help. The extended reaching was putting me in a precarious position, but I kept telling myself, "Just a little farther, and I can reach it!"

As luck would have it, I finally stretched a little too far, lost my balance, and fell sideways off the ladder. I plummeted to terra firma from a height of 10 feet. Looking at my right arm, I saw that it definitely didn't look normal. My stepdad came running when I yelled for help, and we soon were en route to a hospital. I suffered a dislocated right elbow and a strained lower back, which sidelined me for a few weeks and caused a stint of light duty at my squadron.

What did I learn from this event? The next time I work from a ladder, I'll use a different type of boot—



not just one with a steel toe but also a slip-resistant sole. If I should decide to put up vinyl siding for a living, I'll stay within my reach when working from a ladder [*keeping body within the side rails, according to the instructions*].

Use the "Reasonable Man Theory" when you do anything. Don't try to extend your abilities or rush things. While we often don't want to do something as simple as ask for help, or to get down off a ladder, move it, and then climb back up, those are the smart choices. They may seem time-consuming, but ask yourself this question: Compared to a hospital stay for being stubborn, what's worse? 

References:


- Ladder Safety, <http://www.osha.gov/SLTC/etools/construction/falls/4ladders.html>
- Portable Ladder Safety Tips, http://www.osha.gov/Publications/portable_ladder_qc.html
- CPSC Offers Safety Tips to Prevent Ladder Injuries, <http://www.cpsc.gov/CPSC/PUB/PUBS/ladder.html>

Poorly Timed Injury



By LCdr. Jack S. Parker,
VAQ-133

“I’m such an idiot!” That was the line I couldn’t stop thinking as I lay in pain on the side of a basketball court at the gym on Eielson Air Force Base. Just moments before, I had landed on the side of another player’s foot during a pick-up basketball game and twisted my ankle. I knew immediately that I would not be able to walk on it for at least a couple of days.



As the safety officer for my squadron, I couldn't help thinking about the many ways I could have prevented this event from happening. The throbs in my ankle were a steady reminder of what I would get from my ready room. I already could hear them dishing out the merits of operational and off-duty risk management (ORM) to me, even when dealing with off-duty activities.

My injury occurred at the end of the first day of indoctrination briefs for Red Flag Alaska. The jets and the main body just had arrived the day before. It was our first detachment since coming back from deployment two months earlier. The aircrew and intel had spent the entire day in the auditorium, receiving information on everything that would be taking place over the next two weeks. Meanwhile, maintenance prepared the jets for our exercise. The weather forecast called for it to be nice, and we all were excited to get the training started.

This training was our reason for being in Alaska, but, as with most other members of the squadron, I also had other plans. I was going to take advantage of my time living on the base to exercise because the gym was close. Some other personnel from the squadron, including other aircrew, and I had brought our basketball shoes. We had heard they had some nice courts.

At this stage of planning our extracurricular activities, some deliberate ORM would have paid huge dividends for me. Basketball, like other contact sports, is physical and has a high probability of an injury occurring—one that would prevent me from doing my job (ORM steps 1 and 2: identify the hazard and assess it in terms of probability and severity). In

making a decision about this risk of injury (ORM step 3), I really needed to think about the reward and the timing of the risk.

I enjoy playing basketball; it's good exercise, and the competition is fun. However, I should have realized that its reward wasn't even close to the risk of an injury during a valuable training exercise.

There were alternatives, none of which had as high probability of injury, and I would have gotten plenty of exercise. All that was left for me to do was to substitute one of these alternatives for playing basketball during this detachment (ORM step 4: implement the controls that would have reduced the risk below the level of reward).

If the substitute I had chosen wasn't available, or if I later had assessed it to be too risky, I could have chosen one of the other possibilities (ORM step 5: supervise the decision). I **should have** thought about this process before making the trip to Alaska, but I just as easily could have used time-critical ORM on my walk to the gym that evening.

The correct course of action seems simple to me now. Not only am I the squadron safety officer, I'm also the senior pilot and the only formation-qualified lead. I was needed in this capacity during Red Flag Alaska to help qualify other pilots and to accrue much needed training-readiness points. Also, our accelerated deployment-turn-around cycle didn't afford much time to waste. I knew all these things, but I didn't think about them that night as I walked onto the basketball court.

ORM isn't just for work-related operations. It's important for leaders at all levels to incorporate the process of ORM into all our daily activities until it becomes second nature. We also need to encourage those whom we lead to do the same. Only then will we really be able to identify all the risks we face and prevent them from occurring. **S**

Resources:

- Risk Management Resources, <http://safetycenter.navy.mil/toolbox/riskmanagement/default.htm>
- ORM Presentations, <http://safetycenter.navy.mil/presentations/orm/default.htm>
- Basketball Safety Brief, <http://www.safetycenter.navy.mil/ashore/Recreation/safetybriefs/basketballBrief.htm>

Vacuumping Gasoline— *A Bad Idea*

Author's Name Withheld by Request

It was early May, and my grass needed to be cut. Before I could start, though, I had to get some gas for my mowers. I grabbed two approved containers (a 5-gallon and a 1-gallon), jumped in my car, and headed to the local service station, just 15 minutes away. Everything was OK until I returned home and opened the trunk lid to find that the small container had tipped over and emptied its contents into the trunk.

I first soaked up most of the spill with a beach towel... and I wish I could tell you my next move was to call an authoritative source for guidance. That isn't what happened, though. Instead, I went to work sucking up the remaining gas with a wet-dry vacuum. Disaster struck moments later when a spark from the vacuum ignited vapors in the car's trunk.

