

Factual Lines About Submarine Hazards

FLASH

Submarines



April - June 2009

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Route for Safety's Sake!

CO ___ XO ___ NAV ___ ENG ___ CSO ___ SUPPO ___ MDR ___ DCA ___

Safety Officer ___ COB ___ EDMC ___ 3MC ___ CPO Quarters ___ Ship's DCPO ___

When reading through these articles, remember this is not an all inclusive list and there are many other issues that should be addressed with regard to each section's attribute checklist.

Each section owner is cautioned to review the Hazard Reviews and for further information or assistance in improving your safety and / or processes go to:

<http://safetycenter.navy.mil/afloat/submarine/index.asp>

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.*

The 365 Day a Year Green Book and ORM CDR Webb

I've heard the underway "Deficiency Log" called the Green Book, Blue Book, Football, and Trouble Log, I'm certain that there are other less polite names for this book as well. In this topic I will call it the "Green Book." Most boats have an instruction guide, usually in the front cover, that discusses what the CO expects to be placed in the book and how it is to be routed. During a recent survey I reviewed a Green Book that was a little different than most and what I consider to be a fleet best practice. This visionary CO decided that if the Green Book worked well underway, why not benefit from it all the time and use it 365 days a year. By doing this he resolved communication issues by ensuring the right people were informed prior to conducting maintenance. He injected the Safety Officer into the review process to ensure that safety-related deficiencies were addressed properly. The Safety Officer is required to monitor, track and trend safety deficiencies to ensure they are resolved adequately (corrected or interim actions taken). Additionally, the 365 Day Green Book could be an excellent tool which provides new sailors a quick reference for command specific safety information during their indoctrination.

Great Stuff! I recommend a 365-day Green Book for all submarines.

I was thinking about how well this process worked and came up with an idea to push the 365 day a year Green Book to the next step. What if we added the requirements of ORM? In most cases your Green Book instructions cover many of the requirements of ORM, but does your Green Book require:

- (1) Date, Time, Location, and Description of the hazard or problem.
- (2) Risk Assessment Code (RAC) assigned by the person who made the entry and reviewed at every step of the routing process. CO informed immediately of RACs of 1 or 2?
- (3) Recommendation to mitigate the risk or corrective action taken to eliminate the hazard or problem
- (4) Residual RAC based on mitigation plan. Safety Officer approves mitigation for RACs 3 - 5.
- (5) Date the hazard/problem was corrected and supervisor who verified correction.

How do these additions to the Green Book support ORM you're asking? The Safety Officer is now injected into the process. Rather than ORM being a buzz word that few use or fully understand, you have now quietly pushed its daily use into a command program that is already in place. Think this encourages forceful back up! It will definitely have your personnel considering ORM and Safety more frequently, specifically when they have to enter or review a RAC that will wind up in the CO's hands. They are now being taught and using ORM and Safety considerations without having to sit through another "Death by Power Point." Now that's leadership! REF: OPNAVINST 5100.19E, para A0404D

Annual Workspace Safety Inspection

LCDR Beals

Now that we have finished spring cleaning and our HAZMAT and Atmosphere Control programs are up to speed, it's time to perform our annual workspace inspection. Annual workspace inspections are detailed in OPNAVINST 5100.19E, Chapter A3, specifically paragraph A0302. The following information is provided to ensure all the attributes of the space safety inspection are met:

