



Up Top In Operations

November 2004

Monthly Newsletter of the National Operations Department

Volume 11

Oh the Weather Outside is Frightful!

Linda A. Nelson, DC-O

The leaves have turned to brilliant colors in many parts of the country and we await the full force of winter. Yet our Coast Guard and CG Auxiliary missions continue. Although many of those missions will be in a sheltered environment, the hearty souls dedicated to operations will need to brave the forces of nature and continue to do the work of the Coast Guard despite adverse weather. So we dedicate this issue to you! This "Cold Weather Edition" of Up Top in Operations will review the perils of cold weather and cold water operations.

Safe sailing and safe flying!

In Memoriam



It is with regret that we report the passing of Dr. Warren Schneider, DVC-OT from January 1996 to January 2003. Dr. Schneider was an ardent supporter of the telecommunications program. He leaves a strong legacy of commitment to the U.S. Coast Guard Auxiliary.



Cold Water Risk Management

Robert Shafer, DVC-OA

Now that cold weather has much of the country gripped in its icy embrace, this is an opportune time to think about risk management of operations on or over cold water. Even if you have had some training regarding cold water operations, it's worth reviewing the hazards and some techniques for managing the risk.

Let's start by considering the hazards presented by immersion in cold water. Most folks are aware that hypothermia can result from immersion in cold water, but what does that mean? Water conducts heat about twenty five times faster than air of the same temperature. This means that the cold water will suck the heat out of your body faster than your body can generate more heat, thus lowering your body's temperature.

This lowering of your body's temperature is called hypothermia, and it's not a good thing.

Depending on the temperature of the water, hypothermia may begin within 10-15 minutes. Hypothermia can cause death, or contribute to drowning. As you get colder, lack of muscle coordination begins, making self rescue difficult. Unconsciousness occurs when your core temperature cools to about 89.6 degrees. (Normal is 98.6 degrees.) Death is likely when your core cools below 86 degrees.

So how long might you live before succumbing to hypothermia? Well, under good conditions, wearing a PFD and light clothing and minimizing heat loss by staying still, you may survive this long in these water temperatures:

- ♥ 60 degree water - survival time 7 hours
- ♥ 50 degree water - survival time 2.5 hours
- ♥ 40 degree water - survival time 2 hours
- ♥ 32 degree water - survival time 1.5 hours

But in very cold water, you may not live long enough to die from hypothermia. Immersion in very cold water causes an

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Cold Water Risk Management

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uncontrollable gasp or torso reflex (think of the gasp you make when you jump into a cold shower, magnified). This uncontrollable gasp may cause you to aspirate (inhale) water, causing drowning. Cold water immersion also causes pain, hyperventilation, changes in blood pressure and heart rate, and sometimes cardiac arrest. By the way, alcohol causes all of this to be exaggerated.

Clearly, immersion in cold water is a significant hazard. So, what can we do to manage the risk, and increase our chances for survival? First, we should do some planning to make sure that we don't get immersed in the first place. Then, we have to be prepared to survive with proper Personal Protection Equipment (PPE) and some signaling gear.

Let's start with a plan to avoid getting wet. Aviators, consider if flight over water is really necessary. Sometimes a short detour will avoid or minimize long over water flights, while adding little time to the overall flight. Fly as high as possible to extend communication range, and to lengthen gliding time and range. Avoid flight over water if not necessary, or if you are not equipped to survive.

If you can't avoid flying over water, increase your chances of not having to ditch by checking and rechecking your fuel supply. Most sudden engine stoppages are fuel related. Check the fuel carefully for sufficient quantity and quality (correct type, no contamination). Then check it again. Make sure that all tanks needed are feeding correctly before going "feet wet" (over water).

Surface operators; check your fuel supply too. And check weather forecasts carefully, so as not to be

caught in foul weather by surprise. And both aviators and boaters should be equipped with PPE, including PFDs, emergency rafts and protective garments such as Aviation Drysuit Coveralls, Mustang Suits or MAC-10s.

Both aviators and surface operators should have positional awareness when over or on the water. If you don't know where you are, who does? And if you don't know where you are, how can you tell anyone to come get you?

So, what if something bad happens, and getting wet is inevitable? The will to live is vital. It's the most important essential in any survival situation. Beyond that, there are five "stay" rules for surviving an encounter with cold water. They are:

- ♥ Stay Afloat
- ♥ Stay Dry
- ♥ Stay Still
- ♥ Stay Warm
- ♥ Stay with Aircraft / Boat

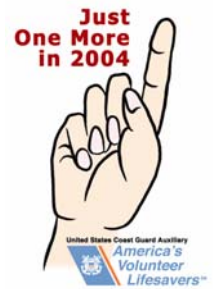
You must **stay afloat**, and a Personal Flotation Device (PFD), is essential for that. You must breathe to prevent drowning, and you must control panic to breathe. Panic decreases the ability to float. A PFD is essential for swimmers and non-swimmers alike. It provides an advantage recovering from cold shock and allows better breath control. A PFD is also essential for heat conservation techniques.