My first reaction was to turn away from the fire, and I remember looking behind me, thinking someone would be there to help. I quickly realized, however, that no one was around, nor would anyone likely come running to help. I live in a neighborhood with 1-acre lots, so the houses aren't that close together.

When I turned back around to the car, I could see the flames were contained inside the trunk. I ran to a fire extinguisher about 6 feet away, at the front of the garage, but couldn't use it because I wasn't able to pull the safety pin. My burned hands were hurting too badly, and I was too excited.

Realizing the extinguisher wasn't going to be of

any help, I ran to a phone in the garage and dialed the 9-1-1 operator. I didn't wait to speak to the operator; instead, I laid the phone down and dashed inside the house to get my car keys. I knew the operator would stay on the phone, and besides, I had to get my car backed outside the garage and protect the house, my motorcycle, and everything else I owned, including a cat. I remember thinking I should have enough time before the car exploded. At least, I was willing to take that chance because I didn't want to lose everything.

When I hit the brake pedal to stop my car, the trunk lid slammed shut and smothered the fire. I wondered later why I hadn't just closed the trunk lid to start with but realized I was too afraid of the flames to get near them again.





Photo courtesy Leah Savage

The local fire department and rescue squad arrived within 10 minutes. During that time, I had spoken to the 9-1-1 operator and had started splashing water from the garage's deep sink on my arms and face to soothe the burns.

Because of heat damage to my throat, I was having trouble swallowing (a very scary experience), so the EMTs sedated and intubated me, and I was airlifted to a local hospital with a burn center. It turned out the 1st- and 2nd-degree burns running from my fingertips up to my elbows didn't warrant admission to the burn center, but I was admitted to the intensive-care center, where I spent 30 hours.

Being intubated absolutely was the worst part of my whole ordeal, mainly because the medical personnel couldn't decide whether to pull out the tube. They brought me back to consciousness at least three times, and on each occasion, I fought with the tube. They eventually decided to leave it in and to keep me sedated for 24 hours. After removal of the tube, they observed my condition for another six hours before releasing me.

I missed four days of work and didn't have use of either hand for six days. Almost two weeks passed before I had use of my left hand, which was severely swollen. My injuries were 99 percent healed after only three weeks, and today, the only remnants are some pinkish, tender skin on my left hand that eventually will fade. Thankfully, there are no scars.

Because I work in a male-dominated environment, I've been careful not to openly discuss my incident. I admittedly caused the problem because of a stupid decision, but I didn't want to hear a bunch of flippant comments about my "doing a dumb women's thing." A few of the guys did ask what caused the spark, and when I explained it was something I was doing, they were respectful and didn't ask any further questions.

My biggest irritation came while my burns were healing. Strangers would ask what had happened, and when I gave them a general outline, nearly all would go on and on about how lucky I was. Sure, I'm lucky to be alive and not horribly disfigured, but it really bothered me they could so casually dismiss the traumatic experience I had been through.

All the wounds aren't visible. I'm still dealing with emotional and financial repercussions that cannot be seen or measured. The damage estimate to my 2001 Acura was more than \$9,000, so the insurance company totaled the car. The compensation I received wasn't enough to replace the car, though, which means—you guessed it—I now have an unplanned car payment for the first time in two years.

I only hope my experience serves to remind others about the danger of using an electrical item near gasoline vapors. I especially encourage parents to watch their teenagers during lawn-cutting season and make sure they abide by all the safety procedures. ■

This author isn't the only victim of such an incident. It didn't take much research to find the tale of a man who suffered the same kind of injuries (1st- and 2nd-degree burns) while doing the same thing (vacuuming gasoline from the trunk of his car) as the author. There was one difference: The explosion in that case sent his garage door flying across the street and rattled windows in numerous nearby homes.

Meanwhile, another man was burned severely while siphoning gas from a motorcycle so he could work on it. He, too, was using a wet-dry vacuum when a spark ignited the vapors, causing an inferno that completely destroyed a duplex (see accompanying photo).—Ed.

Gasoline Handling Tips

Although gasoline-safety incidents at self-service gas stations are rare, it's important to know how to handle gasoline—both at the pump and at home. Here are some simple tips to help ensure every fueling experience you have is a safe one:

Filling Portable Containers. Use only containers with approved labels as required by federal, state and local authorities (red, 1-to-5 gallon metal or UL-approved plastic, with a vapor-tight cap). Never store gasoline in glass or unapproved containers.

Place the container on the ground at least 5 feet away from vehicles to prevent ignition of vapors by hot engines or mufflers. Never fill a container while it is in the bed of a pickup, the back of a station wagon, the trunk of a car, or anywhere else inside a vehicle.

Manually control the nozzle throughout the filling process and proceed slowly. Keep the nozzle spout in contact with the container to prevent static electricity build-up or discharge.

Fill the container no more than 95 percent full to allow for expansion. When you're finished, screw the cap on tightly and clean any spilled fuel from the outside of the container.

Transporting Gasoline in Portable Containers. Place the filled container in your car trunk or back of your pickup—not in the passenger area. Avoid carrying a container of gasoline in a van.

Restrain the container (e.g., some people use bungee cords), so it can't tip over or slide around while you're driving.

Never leave a vehicle with a container of gasoline in direct sunlight.

Remove the container as soon as you arrive at your destination.

Storing Gasoline Safely. Store gasoline containers



in a well-ventilated place—one that's inaccessible to children and pets.

Do not store gasoline inside your house.