1. Almost all submarines surveyed had a zone inspection instruction or policy that listed all workspaces on the boat. Use this list to ensure all workspaces are inspected. If your submarine does not have a list of workspaces, you will need to develop one.
2. Assign an experienced Officer(s) or Chief(s) to conduct the inspection. If this is not the Safety Officer, you will need to conduct training with the safety inspectors to ensure they understand the attributes of para A0302. Remember, this is a safety inspection focused on "hazard identification." This training shall be documented and retained by the Safety Officer with OQE to show all inspectors were trained prior to the workspace inspection. Keep copies of the completed space inspection and training OQE for 2 years. Safety inspections can be conducted in conjunction with zone inspections as long as the inspection includes the attributes of safety. Our experience is that zone inspections are being conducted, but without an emphasis on safety and hazard identification.
3. Safety inspections should focus on identifying hazards. What do I look for? Picture the lights going out and smoke filling the room. What in this space supports evacuation and what in this space would help or hinder combating the casualty? Another tool available to inspectors is the "General Departmental" safety survey checklist located on our web site. Some additional items to look for:
 - a. Unsafe work practices / proper selection and use of PPE / PPE available where required
 - b. Posting of warning signs or equipment placards / EAB deck markings in place
 - c. Assembly of stowage brackets, specifically compressed gas cylinders
 - d. Stowage, labeling and handling of HAZMAT
 - e. Escape hatches/scuttles - not obstructed and operate smoothly. Gaskets (good condition, installed correctly, and clean)
 - f. Fire extinguishers accessible, bolted down, stowed properly, PMS up-to-date
 - g. Doors operate smoothly, latch correctly, not obstructed. Check surfaced and submerged
 - h. Emergency lighting is not obstructed and working. Battle lanterns in place and tested sat
 - i. Ladders, secured (correct size fasteners), deck treads in good condition, handrail tight
 - j. Safety lanyards in place, hooks and chain the correct size and the chain is not plastisoled or powder coated (this prevents inspection and detection of corrosion).

Note: This list is provided to stimulate thoughts; each Safety Officer should develop an inspection guide for his submarine prior to conducting the annual inspection.

4. The Safety Officer combines the results, assesses them and assigns a risk assessment code (RAC) to each deficiency that cannot be corrected immediately. Prioritize the deficiencies by their RAC and focus efforts to correct them using the RAC priority! Track each deficiency through correction and monitor the deficiency information for trend analysis. The trend analysis information will be provided to the Safety Council (command leadership) so the team can identify areas of weakness and take appropriate action to eliminate hazards and reduce future mishaps.

Conducting workspace inspections for safety (hazards) continues to be an area of weakness and requires some team focus. Stay safe, be deliberate in your actions and take care of each other in execution!

REFs: Safety and Occupational Health Program Manual for Forces Afloat, OPNAVINST 5100.19E, 30 May 2007.

Damage Control MMC (SS) Fannin

Last issue we touched on the questions that arose while implementing the PMS Force Revision. From those questions I have submitted and received responses to several Technical Feed Back Reports (TFBR). Per the COMSUBFOR 3MC you are authorized to implement these changes as well. Work with your 3MC to ensure you implement these changes correctly.

NSC SER. NO. 63393-0017-09: For the DC Kits MIP 6641/009 MRC 67 C5CK N (Q-3R) Add new step 1.b. to read the following: If seals are found to be broken or missing, immediately conduct inventory of affected Damage Control Kit to ensure all required material is contained in the Kit. Immediately replace any material found to be missing in Kit.

NSC SER. NO. 63393-0013-09: For the MCU-2P Gas Mask MIP 6641/009 MRC 98 C3YZ N (R-40) Add new NOTE 3 after existing NOTE 2 to read the following: Not all MCU-2/P CBR-D protective masks have second skins (SS) installed. Second skins are being installed as masks process through the Navy CSF in Fort Worth, TX. Unless the mask has gone through the facility for rework and testing, the second skin will not be installed on that particular mask. If second skin is not installed, NOTES 4 and 5 and steps 1.g, 1.q.(reference to SS), 1.r., 1.t., 1.aq. (reference to SS), 1.aq. (reference to SS), 1.ar.(1) through 1.ar.(4) will not be applicable and may be omitted.

NSC SER. NO. 63393-0010-09: Another for the MCU-2P Gas Mask MIP 6641/009 MRC 98 C4TL N (A-3) Add new NOTE 3 after existing NOTE 2 to read the following: Not all MCU-2/P CBR-D protective masks have second skin (SS) installed. Second skins are being installed as masks process through the Navy CSF in Fort Worth, TX. Unless the mask has gone through the facility for rework and testing, the second skin will not be installed on that particular mask. If second skin is not installed, NOTES 4, 10 and 11 and steps 1.g, 1.h.(18) and 1.s.(1) through 1.s.(4) will not be applicable and may be omitted.

