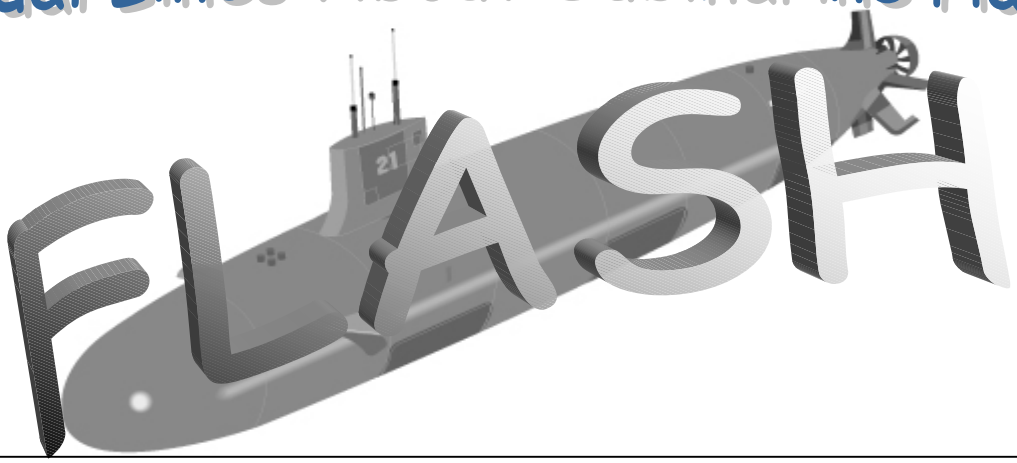
Submarine Division of the Naval Safety Center

Factual Lines About Submarine Hazards



March 2006 Top Deficiencies of 2005

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Route for Safety's Sake

CO _____ XO _____ NAV _____ ENG_____ CSO _____ SUPPO _____ MDR _____

DCA_____ COB _____ EDMC _____ 3MC _____ CPOs _____ Ship's DCPO _____

_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

_____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

This is a special edition FLASH which identifies the most common deficiencies by functional area (e.g., DC, Electrical, Mechanical, Safety Officer, etc.) our surveyors have noted over the past calender year. The purpose is two-fold; first to identify the top recurring deficiencies, thus arming you with valuable information; and, to provide specific guidance so **you** can prevent recurrence. The percentages indicate the number ofsubmarines that had these specific deficiencies. The main reason we collect and analyze this data is to provide you with a tool to minimize mishaps and prevent personnel injuries as well as to increase equipment reliability. Not only do we identify the problem, we also provide prevention methods with verifiable references that you can use to decrease mishaps and mean time between equipment failure and breakdown. When reading through these articles, remember this is not an all inclusive list and there are many other issues to be addressed. It is highly recommended that all-submarines visit our website at http://safetycenter.navy.mil/afloat/downloads/default.htm for more information and assistance. As always, if there are any other questions, we enjoy researching and responding to phone call and e-mail inquiries.

Medical

HMCS (SS) Juneau

100% of submarines surveyed were not providing medical surveillance for personnel assigned to duties involving CHT and/or other occupational exposure as indicated in the Industrial Hygiene Survey Report. Medical surveillance serves two purposes. One is monitoring the effectiveness of major, hazard-specific (e.g., noise, heat, asbestos) programs by following the health status of exposed personnel. The second is prevention by detecting early indicators of excessive exposure caused by the work environment before actual illness, disease, or injury occurs, allowing for the timely implementation of corrective actions to prevent any long-term adverse effects. The submarine's current Industrial Hygiene Survey Report and OPNAVINST 5100.19D provide a listing of required medical surveillance programs for personnel on board your command.

86.8% of submarines surveyed dealt with heat stress surveyors assigned to perform WBGT surveys. Most commands had no one assigned on their Watch Quarter Station Bill (WQSB). For those commands with heat stress surveyors listed on the WQSB, the individuals listed were not trained or qualified using the heat stress surveyor watch station 303 PQS of the safety programs afloat NAVEDTRA 43460-4B. In the majority of submarines, the MDR was the only one listed and trained. Personnel recommended to be assigned and trained include engineering roving watch standers and RL division for casualty response. The Naval Safety Center website has links to the PQS, videos and power point presentations for heat stress and WBGT monitoring and maintenance for training your crew and heat stress monitoring personnel. If your command has had a recent safety survey, your safety officer has a CD with this PQS on it.