Store containers away from ignition sources (gas pilot lights or flames, electric motors, stoves, heaters, etc.) and combustibles (paper, rags, cardboard, etc.). **S**

Resources:

- Gasoline Handling Tips, http://www.chevron.com/products/ourfuels/prodserve/fuels/documents/gasoline_handling_tips_brochure.pdf
- Clean Up Spilled Gasoline, <http://www.good-housekeeping.com/home/heloise/cleaning/clean-spilled-gasoline-jun07>
- Gasoline SafeTips, <http://safetycenter.navy.mil/safetips/a-m/gasoline-p.htm>

I Survived Iraq, But...

By HM2 James Bowes,
Naval Branch Health Clinic Mid-South

Ibroke my neck while vacationing with my wife in Hawaii.

You heard me right. After spending seven months deployed with 2nd Marine Logistics Group, Supply BN, Surgical Company, at Al Taquaddam Air Base, I returned home healthy and problem-free only to break my neck while on vacation with my wife.

We had decided to relax and enjoy being with each other, as well as friends and family in Oahu, Hawaii, one of my previous duty stations. One week into our vacation, we went to Sandy Beach (aka Break Neck Beach, aka Bones Beach).

Having lived in Hawaii twice before, I have had a fair amount of experience in the waves. I was riding one into shore when it slammed me on the beach. I landed on the back of my neck and right shoulder. I was able to walk out of the water, holding my arm, and told my wife I thought I had broken something. My original plan was to put on



a sling and have my wife drive me to a hospital, but realizing my neck was hurting, too, I had my wife get the lifeguards. They put me on a backboard, which was the best thing they could have done.

After a wild ride in an ambulance, multiple X-rays, and some MRIs, I learned that I had broken and dislocated two vertebrae (C4 and C5) in my neck, and they were pushing into my spinal column. *[My medical source tells me the author probably meant “spinal canal” or “spinal cord,” rather than “spinal column.”—Ed.]* I also had broken my right shoulder blade and displaced my right collarbone. The doctor said I needed surgery.

The next morning, doctors straightened out my neck by fusing C4 and C5 together and locking them in place with a plate the size of a silver

dollar, held together by two screws. My broken shoulder was the least of my problems; all I had to do for it was wear a sling. Thanks to an excellent hospital staff, I recovered quickly and left in only four days from the time I had gotten to the emergency room.

Time away from work was a different matter. It was at 21 days and still counting when I sat down and penned this article. I expect to find out at my next appointment how much longer I’ll be sidelined.

Here are the lessons I learned from this incident:

- Trust your instincts.
- Pay attention to the posted warnings.
- Just because you think you can doesn’t necessarily mean you can.

Last but certainly not least, count your lucky stars. I easily could have ended up like a patient who arrived at the same ER a few hours before me. He had similar neck injuries, which he sustained while doing the same thing I did. There’s one major difference, though: He’s not walking any more. 📌



Resources:

- On Oahu’s South Shore... Sandy Beach Park, <http://www.aloha.com/~lifeguards/sandy.html>
- Archie Kalepa: Waterman, http://www.makaihawaii.com/makai_preview_archiek.html
- Cervical Fracture, http://en.wikipedia.org/wiki/Cervical_fracture

Experience Only Good If You Use It

By GySgt. John P. Higgins,
Naval Safety Center

In May 2006, while assigned to HMM-365 (REIN), as part of the 24th MEU aboard USS *Iwo Jima* (LHD-7), I was supervising the ordnance-division pack-up. We were finishing our last work-up before a six-month cruise. We would offload the gear the next morning, and I wanted to ensure everything would be ready.

I had confidence in my Marines, but as the day went on, I became increasingly agitated with the speed at which they were moving. After about 16 hours of nonstop flight operations, packing, and a lot of yelling, I was fed up. Finding two of my Marines standing around doing nothing was the final straw. As I began to yell at them, they tried to explain they were waiting for two other people to help them move a large electronic pod into its container. I let go a litany of harsh words, including some about being lazy and weak.

I had the two Marines get on one end of the pod, and I took the other. On my command, we lifted and moved the pod into its case. While lowering the pod, its weight shifted, catching the middle finger of my left hand between the pod and the container. The sharp edge of the pod sheared off the tip of my finger.

I instantly knew I couldn't blame anyone but myself for my predicament. I told the two Marines to leave the pod where it was—only half in the container—until they had enough people to finish stowing it. Meanwhile, I pinched the end of my finger, bit my lip, and proceeded to medical. I spent the next few hours being visited by everyone from the captain of the ship on down, with each asking me to retell the whole story. At the same time, medical personnel cleaned, poked, snipped, and ground down the rest of my finger. The cleaning part was the most painful. The doctors weren't sure if I'd ever grow a fingernail or regain feeling in the tip of my finger.

Two years have passed since that painful day, and while I did grow a small fingernail, I still have no feel-



ing in my middle finger. It's now the same size as the two fingers next to it. I've kept the tip of my finger in a jar as a reminder to always put safety first. My 16 years of experience didn't protect me that day. I was complacent, I rushed, I ignored procedures, and I paid the price. The worst part of all is that I knew better. ■

Resources:

- Marine Corps Institute: Operational Risk Management, <http://safetycenter.navy.mil/orm/downloads/ORM-USMC.pdf>
- Battle the Blue Threat Safety Campaign Plan, http://safetycenter.navy.mil/bestpractices/aviation/downloads/HMM-268_blue_threat.pdf

LCUs Add Risk to Well-Deck Ops

By Ltjg. Jessica Poniatoski,
USS *Boxer* (LHD-4)

The first several operational days of our deployment to Central and South America in support of Operation Continuing Promise 2008 proved to be challenging for *Boxer's* young line handlers (boatswain's mates and deck seamen). Three of them suffered minor hand injuries.