NSC SER. NO. 63393-0011-09: For the LiOH Hoppers MIP 6641/009-C8 MRC 17 C2NM N (A-14) You are authorized to make the following pen-and-ink change to MRC C2NM: Line-out the first Warning and replace with Preliminary step a. to read.. "Accomplish 3000/029: Q-10 (6FFE) to ensure blower/fan has been electrically safety checked". Add to the Tools, Parts Materials, Block of the MRC MIP (3000/029: Q-10 (6FFE)). Add to MIP 6641/009, A-14 Mandatory related maintenance column: 3000/029: Q-10.

NSC SER. NO. 63393-00002-09: For PKP extinguishers MIP 6641/009-C8 MRC 18 C4TA N (A-18R) should be modified as follows: Add the following new PARTS item 3:[14882] Ring, quad
--Changed existing step 1.t. to read the following: Slowly unscrew and remove fill cap, gasket and quad ring/O-ring.
--Changed existing step 1.w. to read the following: Clean and inspect fill cap, gasket, quad ring/O-ring, and cylinder threads for nicks, cracks and galling. If gasket and quad ring/O-ring are deteriorated or show signs of damage, discard and use new gasket and quad ring/O-ring (SPMIG numbers 13590 and 14882).
--Change existing step 1.aa. to read the following: Apply a light coat of silicone compound to fill cap threads, seat, gasket and quad ring/O-ring; reinstall fill cap, gasket and quad ring/O-ring. Tighten cap firmly hand tight.

NSC SER. NO. 63393-0030-09: For the SCBA MIP 5519/016-C8 MRC C8 C5DB N (W-1) Remove the website reference and replace with Note 5 "Links to authorized domestic and international retesters may be found at <http://phmsa.dot.gov/hazmat/regs/sp-a/approvals/cylinders>."

NSC SER. NO. 63393-0031-09: For the SSN-688, SSN-21 and SSBN/SSGN EAB MIP 5519/028-C8 MRC 57 9AMJ N (R-7) the following changes are authorized. In the TPMTE block add SPMIG 02086 Gloves, chemical and oil protective, disposal, SPMIG 03707 Goggles, industrial, non vented, delete SPMIG 00363 Detergent, laundry. Add new step 1.a. to read "Put on goggles and gloves.". Add new step 1.e. to read "Remove gloves an goggles."

NSC SER. NO. 63393-0032-09: For the SSN-774 Class EAB 5519/774-86 MRC 15 9QHY N (R-7) the following changes are authorized. In the TPMTE block add SPMIG 02086 Gloves, chemical and oil protective, disposal, SPMIG 03707 Goggles, industrial, non vented, delete SPMIG 00363 Detergent, laundry. Add new step 1.a. to read "Put on goggles and gloves.". Add new step 1.e. to read "Remove gloves and goggles."

Revised documentation will be available on PMS 3-09 CD ROM. Remember, the only correct way to fix a problem with or clarify the procedure in MRCs, is to submit a TFBR.

Sparkle vs. Personnel and Equipment Safety **HMCS (SS/AW/SW) Bonneville**

NSC received the following email concerning the use of epoxy paint (MIL-P-24441) while underway on a submarine. Painting while underway is an extremely dangerous evolution, not to mention the fire hazard associated with storing the paint on board and potential equipment damage. There are numerous lessons to be learned associated with underway painting on submarines.

While recently stationed aboard a submarine, our crew regularly painted while underway using the "one cup per day per person rule." In my final 2 months aboard the boat, we were making preparations for an up-coming ORSE. I began to question the "one cup" policy when we started painting underway with two-part polyamide epoxy paint. The fumes emitted by this paint caused the petty officer who was mixing it to almost collapse from dizziness and he had to leave the area and lie down down. Everyone on-watch in the engine-room during these days of painting had a headache, even though we were ventilating every few hours to reduce the vapors. The command believed that ventilating occasionally throughout the day was sufficient enough to remove the vapors, and painting was allowed to continue. The corpsman was informed and he confirmed the medical hazards and symptoms associated with this evolution, but the command felt the painting was necessary and directed it to continue.