Damage Control

MMCS (SS) Morrow

During the past year, damage control surveys have shown many of the same discrepancies of years past. The following items are the most common DC discrepancies observed. When setting priorities these items should be at the top of your list.

100% of submarines surveyed with SCBAs installed had at least one bottle below the 4000-psi minimum required pressure per the appropriate MRC. **Weekly** PMS requires that any bottle less than 4000-psi be removed from service and tagged until recharged. This PMS leaves no room for interpretation. This is to ensure that no person dons an SCBA that is below the minimum pressure. To avoid having SCBA bottles removed from service, recommend addressing this issue in the planning process leading to drill periods or times when the ship knows air bank pressures will not support post-drill-set charging.

81% of submarines surveyed did not complete S-4R of MIP 5556/004-35. This MIP covers the galley-range-guard system. The most common discrepancy is the scissor assembly not being properly adjusted for 3" of travel. If the scissor assembly does not have 3" of clearance there is a possibility that the nitrogen cylinder will not fully actuate the APC cylinder. A full review and understanding of the PMS card is essential prior to starting this PMS item.

79% of submarines surveyed had submersible pumps that were electrically unsafe. The reason was either the semi-annual check was improperly completed, or during use, the pump had cable sheathing pulled beyond the compression fitting, thus exposing electrical wire. Electrical tape is not a suitable fix for exposed electrical wires. The cable sheathing must be re-inserted into the compression fitting. This must be performed only by qualified, electrical-division personnel.

79% of submarines surveyed had OBAs with numerous mechanical discrepancies. All of these discrepancies should have been identified and corrected during the periodic or situational scheduled completion of Q-8R on MRC 6641. Guide rods contacting the plunger assembly and torn breathing bags are the most significant discrepancies noted. Proper completion of this PMS is a time consuming process. The work center supervisor should ensure that all maintenance personnel have a full understanding of the procedure prior to starting work. Post maintenance inspection by senior leadership would ensure that these deficiencies are not a result of improperly performed maintenance. Remember: in no other case is the phrase "expect what you inspect" more appropriate.

Electrical Recurring Deficiencies

EMCS (SS) Brunberg

Once again it is time to look back at the past year and review our most common deficiencies. Unfortunately we have repeat offenders from the previous year.

1. Navigation lighting panel N-1.

The N-1 panel is the worst offender again this year. **69.4%** of submarines surveyed had problems with N-1 panel hardware. The good news is that this is down **20%** from last year, however, we still have work to do. Many submarines surveyed had missing hardware or incorrect hardware installed. The N-1 panel can be a shock hazard and a potential killer if it is incorrectly configured. Two N-1 panel electrical shocks were reported in FY 2005.

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The problem is that there are exposed, energized, metal stiffeners inside the holes that are drilled through the circuit breaker handles to install interlock bars. The interlock bars flip between the primary and secondary circuit breakers and are installed on the common breaker with a metal cotter pin. The cotter pin must be insulated from the exposed metal stiffener with a plastic bushing (NSN 9G 5970-01-094-1582). The other end of the interlock bar is secured to the primary or secondary breaker with a thumbscrew. The thumbscrew (NSN 9G 5970-01-094-3317) must also be plastic, or it will complete the circuit to the metal stiffener and energize the exposed interlock bar if the bushing is not installed.

Make sure that your N-1 panel is safe and properly configured per A&I 3171 (SSN) or TZ 0856 (SSBN/SSGN). The plastic thumbscrews are easily lost and frequently wear out. I recommend all commands order extra plastic thumbscrews and keep them in a bag taped to the inside of the N-1 panel door.

2. Electrical Safety Programs.

This one is actually worse than last year up **5.6%**. Many submarines had excessive unchecked and out of periodicity electrical equipment. To make matters worse, in many cases there were no EGLs for electrical equipment and unauthorized power strips and extension cords being used onboard.

The problem: Electrical equipment is not being properly logged and tracked on EGLs per the applicable MRC, and unauthorized electrical equipment is being bought and used onboard.