In their defense, I need to point out that well-deck operations during this deployment weren't exactly routine. We didn't embark the faster and safer landing craft air cushions (LCACs) as usual. Instead, we were working with two landing craft utili-

ties (LCUs) from Assault Craft Unit One, based in Coronado, Calif. [*Boxer is the first LHD in eight years to embark two LCUs on deployment.*] As a result, launch and recovery became more risky.

The main issue affecting all well-deck operations is sea state, which in this case was high. Given the LCUs' size and limited mobility, that factor became increasingly important. With eight feet of water in the well deck and significant wave action, our line handlers on the wing walls had difficulty controlling the craft and preventing them from crashing against the battle boards.



Navy photo by PH3 Marvin E. Thompson, Jr.



Navy photo by MC3 Jhoan Montolio



Navy photo by MC1 Ken J. Riley



Navy photo by MC2 Oscar Espinoza

Constant adjustments and readjustments of the eight lines around the T-bits were necessary to control the LCUs as they moved port to starboard, forward and aft. When bringing one into the aft spot, even after bringing up the stern gate to reduce wave action in the well, the craft still would move abruptly, making line handling even more demanding and dangerous.

To meet the increased risks and to prevent any more injuries, deck department's upper chain of command organized a safety stand-down. Everyone got reacquainted with line-handling procedures, well-deck safety practices, and ORM.

Senior Chief Boatswain's Mate Deondra Quarles, the departmental LCPO, led the training session on general well-deck procedures, proper line-handling techniques, repeat-back line commands, and an understanding of how the craft master positions an LCU in the well. Line handlers then practiced their skills in a controlled environment, focusing on line movement, hand positioning, and keeping a minimum of 18 to 24 inches away from the T-bitt. Training concluded with Sailors adjusting the lines on the T-bitt in conjunction with tensioning and de-tensioning of the lines to simulate movement of the craft.

The safety stand-down proved successful, as demonstrated by the fact all future launches and recoveries during the deployment were conducted without a single mishap. ■

The author is the ship's first and third division officer.

Resources:

- Know the Risks of Well-Deck Ops, and Manage Them, <http://www.safetycenter.navy.mil/MEDIA/fathom/issues/AprJun02/knowtherisks.htm>
- USS *Bataan* Launches, Recovers LCUs, http://www.news.navy.mil/search/display.asp?story_id=28801

He's Efficient... What



Navy photo by PH3 Lamel J. Hinton

By John Mapp,
MARMC

A short time ago, at a naval station not so far away, a contractor was hired to do some welding on an LCAC. He girded his loins and pondered the most efficient way to do the job; he had to repair a damaged fuel tank.

You'd expect that a brief risk assessment would be in order. A rational person would consider using mechanical ventilation (to ensure plenty of fresh air), a good general-purpose cleaner (to remove any remaining fuel residue from the surfaces to be welded), and an AFFF extinguisher for the fire watch.

This warrior of the arc welder, though, was above such petty concerns. His sole purpose in life was to do the job as quickly as possible. He squared his shoulders and made a few quick decisions. Mechanical ventilation just would get in the way. Besides, a nice breeze was blowing—that oughtta be plenty of air.

Completely cleaning the bulkheads of fuel residue before starting probably was unnecessary, too. Being a “professional” (said so right on his certificate from the Three Stooges School of Industry), our stalwart laborer probably could get by spot cleaning the areas

Else Is There?

immediately around the seams just before striking an arc.

“AFFF? Bah! That stuff’s expensive, you know. The fire watch could make do with a small water extinguisher.”

In the interest of efficiency, our hero decided he’d skip the general-purpose cleaner and use a much more effective penetrant cleaner and developer. He was so efficient he didn’t even bother reading the warning label, where he would have seen these phrases, “*highly flammable*,” “*use only in well-ventilated area*,” “*avoid contact with skin or clothing*.” No such picayune concerns would distract our master of efficiency.

Humming contentedly, our manic metalworker set up his arc-welder, turned on the power, ran the cables into the tank, and put a welding rod in the stinger, which he then laid on the deck. A few quick sprays of the penetrant cleaner, followed by vigorous wiping of the bulkhead with some handy rags, removed the possibility of any fuel remaining on the metal surface. For the sake of efficiency, our hero wore his welding gloves for the entire evolution. Changing gloves takes time, you know. Gotta be efficient... manage one’s time.

Our master of efficiency quickly developed a rhythm. Spray the bulkhead, wipe it down with rags, drop the rags on the deck, pick up the stinger, and run a bead on the metal. Perhaps he was so absorbed in his work that he didn’t notice the pile of cleaner-soaked rags at his feet. Maybe the breeze outside the tank wasn’t enough to prevent the build-up of brain-fogging fumes in the tank. In any event, our hero reached down to pick up the welder and accidentally struck an arc on the deck. The cleaner-soaked rags efficiently burst into flames.

“Don’t panic,” our hero thought to himself. “I’ll just toss these rags out onto the concrete so the fire watch can put them out. No problem.”

Maybe the combination of welding fumes, fuel, and vapors from the penetrant caused him to forget that his gloves were soaked in the highly flammable cleaner. Perhaps he was simply unaware of it, or decided to ignore the fact for the sake of efficiency. In any case, our hero grabbed the merrily burning rags with his gloved hands and tossed them out of the tank.

“Hmmm...” our hero thought to himself. “Maybe there was a problem with that idea after all. My hands


seem to be burning. What would be the most efficient way to deal with this problem?”

Our hero quickly abandoned efficiency and followed the burning rags out of the tank. He held out his burning gloves, and the fire watch dutifully hosed them down... and hosed them down some more... but the water wasn’t putting out the fire. “That’s not very efficient at all,” he thought.