The command decision to carry paint on board is permitted by the submarine atmosphere control manual, but the decision to paint underway is a direct violation of requirements. As leaders, we cannot enforce standards and procedural compliance nor can we expect our sailors to do the same, if we are going to ignore manuals and instructions written to protect our personnel and equipment. The hazards associated with painting and the requirements for painting are:

Per the MSDS for epoxy paint, personnel are subjected to the following Health Hazards by inhalation, skin contact, eye contact, or ingestion of the paint and vapors:

Irritation of respiratory tract. Prolonged inhalation may lead to mucous membrane irritation, fatigue, drowsiness, dizziness and/or lightheadedness, headache, un-coordination, nausea, vomiting, diarrhea, gastrointestinal disturbances, blurred vision, coughing, choking, difficulty with speech, central nervous system depression, intoxication, tightness of chest, anesthetic effect or narcosis, difficulty of breathing, allergic response, asthmatic reaction, tremors, abnormal blood pressure, severe respiratory tract irritation, severe lung irritation or damage, liver damage, kidney damage, pulmonary edema, pneumoconiosis, loss of consciousness, cyanosis, respiratory failure, asphyxiation, death.

COMNAVSUBFORINST 5400.38 (SSBN), 5400.39 (SSN) and 5400.48 (SSGN) SSORM:

Per SSORM, article 3102, painting of interior surfaces must be accomplished in accordance with article 4-3.2.6 of the Atmosphere Control Manual and OPNAVINST 5100.19E Chapter D12. "***Interior painting shall not be permitted under any circumstances while the submarine is submerged.***" Painting is permitted at sea only after surfacing from the last dive on return from patrol. Interior painting with conventional organic solvent based paints (alkyd, ***epoxy***, oil based) that exceeds one quart per day for the entire ship, shall be completed at least five days prior to departure for sea. Charcoal filters shall be replaced five days after conventional organic solvent-based paints have been utilized. Exhaust ventilation at a rate of at least six changes per hour shall be maintained during all painting and for at least 72 hours thereafter from any compartment in which any painting is done.

OPNAVINST 5100.19E:

Per paragraph D1203x., personnel shall exercise caution when using two-part polyamide paints in the vicinity of electrical generation equipment. These two-part polymer paints can release vapors that contaminate commutator films. Use of positive pressure units for motor generators can mitigate polyamide painting effects.

Naval Safety Center adds that painting prior to or during air charging operations has the potential of introducing atmosphere contaminants into the low pressure and high pressure air system and ultimately contaminating the EAB system.

The lost operational time and cost associated with motor generator repairs that are damaged by exposure to paint fumes is a well documented lesson learned.

Submarine Atmosphere Control Manual:

Appendix A of the Submarine Atmosphere Control Manual places all epoxy primers and formulas in the "Restricted" usage category. Restricted items are not allowed on board submarines while underway, except under specific exemptions, although they may be used on board in limited quantities while ***in port and ventilating outboard.***

Finally, paragraph 4-3.2.6 of the Submarine Atmosphere Control Manual states "***Under no circumstances shall painting be allowed while the submarine is submerged.***"

When confronted with the decision to paint for an upcoming inspection or follow the requirements, leadership chose painting in this case.

We must lead by example, lead from the front and make the right choices!

REFs: (A) COMNAVSUBFORINST 5400.38/39/48, Standard Submarine Organization and Regulation Manual. (B) Safety and Occupational Health Program Manual for Forces Afloat, OPNAVINST 5100.19E, 30 May 2007. (C) NAVSEA S9086-VD-STM-010, Revision 3, Chapter 631 Preservation of Ships in Service. (D) Submarine Atmosphere Control Manual S9510-AB-ATM-010/(U) Volume 1, Revision 4, 17 Oct 2008, Chapter 4, 7 and Appendix A.

Fluke MMC(SS) Fannin

DAMAGE CONTROL:

How many of you have obtained the latest AEL for the Tool Roll? It is 2-880043004 Revision April 2007. Note 3 of this revision requires SSN-774 Class to have one Fluke 77 III/BN multimeter in each Tool Roll and allows all other Class submarines to replace the old AUL 1410 Voltage tester with the Fluke multimeter on an as-needed basis. There are a couple things that we need to do to incorporate the new Fluke multimeter properly: The process described below only applies to the Fluke 77 multimeter used in the Tool Roll. There may be other calibration requirements for multimeters and test equipment used in other areas on board. That determination is based on the model and application per METRL.