To reduce heat transfer, **stay as dry** as possible. Get out of the water if you can. This is where a life raft is a life saver. A dry suit is excellent protection, but not as good as being out of the water in a raft, or on a floating object. The main heat loss areas of the body are the head, neck and groin. These are the areas that should be protected most to minimize heat loss. If it's impossible to get

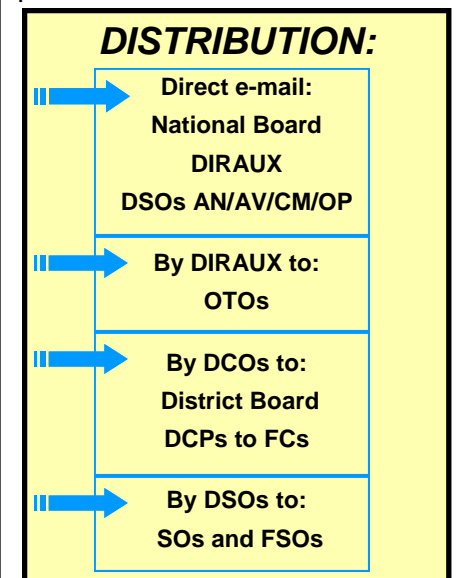
completely out of water, get these main heat loss areas out of water, perhaps by hanging on to a floating object. If nothing else, get your head out of water and dry. A head in water increases heat loss by 80% over a head out of water.

If you are in the water, **stay still**. Movement increases blood circulation in the extremities, and increases water circulation next to the skin of your extremities, thereby increasing heat exchange. Staying still decreases heat loss by 30% over swimming or treading. It is difficult to float motionless without a PFD.

Stay as warm as possible. To do so, protect the main heat loss areas. Keep your shoes, coat and hat on. If getting out of water is impossible, assume HELP, HUDDLE, Human Carpet or Human Chain positions. The HELP, or Heat Escape Lessening Posture, is a method of reducing your surface area to the minimum possible.



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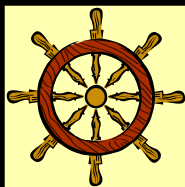
Draw your legs as close to your chest as possible, and then pull your arms in, making yourself into a ball. The HUDDLE posture is a sort of group hug in the water.

Multiple survivors can share their heat with one another by holding on to each other, and reducing the area that each is exposed to circulating cold water. The Human Carpet and Human Chain are group formations in which the survivors interlink arms and legs in order to share heat, and remain together. These heat conservation positions double survival time over swimming or treading water. These positions are impossible without a PFD.

Stay with your aircraft or boat. It may be possible to get out of the water by climbing up on an overturned boat or floating aircraft. You also have a much better chance of being spotted, as you present a much larger target. Should you try to swim for shore? Success in swimming to shore depends on many variables. Swimming increases heat loss. In 50 degree water, average person wearing PFD and light clothing can cover a distance of only .85 mile before being incapacitated by hypothermia.

OK, you are wearing a PFD and you brought a raft, so now you're floating around in your little rubber boat. Now what? Assess your situation. What shape are you in? Are you breathing, injured, warm, dry? Does anyone know you are in trouble? Did you send a MAYDAY or file a float plan or a flight plan? Do you have an ELT or EPIRB? Are there any vessels or aircraft nearby? How can you attract attention?

Signaling devices are your next line of defense. Some useful items



Up Top in Operations is the monthly newsletter of the National Operations Department of the United States Coast Guard Auxiliary.

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include a mirror, flares, a whistle, an ELT or EPIRB, dye markers or a See Rescue Device, chemical light sticks or and strobe light. Don't forget that a cell phone or a marine or aviation handheld radio may be helpful if it's in a waterproof bag.

Remember, the key to surviving an encounter with cold water is preparation. Safety isn't an event, it's an attitude! Check your aircraft or vessel, check your survival equipment, check your planning, and check yourself.

No one plans to have a mishap. But lots of mishaps occur from lack of proper planning. The best way to avoid using your water survival skills is to plan to avoid a mishap.

But be prepared, because even the best of plans can go awry.



Dress For Success-A Guide to Cold Weather Operations
James M. McCarty, BC-OEI

The skies seem a little bluer today, the air feels a little crisper than last week, and the spray coming over the bow is a little too refreshing these days. As the weather turns our thoughts away from summer, we begin to enter that period of the year that can pose new challenges to our boat crews and air crews, as we strive to continue safe operations throughout the off season. As always, good preparation, smart planning, and increased situational awareness will help insure that we accomplish our mission safely and effectively this coming Fall and Winter; now lets focus our discussion on basic cold weather clothing.