Our hero then pulled off his gloves and ran water over his hands in a sink until the flames finally subsided. At this point, the fire department arrived and fastened him to a stretcher for that always-exciting ride to an emergency room. The doctors there worked on his second- and third-degree burns.

Many errors contributed to this very inefficient conclusion. A basic risk assessment should have included more than just the risks of not wasting time. What about the hazards involved? Perhaps our efficiency expert should have gone a little farther with his concern for the most efficient way to do the job. How much work is he going to accomplish in the burn ward? Despite the greater set-up time, using the proper cleaner and wiping down the bulkheads before striking an arc would have prevented this injury (thereby resulting in more efficiency). Our hero also should have kept the welding area clear of flammable materials. Laying the welder on the metal deck probably wasn’t the most efficient idea, either.

Professional welders have a set of rules and work habits that are meant to keep them safe while they do their job. These rules and work habits were developed because someone else paid the price for not doing the job right. Every time people take shortcuts with fundamental safety precautions, they risk writing a new chapter for that set of rules and work habits—in blood.

Always remember that mishaps represent very inefficient use of your time. Sacrifice safety for efficiency, and you end up with neither one. 

Resources:

- Arc Welding Safety, <http://www.cdc.gov/nasd/docs/d000801-d000900/d000873/d000873.html>
- Safe Practices Promote Arc Welding Safety, <http://www.lincolnelectric.com/knowledge/articles/content/lenstaybl.asp>

Taking ORM to the Next Level

By Cdr. James Koeltzow,
USS *Kitty Hawk* (CV-63)

All the Navy's most tactically effective commands have implemented operational risk management (ORM) into their processes and culture. The challenge for championship teams is to improve continually on those processes and execution.

For ORM, the initial challenge is to take the model and information provided by the Naval Safety Center and training lessons located on Navy Knowledge Online (NKO) and instill it into the thoughts and habit patterns of every Sailor. For units that are deployed, as *Kitty Hawk* is much of the time, a critical barrier to getting out the information is connectivity to Web-based systems and quality training programs. We have loaded many of the NKO programs into the shipboard computer systems where it easily can be accessed through the Sea Warrior link.

Once that knowledge is fully integrated into the command culture, we should ask ourselves how we can make ORM more effective. Another significant barrier is making ORM easily understandable and retainable. We addressed this issue by modifying the five-step ORM process into three simple questions:

- How can I screw this up?
- How can I keep from screwing this up?
- If I cannot keep from screwing this up, whom do I tell?

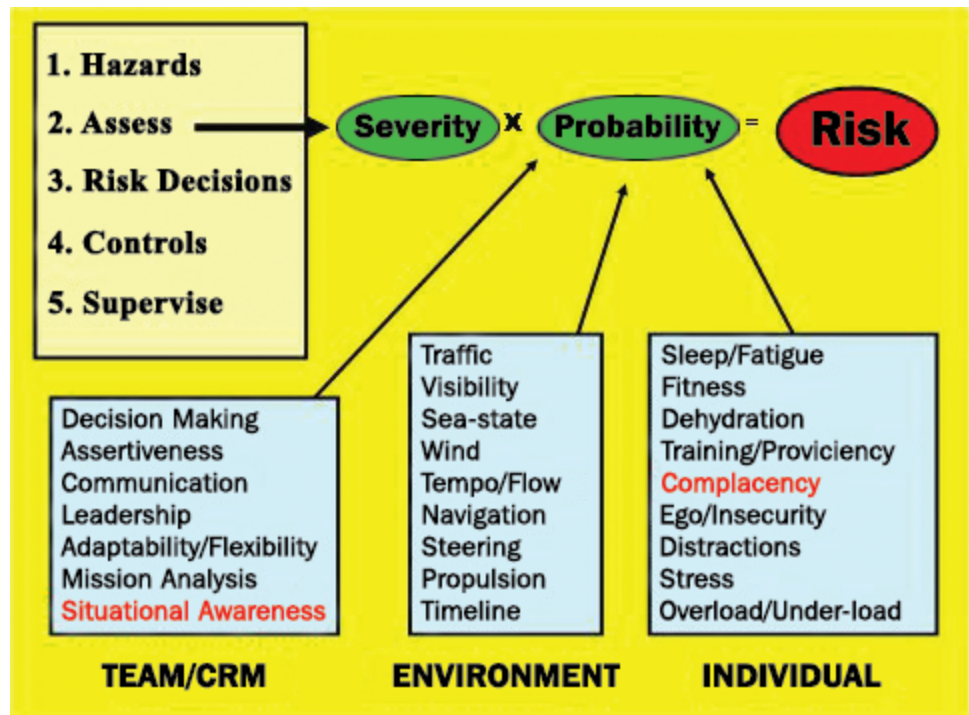
This change has proven to be very effective and is in the NKO ORM training as a safety best practice.

In our briefs on *Kitty Hawk*, we have expanded

the ORM model and perhaps more accurately structured the process. We systematically incorporated individual, team and environmental factors into the five-step process. I had noticed many Navy briefs and some messages in which conditions such as situational awareness incorrectly had been identified as hazards. More accurately, situational awareness or a lack of it is a condition that affects the probability that a hazard may cause injury or damage.

You will notice in my model (*see accompanying chart*), all of the CRM (crew resource management) principles are team or social factors that impact ORM probability. This point is important in terms of how safety concepts we frequently use fit together in the big picture (*see accompanying example, using a common evolution like underway replenishment*).