To have an effective electrical safety program the command must train the entire crew. It must be clear that all electrical equipment onboard must be inspected and tagged (within periodicity) by electrical personnel to use it. Electrical division must accurately track all government-owned electrical equipment on EGLs and accomplish the PMS accurately as required. MIP 3000/029 governs the maintenance for all government owned equipment. This PMS requirement does not exist for personal electrical equipment. paragraph 2.7.3.6.1-2.7.3.6.9 of NSTM 300, Electrical Plant - General, provides detailed inspection and acceptance criteria for personal gear and clearly requires all personal gear to be tagged after inspection.

I have seen many unauthorized power strips with current electrical safety tags. Electrical personnel who perform electrical equipment inspections must know the requirements of paragraph 2.7.3.6 of NSTM 300 and follow the instructions on the MRC, note 5 of the scheduling aids on MIP 3000/29, states the only authorized power strips for shipboard use are listed with their national stock numbers.

Combat Systems

FTCS (SS) Lauber

During my first year at the Safety Center I personally noticed, and upon subsequent previous year reviews I have noted, the percentage of deficiencies has slowly decreased over the years. Unfortunately, we still have several areas that need improvement. In this special issue, I included the top problem areas with a solution for each. Let's keep up the good work and continue to improve in all areas of safety.

57% of the submarines surveyed did not have "AMMUNITION FAR SIDE" signs posted in all required locations. Paragraph 2.19.1 of "Ammunition and Explosives Safety Afloat Operating Procedures" (OP-4), Rev 7 requires these signs to be posted on the external side of all boundaries except for those external to the hull, and "Special Decorative Material."

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I do not consider a submarine's brown wood grain laminate as special material. On Tridents, a sign should be posted in the CO's stateroom on the backside of the small arms locker. This includes the middle-level passageway aft and above the ammo locker on SSN 688 class submarines. This will ensure the sign covers both the ammo and pyrotechnics lockers. OP-4, Rev 7, figure 2-1 and Chapter 5 of NSTM 700, Shipboard Ammunition Handling and Stowage. Figure 700-5-1, paragraph 700-5-11, illustrates exactly how these signs are to be constructed.

55% of the submarines did not have their dummy ammo container properly color coded and/or properly labeled. OP-4 states, "Practice/dummy ammunition is to be segregated from service ammunition." A separate spare ammo can is authorized for this. SW010-AF-ORD-010, "NAVSEA Identification of Ammunition," table 1-1 states that inert, or practice/dummy ammo is to be kept in a gold, vice a navy gold; yellow colored canister. Keep in mind that although these canisters may look the same the aforementioned colors are different. It is required to be stenciled with "FOR PRACTICE ONLY" written in 1" letters IAW OP-4 Rev 7 Para 3-14.11.

48% of the submarines could not produce the correct 'O' ring for the otto fuel gag assembly IAW Firing Craft Procedures OD 44979, Vol. 4. In some cases the crew had taped a spare 'O' ring to the bracket leaving behind tape residue, thus preventing a good seal. This is extremely important to prevent otto fuel from leaking inboard. OD 44979 Vol. 4 lists all the required emergency equipment for otto fuel spills. The Safety Center recommends placing a new 'O' ring, in its original packaging, in a plastic bag and taping it to the metal band of the assembly. This method protects the 'O' ring from dirt and decay, gives the user the expiration date, and prevents the tape residue problem.

I hope the combat systems area continues to lead the way in safety aboard submarines.

Deck

FTCS (SS) Lauber

Life preserver maintenance still continues to be a major issue in deck. In this issue I have compiled several of the top discrepancies noted during safety surveys over the past year. In each of these areas, I have listed the procedure or reference for you to correct them.

94% of the submarines surveyed failed to stencil their life jackets properly IAW NSTM 077, Personnel Protection Equipment, though this is not a life-threatening problem, it is still a requirement. Imagine yourself finding a life preserver floating in the water or washing up on a beach. Wouldn't you stop to think where did this come from? Was there an accident out there? Was there a body attached to this? If the life preserver were stenciled, it would be easier to answers these questions. NSTM 077 paragraph 2.2.2.1.2 states that life preservers will be stenciled in 2" high, black, block letters with the submarine's name and hull number on the back. Currently, there is no instruction or written order stating that stenciling is not required due to force protection.