1. Work with your ship's calibration coordinator and submit a feedback report to add the Fluke multimeter to your calibration recall list. SSGN and Virginia Class will coordinate with Squadron to add the item to their ships inventory.
2. Once the item appears on your inventory you can send the Fluke multimeter to the calibration facility.
3. The calibration facility will perform a one-time calibration of these units and then affix a "No Calibration Required" (NCR) sticker to the meter.

Note - Ship's force is not authorized to place NCR stickers on this equipment.

Note - If the Fluke 77 multimeter comes from Fluke calibrated (calibration sticker affixed to the unit), and the calibration due date has not lapsed, you are authorized to place the Fluke multimeter into the Tool Roll for use while you are waiting for the multimeter(s) to be added to your recall/inventory. Fluke multimeters that are out of calibration shall not be placed in the Tool Roll until they are checked by the calibration facility. NSC recommends replacing the old AUL 1410 Voltage Testers as soon as practical. The problem with the old AUL 1410 Voltage Tester is blown indicator lamps may provide incorrect indications. This will not be a problem if the operator uses the AUL 1410 to check voltage on a known energized circuit prior to and after using it on a damaged circuit.

REF: Navy Metrology/Calibration Program, METRPO 2.1 and Email between NSC and NAVSEA.

Electrical Shock ETCS (SS) May

Two submarine personnel received an electrical shock when they came into contact with the personnel brow. The source of power was an energized 440 VAC cable that had been run across the brow to provide power to a dive barge moored outboard the submarine. The cable had cracks that became saturated that night when it rained and shorted to the brow. A sailor leaving the ship received a shock when he grabbed the handrail. The sailor informed the Petty Officer of the Deck (POOD) he had just been shocked and you can imagine what happened next. Yep, you got it right, the POOD grabbed the rail to verify the shock report and also received a shock. The ship's electrical division verified the cable as the source and secured the power. Inspection of the cable revealed obvious cracks in the insulation. The cable also had an electrical safety tag attached indicating the cable had passed inspection within the last couple days. After the cable dried out, resistance checks returned to normal (as expected). The safety inspection is more than just a resistance check, it includes a thorough visual inspection of the cable and plug ends.

Since 1980 there have been 14 reported electrical shocks caused by stray voltage conducted to personnel brows. These shock incidents were caused by shorted lighting strings or power cables that were damaged by the brows movement and subsequently shorted to the brow.

Things you should take away from the scenario.

1. Stop being a lemming! Call away the casualty and secure the brow!
2. The electricians should have noted the damage during the electrical safety check. The divers should have discovered the damage while rigging the cable. Ship's force personnel (at a minimum; Sentry, POOD, BDW, Duty Chief, or Duty Officer) should have found this damaged cable using basic submarine watchstanding principles.
3. Electrical ratings are making two common mistakes. First: Tagging equipment that is unauthorized for submarine use. Second: Not following the MRC. This is not uncommon, we repeatedly find *unauthorized* multi-outlet power strips, power cables, and damage power cables with safety checks/tags (often recently checked). This is unacceptable!
4. The number of reported shocks is likely only a fraction of those that have occurred. This is due to changes that were made to the reporting requirements (OPNAVINST 5102.1D) and introduced in January 2005. The change was confusing and commands stopped reporting. There were 62 electrical shocks reported in 2004, 37 in 2005, 6 in 2006, and 6 in 2007.
5. **All electric shocks are mishaps requiring reporting, they require an EKG and this is greater than basic first aid = reportable mishap!**

Photo's taken during recent surveys.



The bottom line here, we must take a hard look at our electrical safety practices, Naval Safety Center's survey data indicates more than 90% of the boats surveyed had ineffective electrical safety programs and practices. Portable electrical equipment, both government and personally owned are not being tracked or electrically safety checked. REF: NSTM 300-2.17.5., and PMS.

Deck FTC (SS) Cahill

Manual Reverse Osmosis Desalinator:

During the past few surveys, I noticed personnel are not aware of the Planned Maintenance System (PMS) MIP: 5940/001 (Q-1R) for the Manual Reverse Osmosis Desalinator (MROD), step 1h., requires the sailor to "Place the unit in a plastic bag." Previous Force Revisions (FR) listed a plastic bag which did not fit the device. Device dimensions are called out as 3.70 inches wide by 5.70 inches in height by 22.4 inches in length. The SPMIG number has been updated for an 18 inch by 24 inch bag. This bag is not a Ziplock-type bag and does not have to be heat sealed. PMS card for MROD MIP: 5940/001 (48M-1), SPMIG number 11699 for Test Kit, is missing (NSN 4610-01-548-9743) required data and 11697 for Tool Kit (NSN 5180-01-549-6746). PMS TFBR has been submitted to correct the missing material items needed to complete the PMS. The 48M-1 maintenance requirement may require assistance from the Engineering Laboratory Technician (ELT) division for completion.