Starting with hazard identification, let's use





the RAS (replenishment at sea) with a new ship—one we haven’t worked with—and the sea state is projected to be high (rough seas). Both factors would be highlighted in the brief for increased probability for a collision, and the question is asked: Do we want to impose some mitigation strategies? In this case, the CO may want to change the replenishment course or perhaps put his most experienced personnel on watch stations, both of which would reduce the probability component.

When briefing ORM before operational missions, we almost exclusively are dealing with factors that

line-handling or a line breaking loose as the hazard example. It passes the hazard-validity test because it can cause damage, and it can injure personnel. Situational awareness cannot injure someone or cause damage and, therefore, is not a hazard (e.g., *I was lying in my rack, fell asleep, and lost situational awareness. So what? I do that every day and most of the night. This isn't a problem unless a hazard exists, like perhaps the No. 3 main machinery room directly below.*)

The next step of the ORM process is to assess the risk of the hazard. What is the chance a line might break, and if it does, how much damage will it cause? It's quite possible a line might break, but if all personnel are positioned strategically, the possibility of injury and amount of damage should be minimal. The overall risk assessment would be medium.

However, if your assessment includes some of the team, individual and environmental factors listed in the example, such as sea-state, fatigue, complacency, and/or poor communications, the probability of injury goes up. The hazards never really change from one evolution to the next. Rather, it's the social, personal and environmental conditions that change and subsequently cause changes in the risk assessment. Mitigation strategies should be directed at these conditions, not the hazard, to reduce probability or severity.

For example, an underway-replenishment hazard is ship collision. The standard risk assessment is medium (probability is low, but the severity could be very high). Let's say, though, we brief that we're doing

affect the probability of an identified hazard that causes damage. The hazards associated with missions rarely change and, in most cases, should be standardized. Potential severity does not change much, either, and is predominantly mitigated with PPE solutions that are mandated by NATOPS, instructions and SOPs. Using a briefing slide similar to the example included with this story will aid decision-makers in considering some factors that otherwise may get overlooked.

Deeper understanding of the ORM process and how our safety concepts integrate and relate to one another, along with continued emphasis on aggressively executing ORM, will keep yielding operational effectiveness success. ■

The author was the ship's safety officer at the time he wrote this article. Kitty Hawk is expected to be decommissioned in January 2009.

Resources:

- Operational Risk Management (ORM), <http://www.safetycenter.navy.mil/orm/>
- Operational Risk Management Training Online, http://www.navy.mil/search/print.asp?story_id=9823&VIRIN=&imagetype=0&page=1
- Operational Risk Management (ORM), http://www.safetycenter.navy.mil/instructions/orm/3500_39B.pdf

It Could Have Been a Smelly Mess

By DC1(SW/AW) Kenneth L. Wurster,
PCU *George H. W. Bush* (CVN-77)

It was about 0700 one cool, autumn morning when the boatswain's mate of the watch started piping sea and anchor detail. We expected to be moored at 1000—but that was before a problem developed.

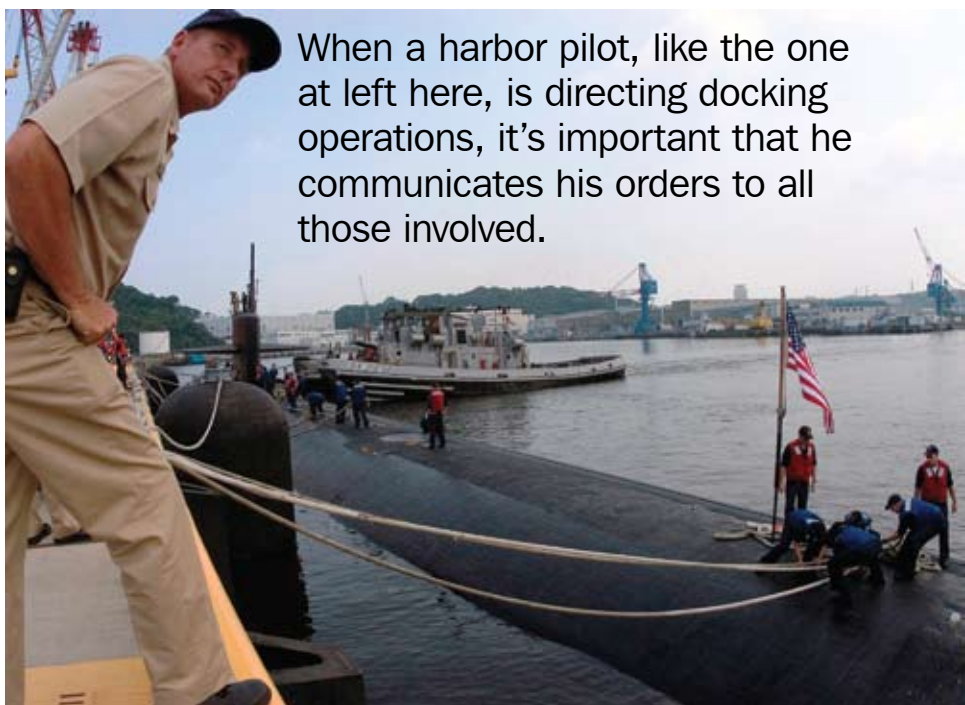
Everything was OK while transiting the channel. The tugs met us and came alongside as we moved toward our pier. The ship then turned and headed into the assigned berth. When we were close enough to the pier, a signal was given to put over all lines. Members of a pierside working party grabbed the lines and kept taking up slack as the tugs inched our ship closer to the pier. Once all ship movement had stopped, workers connected hotel services—steam, potable water, electrical power cables, CHT (collection, holding and transfer system), and oily waste.