Life Buoy rings: 75% of the submarines surveyed needed to replace their life buoy rings due to aging, poor material condition and incorrect stenciling. This stems back to the previous paragraph about life preservers. Properly maintained and stenciled equipment can answer the standard, who, what, when, where,

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and why questions. Paragraph 2.6.2.1 of NSTM 077 states, "The ring is to be stenciled with distinguishable, black, block letters with the submarine's name and hull number. NSTM 077 also explains how to attach the required two-inch reflective tape that is required around the entire ring at 90-degree intervals. Distress marker lights are to be attached with ¼-inch diameter polyethylene line as outlined in paragraph 2.6.2.2. Following this simple guidance will eliminate these common problems.

60% of submarines surveyed did not have current weight test documentation for the safety track and davit. The davit falls under paragraph 583-9.6.1 of NSTM 583, Boats and Small Craft. The IMA is responsible for the safety track using one of the following methods: HM&E Weight Test Procedure 111-5387 for SSN-688 CL, MS 1510-081-002 for SSBN-726 CL and TP 6111-2-201 for SSN-21 class submarines. The requirements and periodicities for completion have not changed. Davits are on 18-month periodicities and safety tracks are on two-year periodicities. Knowing and understanding these requirements is key to successful maintenance planning. You should maintain a copy of these results on hand. A copy can be obtained from your parent squadron. I recommend keeping them in the deck PMS binder.

60% of submarines surveyed did not complete start up PMS, correctly or at all, on their MK1 auto-inflatable life jackets. MRC 5832/014, SU-1 requires inspection and testing of life preservers and accessories. R-2 is related maintenance associated with SU-1. These procedures direct you to torque the auto-inflation actuation-retaining nut, and then inflate the life preserver. After two hours if the bladder had not leaked, then you are to apply anti-sabotage compound to the nut. Accomplishing these steps forces the removal of the shipping string and causes the maintenance person to install a copper shear wire on the actuator. I frequently hear from crewmembers on submarine surveys that they cannot find ordering information for the correct material. The PMS viewer program has a direct link to the SPMIG. SPMIG stands for Standard PMS Materials Identification Guide. The SPMIG lists the correct stock number for the anti-sabotage compound and copper shear wire, as well as all items listed in brackets in the tools and materials section of any standard MRC. Both the SU-1 and R-2 MRCs take several hours to perform, but are critical to ensure that life preservers operate correctly in the case of emergency.

Developing a more thorough understanding of all MRCs will lead to a safe environment. Do not wait until someone gets seriously hurt, or worse; the unspeakable occurs. Take the time now during a duty day, or slow underway period to read and develop an understanding of appropriate NSTMs and MRCs. Supervisors must continually train and educate maintenance personnel to achieve and maintain the high maintenance standards that submariners are accustomed to.

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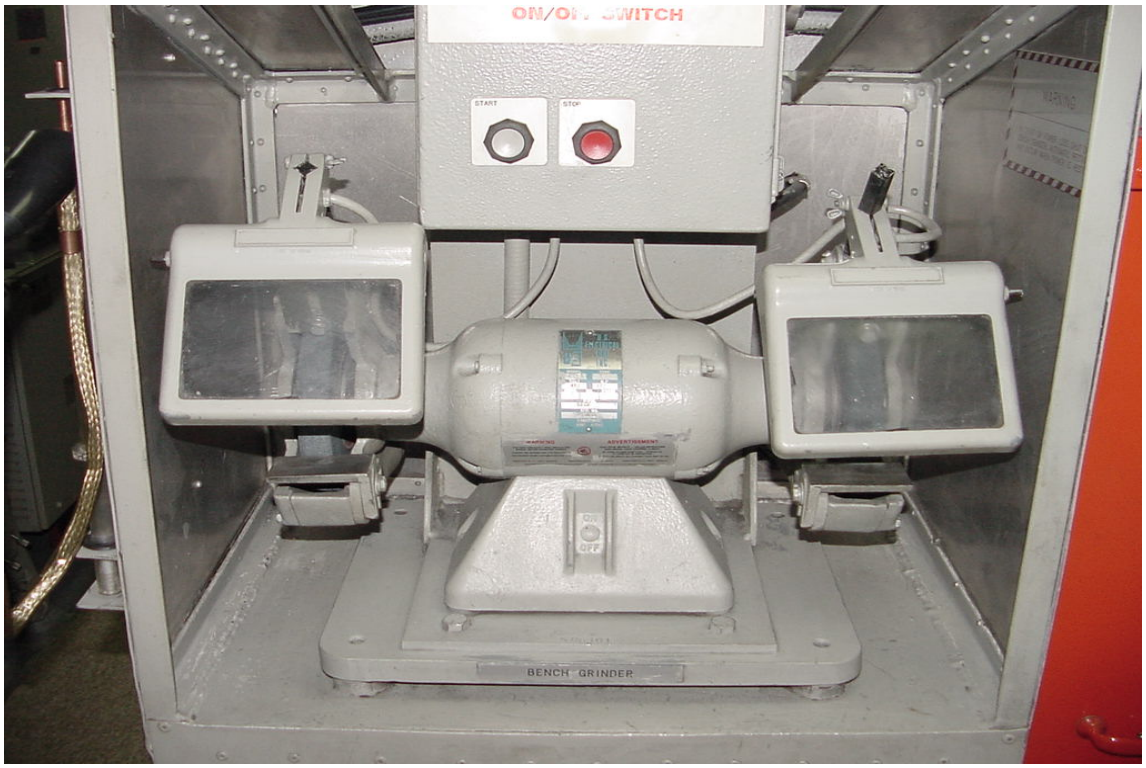
Mechanical