MK1 Life Preserver:

In February of 2009 we lost a sailor when he fell overboard and slipped out of his MK-1 Life Preserver. This casualty supported testing of Life Preservers by NAVSEA (April 2009). Some specific items of interest for the submarine fleet from this mishap are: (1) Ensure proper weight of CO2 cylinders (24 gram - Mk1 Commercial and 29 gram Mk1 Military Specifications, only) NAVSEA message DTG 031933Z MAR 09 addressed this issue. (2) Ensure proper fit of Mk-1 Life Preserver using chest measurement in circumference = small 36 - 38, medium 40 - 42, large 44 - 46, X-large 48 - 50, and 2X-large 52 - 54.

NAVSEA releases interim guidance for proper usage of deck safety equipment through messages, until Naval Ships Technical Manuals can be changed. The messages listed above are available on the Naval Safety Center website

<http://safetycenter.navy.mil/afloat/submarine/index.asp>

High Tech Resources FTC (SS) Cahill

The main page at <http://www.safetycenter.navy.mil/index.asp> has PODCASTS and VODCASTS for download. The links are located at the bottom of page under headings of "Latest PODCASTS" and "Latest VODCASTS."

The podcast page is <http://feeds.feedburner.com/navalsafetycenternews>.

Some titles on the website are:

Music with a Safety Message: AO3 Wallen Sings to Save Lives

Music with a Safety Message: Chief B. Ware Sings to Save Lives

Episode of the Friday Funnies, "Which Way to Catalina"

Episode of the Friday Funnies, "The Jeep, the Grass Fire, and The Fish"

Episode of the Friday Funnies, "The All-Time Absolute Worst Butt Kit Ever Devised"

Archives of the Friday Funnies, "From Norfolk to Louisiana and (Almost) Back in a Weekend"

Archives of the Friday Funnies, "A Bee and the Hatchet"

Many more to choose from on the webpage

iTunes are also posted. Simply do a search for Naval Safety Center in the podcast section of iTunes or enter this URL using the advanced tab: <http://www.safetycenter.navy.mil/podcasts/nsc.xml>

YouTube: We are posting some of our videos on YouTube www.youtube.com (not available through NMCI). Again, the easiest thing to do is to search for "Naval Safety Center", and it will bring you to our page listing (channel).

Troop Tube: A relatively new commercial site (from the Military.com folks). Enter <http://www.trooptube.tv> click on "all videos," scroll down until you see a listing of options for Navy, and click on the "news" button. NMCI allows this connection.

FLASH Editor FTC (SS) Cahill

We at the Naval Safety Center look forward to the fleets questions and feedback. In the spirit of "ASK THE FLASH" we are opening the FLASH up for write in articles. As a reminder, submit technical information using official ".mil" unclassified e-mail. You can e-mail your article or ideas to: SAFE-submarines@navy.mil.

Effective COMNAVSAFECEN Submarine Safety Advisories

2007			
31	7-07	081545Z AUG 07	Guidance on NAVSEA Approved Safety Harnesses and Climber Safety Sleeve Recall Interim Aloft Procedures
2008			
34	3-08	211439Z OCT 08	SCBA Repair Facilities
2009			
39	1-09	231743Z APR 09	Effect Afloat Safety Advisory

To download advisories, you must be on a .mil domain terminal and have a PKI certificate. Go to our Naval Safety Center Website <http://www.safetycenter.navy.mil/index.asp>, on the left hand side of screen click DKO Secure Site. Click <https://www.us.army.mil/suite/page/418385> and this takes you to the log-in screen for DKO/AKO. Select our direct link <https://www.us.army.mil/suite/page/418385>. On the left bottom of webpage screen click on the file named Secure, Afloat, Messages, and Afloat Safety Advisories.

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