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The USCG Rescue and Survival Systems Manual (COMDTINST M10470.10E) has a chart to help us determine how and when to prepare for cold weather operations. The combination of air and water temperatures indicated on this chart provides guidance to operational personnel about the choice of thermal protection garments that should be utilized in a given situation. Use this chart as a starting point. Every situation must be evaluated as unique, and all operational personnel should anticipate that conditions of wind velocity, water and air temperatures could be worse than the predicted forecast. Lets review a few basics.

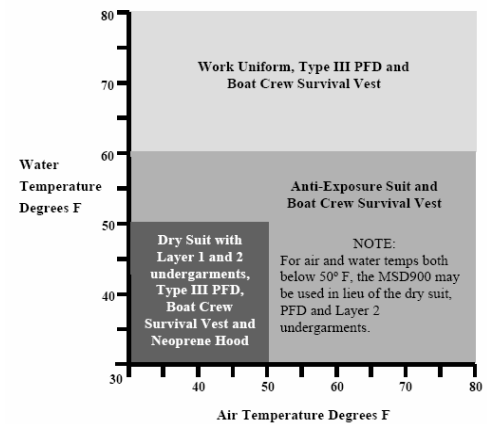
Layered clothing is the key to thermal protection. So...how do we prepare ourselves at home, before getting underway? First, we insure that our 1st layer of clothing that covers our skin carries moisture (perspiration or external sources) away from our skin. This means we avoid cotton underwear, and use a Polypropylene material. Our second layer should be designed to trap warm air between the first layer, and our external garments. Fleece, or fuzzy materials that are loose fitting will insure that we retain body heat that is trapped beneath our outer protective wear. Third, our outer wear should be wind and moisture proof or resistant, such as a "dry suit", "anti-exposure coveralls", or rain gear as appropriate to the adverse conditions we anticipate. Let's take a closer look at layer 3, the outerwear.

The **anti-exposure suit** provides cold weather protection to crewmembers when the **water**

temperature ranges between **50 degrees and 60 degrees F**, and when the **air temperature** ranges **between 50 and 80 degrees F**. When in doubt about anticipated conditions, operational personnel should overdress, or be prepared to dress appropriately for sudden and unexpected changes in the environment. Anti-exposure coveralls are constructed of all orange or orange and black urethane coated nylon fabric with a closed cell foam interlining. Sleeve and leg openings can be closed tightly around the wrist and ankles, however they do not provide a watertight seal. Anti-exposure coveralls provide 22 to 45 pounds of buoyancy (depending on size) and feature an attached, orally inflated pillow to support the wearer's head in the water, an attached hood for extra thermal protection, and retro-reflective tape on the hood and shoulders for better visibility at night. Maintenance is limited to cleaning the coverall and lubricating the slide fasteners. Personnel must also check for tears, rips and areas of excessive wear.

Dry suits are required whenever both water temperature and air temperature reach 50 degrees F or below. These suits are orange and black color combination, and constructed of waterproof and breathable (moisture vapor permeable) fabric. Seams are stitched and sealed with seam tapes. Sleeve and neck openings maintain watertight integrity from latex rubber seals. Sock type feet are integrated into the legs. The knee and seat portions of the suit are reinforced. The neoprene hood is required to be carried in the leg pocket of all boat crew dry suits. However...

- ♥ *Dry suits alone provide inadequate insulation for hypothermia protection.*
- ♥ *Dry suits are not inherently buoyant. Personal flotation devices shall be worn with dry suits.*



Maintenance is limited to cleaning of the dry suit, lubrication of slide fasteners and application of 303 Aerospace Protectant™ to latex seals. Unit personnel are not authorized to make repairs to the dry suit fabric. Replacement of latex seals is authorized.

All crewmembers have a responsibility to take care of their own equipment. We need to inspect it for serviceability prior to getting underway. We check for holes, frayed and worn areas, missing buttons or snaps, areas of dry rot, broken zippers, etc., that can cause a leak or break in the integrity of the gear that we have selected for that day's mission. Boat crew coxswains and pilots-in-command have the responsibility to physically inspect all equipment for any flaws or potential flaws and be prepared to repair or replace equipment found defective prior to commencing operations...or abort the mission itself when equipment problems cannot be corrected prior to getting underway or airborne. Weather conditions can change at a moment's notice so all crewmembers must maintain situational awareness for weather related risk factors. The simple fact is that we cannot help others, or fulfill our mission, if we can't function at optimal levels of performance while conducting operations in cold weather.