ETC (SS) Mackey



Bench Grinder Set Up Correctly

75% percent of submarines surveyed in 2005 had mechanically unsafe bench grinders. Noted discrepancies included **65.6%** misaligned/missing tool rests, **75%** broken /missing point of operation guards (chip shield), and **54.8%** worn grinding wheels most with embedded non-ferrous materials. Embedded metals in grinding wheels can cause them to fly apart at high RPMs. Usually the embedded materials are non-ferrous, and should not have been allowed to tooled on the grinder. These conditions could lead to serious personnel injury.

Inspect your bench grinder to ensure it is safe for operation. Attention to detail in performing MIP 6603/001 is paramount. Chapter D8 of OPNAVINST 5100.19D and MIP 6603/001 provide guidance on the maintenance required to ensure a safe working environment. Identifying and accomplishing PMS correctly is not only a requirement, but also a time-tested, proven method to keep your bench grinder safe.

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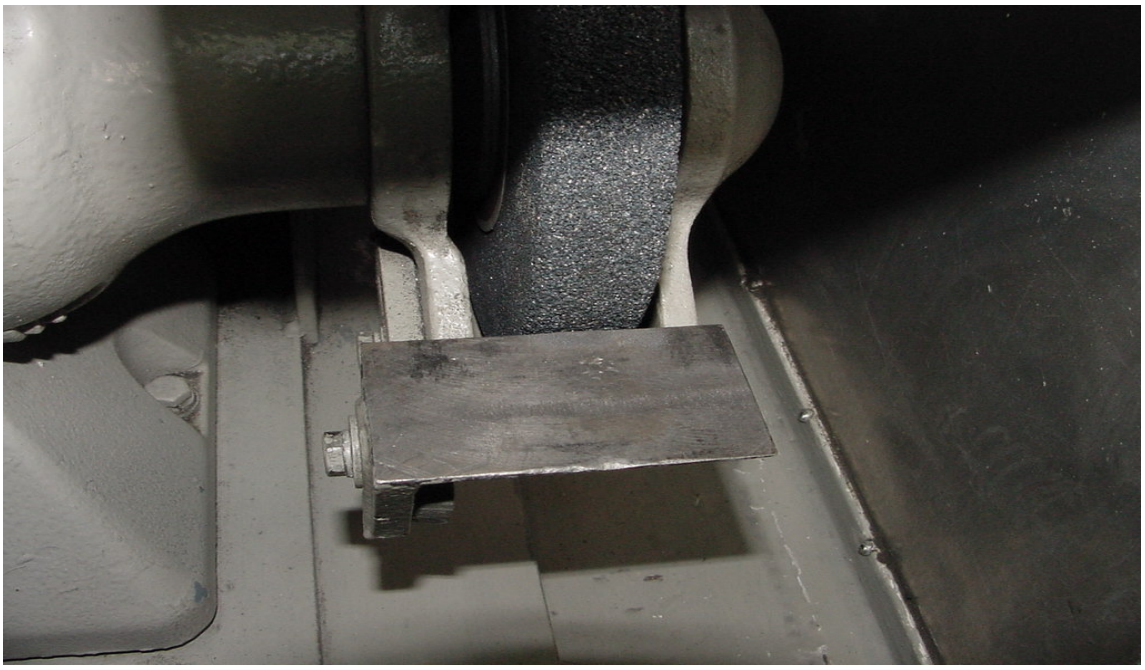