The pilot for our docking, however, wasn't happy with the ship's position and commanded the tugs to move us about 50 feet aft. The problem was that he didn't tell anyone on our ship what he was doing. With this unexpected movement, mooring lines began tightening up, and deck hands were working frantically to slacken them.

Unfortunately, there wasn't much we could do about the hotel-service lines because they don't have much slack in them. Our biggest concern were the CHT lines—two forward and one aft—which were full because they had been pumping down our tanks from the three-hour sea-and-anchor transit.

The CHT-detail leader secured all pumping and ordered a flush. At this point, the forward CHT line was strained. Personnel from PWC still were on scene and were ready to disconnect if they had to, but they didn't want to have a CHT spill, either. They signaled to the dockmaster to have the ship stop.

On deck, the CHT line was extremely tight, and it looked like the CHT riser was starting to bend from



When a harbor pilot, like the one at left here, is directing docking operations, it's important that he communicates his orders to all those involved.

Navy photo by MC3 Matthew R. White

the stress. The word we got was that pumping had been secured but that flushing would take five more minutes.

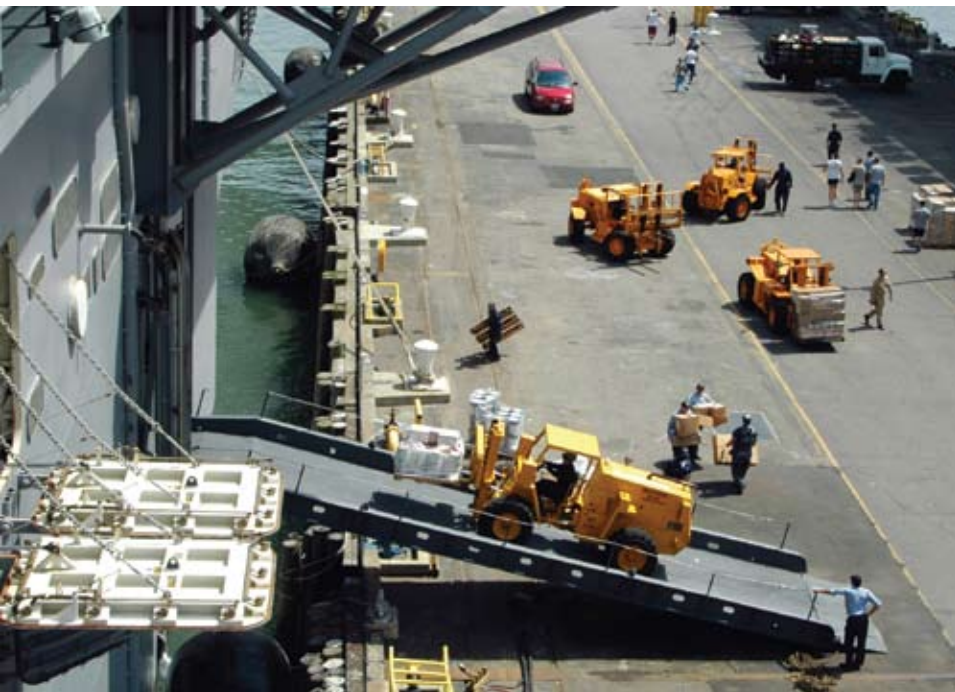
When the dockmaster came over and realized our problem, he secured all movement of the tugs. They went into reverse, which allowed the ship to move forward just enough to add slack back in the lines. It was a close call, but no CHT was spilled during this incident. ■

The author was assigned to USS Cole (DDG-67) when this event occurred.

Resources:

- What's That Smell?, <http://safetycenter.navy.mil/media/fathom/issues/AprJun01/WhatsThat.htm>
- Sewage Safety Presentation, <http://www.dcfp.navy.mil/mc/presentations/DCASE7-18/DCASE7-181.htm>

Walkin' and Talkin' Can Be Hazardous



Navy photo by PH3 Bradley Dawson


A forklift loaded with stores moves up an LPD's ramp.

dangerous environments Sailors ever encounter. Anytime you're aboard new construction in a shipyard, the danger level is elevated. Part of the problem is that some safeguards enjoyed by operational ships haven't been brought online yet. And once the move-aboard swings into motion, the daily pace becomes incredibly hectic.

These two Sailors should have paused their conversation long enough to take note of the forklift ahead of them. Had they done so, they would have noticed they were following too closely, which limited their response time. They

also would have seen the forklift was having trouble. These Sailors weren't the only ones at fault, though.

One has to wonder why no safety observer was present to watch the forklift operations. Did anyone apply ORM to a heavy forklift, under a load, driving up a plastic-covered ramp? Had the supervisor for these Sailors warned them about keeping their distance behind a forklift?

The most important lesson to take away from this incident is that it pays to be aware of your surroundings—all the time. 

The author was assigned to USS Iwo Jima (LHD-7) when this event occurred.

By ET1(SW/AW) Marshall B. Werner,
PCU *George H. W. Bush* (CVN-77)

After months of living in government quarters, members of an LHD's precommissioning unit (PCU) were starting to move aboard ship. Among those carrying their seabags up the boarding ramp were a couple of Sailors who were deep in conversation. This duo was so engrossed they didn't notice the forklift in front of them just had stopped... and was sliding backward. The forklift's wheels had lost traction on the plastic that had been laid on the ramp to protect the nonskid.

Shipmates began shouting to the two Sailors, trying desperately to warn them of the impending danger, but everything was happening too fast. Just as it looked like the Sailors were going to be clobbered, the forklift's load shifted off-center, pulling the forks to one side and running the load into a bulkhead.