Tool Rest Correctly Adjusted

Some general guidelines as listed in OPNAVINST 5100.19D include:

A. Using a dressing tool to eliminate grinding wheel imbalance and possible disintegration.

B. Adjusting tool rests to within 1/8th of an inch of grinding/wire wheels.

C. Adjusting the grinding wheel hoods facing the operator to not less than 25 degrees and not more than 65 degrees from a vertical line drawn through the spindle center.

D. Ensuring non-shatter eye shields are properly installed and adjusted with the proper light bulbs installed. The school is four days long. Course criteria and locations can be found on our website under the training link at www.safetycenter.navy.mil.

Safety Officer

LCDR Chandler

95.7% of submarines surveyed did not have at least one officer and one senior enlisted qualified as ORM instructors as specified in paragraphs 6 and 7 of OPNAVINST 3500.39B. Instructors should be graduates of the OPNAV sponsored two-day application and integration course. Fiscal year course locations and information on how to obtain quotas, as well as a brief course description, was released via NETC Pensacola message 071855Z MAR 06 (NAVADMIN 077/06). Contact the Naval Safety Center for further information. The NKO ORM application and integration course is approved as a suitable substitute for submarines that are unavailable during the times listed on the message.

73% of submarines surveyed had not prepared requests soliciting outside occupational safety and health (OSH) support for industrial hygiene surveys (IH). These requests should state that an IH survey is required every two years and reference the OPNAVINST 5100.19D. These surveys should be requested from the nearest military treatment facility (MTF), or Navy Environmental Preventive Medicine Unit (NEPMU). Further assistance can be obtained from the Naval Safety Center, Submarine Division.

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General Departmental

LCDR Chandler

83% of submarines surveyed did not utilize fire retardant Navy wool blankets in berthing areas as specified in COMNAVSEASYSCOM 171551ZOCT01 (NOTAL). The following are the only authorized NSNs for these blankets: Crews Berthing: 7210-00-082-5668, Officers: 7210-00-282-7950. Additionally, a large number of submarines were found to be using foam mattresses, vice innerspring mattresses as required by COMNAVSEASYSCOM 081509Z MAR 04 (NOTAL). The following are the only authorized NSNs: Crew, Sub. (SM) 7210-01-498-0286, Crew, Sub. (REG) 7210-01-498-0292, Officer/CPO, Sub. 7210-01-498-0295.

83% of submarines surveyed were found to have flood control doors with door gaskets in poor/unusable condition. IAW MRC A-1 of MIP SO-592, these gaskets must not be cut and should come into full contact with the seating surface at all intended contact points.

76% of flood control doors did not lock and latch when released as required by GSO and GENSPECS 624. Although this is annual PMS, (MRC A-1 of MIP SO-592), implementation of more frequent inspections can be included into pre-underway check sheets, zone inspections, and as a point of inspection on housekeeping surveys performed by noise reduction petty officers.

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Effective COMNAVSAFECEN Submarine Safety Advisories

17-00	**201959Z DEC 00**	**Contract Liberty Boat (Water Taxi) Safety**
1-05	**031600Z JAN 06**	**Effective COMNAVSAFECEN Afloat Safety Advisories for Surface Ships and Submarines**

To download, you must be on a .mil domain terminal and have a PKI certificate. Go to our secure web site by selecting the 21HSecure site link. Once you are on the secure site, select the 22HAfloat Messages link, and then select the 23Hadvisories you need.

Warnings, Cautions and Notes

The Flash is a newsletter that provides safety-related information to the fleet. This information is a summary of research from selected mishaps and surveys done throughout the force. This data is provided to assist you in YOUR mishap prevention program and gives advance notice of other safety-related information.
This newsletter is NOT authoritative but will cite references when available.

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