The list of things that went wrong here is long, starting with the fact the two yak-a-holics had lost situational awareness in one of the most inherently

Resources:

- Forklift Procedures (Shipboard), http://www.safetycenter.navy.mil/bestpractices/afloat/Kearsarge_forklift.htm
- Staying Safe in the Shipyard, http://findarticles.com/p/articles/mi_m0QVD/is_2004_Summer/ai_n6134527

BEST PRACTICES

A Little Attention to Detail Goes a Long Way

By EMC(SW/AW) Brian S. Long,
USS *Gettysburg* (CG-64)

I was walking to work one morning on base when I came to a crosswalk. After waiting for all the cars to stop, I started across. Everything was OK until one of the cars jumped forward, barely missing me. The driver's foot evidently had slipped off the brake. Split-second lapses in attention to detail like this can lead to serious injuries.

One of the cornerstones of safety is attention to detail. As we walk through our spaces daily, we often let down our guard. When we stop paying attention, unsafe conditions develop, and that leads to mishaps. To avoid such problems, we must focus on what we're doing, as well as what others around us are doing.

One of my toughest challenges as safety leading chief petty officer is to combat complacency. To aid our safety-division efforts, I've adopted one of our CO's favorite sayings, "A little bit, all the time." I pick one area for the safety petty officers to focus on each week. On Monday, I task them to look for every possible discrepancy in that particular area. By Friday, the discrepancies have been fixed, or they've been given a JSN (job sequence number).

I choose the tasking, based on hazard reports or discrepancies noted by the crew. My decisions are easy sometimes. For example, the assistant safety officer was walking down a ladder when she slipped and fell. Because she was paying attention, she avoided getting hurt. A look at the ladder revealed hardware was missing from the railing, and some of the treads were worn. Her fall was the result of unnoticed wear and tear.

This incident led to my first assignment for the safety petty officers: Inspect the ladders in all spaces. It was amazing how many ladders had problems. I couldn't understand how so many junior Sailors, chief petty officers, and officers could have used these ladders without noticing the discrepancies.

Planned maintenance requires a check of ladders once every 18 months. A lot can happen to a ladder in



Navy photo by MSN James R. Evans

a shipboard environment during that time, so it's critical that we take a fresh look at spaces.

I will continue tasking the safety petty officers weekly to inspect all the different areas (e.g., electrical safety, hatches and scuttles, stowage for sea, hazmat, and other safety-related areas). I hope this effort will improve the safety petty officers' ability to do space walkthroughs and also will break the cycle of complacency. Getting the attention to detail back where it needs to be will eliminate potential hazards and give our Sailors a safer working and living environment. ■

Resources:

- How To Target Human Error—And Prevent It, <http://safetycenter.navy.mil/articles/general/targethumanerror.htm>
- Complacency, <http://www.toolboxtopics.com/Contributed/Complacency%20%202.htm>

Guest Editorial:

Speaking Up for Speaking Up



Navy photo by JO1 Mike Jones

By John Mapp,
MARMC

A recent mishap onboard a surface combatant brought to light a potentially lethal problem. A contractor working as part of an inspection team got shocked while checking an electrical submersible pump. He wasn't wearing any PPE, nor was he following established procedures for the inspection team or the PMS card for the pump.

Two chief petty officers watching the evolution didn't correct the problem. Post-mishap interviews with the personnel involved revealed that no one onboard the ship was willing to tell the inspector that he was operating in an unsafe manner. Because he was

part of the inspection team, he was supposed to be a subject-matter expert. This kind of attitude can lead to serious consequences.

How many Sailors and Marines would permit senior personnel to perform unsafe acts because they're not willing to correct someone who outranks them? If a fireman is afraid to tell his LPO that he has to wear safety glasses when using a grinder, would he have the guts to tell his chief "no" when the latter orders him to do something patently unsafe?

"All right, Sailors. Pour this chemical into the toilets, and let it soak. While you wait, clean the outside of the toilets with this abrasive cleanser. What's your problem, seaman?"

"Chief, the can of toilet cleaner says to avoid using that abrasive cleanser near it because toxic gas might result."

"I just gave you an order, seaman."

For "safety first" to be more than an empty slogan, your basic E-1 must be encouraged to tell an O-9 to stop when he's doing something unsafe. *"With all due respect, admiral, I can't let you go into this compartment unless you're wearing eye and hearing protection."* Anything less means that safety automatically is trumped by rank, which could lead to a lot of needless injuries and deaths.

Here's the concept I suggest including in all ship-board inspections:

Include a review of the command's mishap log in each one. During the course of an inspection, an inspector could deliberately ignore a safety precaution in the presence of ship's-force personnel. If ship's force fails to correct the inspector, the ship automatically fails that portion of the inspection. The CO should be penalized in writing for failing to enforce safety regulations among his crew.

Once a few COs get burned, the rest of the officer cadre may start getting the message that safety is an integral part of their career path. Officers who wish to get promoted will have to encourage safe behavior and make sure their subordinates get the right safety training. We need officers who don't just encourage but insist that their subordinates correct unsafe behavior. ■

If you go snowmobiling this winter...

- Don't consume alcohol before or during operation.
- Slow down.
- Carry a first-aid kit, flashlight, knife, compass, map, and waterproof matches.
- Avoid riding across bodies of water when uncertain of ice thickness or water currents.
- Dress correctly (helmet, goggles or faceshield, and water-repellent clothing).
- Stay on marked trails or, where allowed, on right shoulder of road.
- Never travel alone, or if you must, tell someone your destination, planned route, and when you'll return.

