

## Maximising the chances of survival in cold water

### Introduction

Dangers related to “man-overboard” and “abandon ship” situations are normally included in emergency preparedness plans and procedures, both for ships and offshore installations. Dedicated emergency training and drills focus on these types of accident scenarios. It is also important to continuously remind each and every crewmember, as part of their training, what to do if they happen to fall into the sea or have to enter the sea in an emergency. Individuals with an understanding of how the body reacts to exposure to cold air and water, and who know how to delay the damaging effects of cold stress on the body, will have a much better chance of staying alive. With an increasing number of maritime and offshore-related activities taking place in Arctic environments, it becomes ever more important to focus on these issues.

At its 91st session in November 2012, the IMO Maritime Safety Committee approved a revised version of the "*Guide for Cold Water Survival*". The Guide has been amended and updated to reflect medical progress made in recent years and is intended primarily for seafarers. The Guide highlights the importance of understanding that an individual is not completely unable to influence his/her own survival in cold water by providing practical advice on how a seafarer can make a difference in a situation where he has fallen into the sea or had to enter the sea in an emergency. Please see [IMO Circular MSC.1/Circ.1185/Rev.1 for details](#).

### Responses to cold water immersion

When the human body is suddenly immersed in cold water, the first issues the body needs to cope with are panic and shock. The initial shock places a severe strain on the body, with uncontrolled breathing and a rapid heart rate. After a few minutes the initial response normally eases off and the mental capacity and sufficient strength to act may return. But immersion in cold water quickly numbs the extremities of the body to the point of uselessness. Cold hands cannot fasten the straps of a lifejacket, grasp a rescue line or hold on to a floating object. One can probably swim short distances, but any distance is easily underestimated in cold water. Severe pain may impair any rational thought within a very short time of immersion. And finally, hypothermia sets in and, without rescue and proper first aid, unconsciousness and death follow.

The table below provides an indication of approximate time to unconsciousness and expected survival times based on water temperatures. However, the time a person can survive in cold water depends not only on the water temperature but also on a number of individual factors, some of which can be directly linked to training and situational behaviour of each individual:

- *Individual differences*: body size, body fat, physical condition, swimming ability, cold tolerance
- *External factors*: clothing, flotation aides, weather conditions and sea state
- *Behavioural response*: activity, posture, psychological condition or “will to survive”

Water temperature (°C):	Exhaustion or unconsciousness in:	Expected survival time:
0	< 15 minutes	45 minutes
0–4	15 – 30 minutes	30 – 90 minutes
4–10	30 – 60 minutes	1 – 3 hours
10–16	1 – 2 hours	1 – 6 hours
16–21	2 – 7 hours	2 – 40 hours
21–27	3 – 12 hours	3 hours – indefinite
> 27	Indefinite	Indefinite

Source: [Minnesota Sea Grant](#)

### Hypothermia

Hypothermia is the result of more heat being lost by the body than is produced (through metabolism and shivering) and retained (through body fat, clothing and behaviour). Cold water is an especially effective heat conductor, which leads heat away from a body at a much faster rate than cold air. A core body temperature between 32°C and 35°C is defined as "*mild hypothermia*" and is characterised by strong shivering, anxiety and a rapid pulse but most individuals are still conscious and able to act. A core body temperature between 28°C and 32°C is defined as "*moderate hypothermia*". During this phase the shivering often decreases and breathing becomes weaker and superficial. Movements are slow and laboured and the body temperature drops quickly. Drowsiness and disorientation soon lead to indifference and passivity. A core body temperature below 28°C is defined as "*severe hypothermia*". The body's ability to produce heat ceases almost completely and vital signs are strongly reduced, and eventually lost.

### Summary and recommendations

The human body is very sensitive to cooling. If your core body temperature is reduced by 3-4°C, you can no longer take care of yourself and if it drops by 6-7°C there is a risk to your life. As seafarers are at constant risk of being exposed to cold water, it is of particular importance for them to know how their body responds to cold water and what they can do to help ward off its effects.

IMO's revised "*Guide for Cold Water Survival*" is a valuable tool in this respect and Gard's Members and clients are recommended to carefully review the Guide, implement its relevant recommendations as part of the emergency preparedness training program and ensure that all crew members are familiar with its content. For ease of reference, some of the Guide's important tips about survival are summarised below:

<b>Prior to abandoning vessel</b>	<ul style="list-style-type: none"> <li>• <b>Plan your emergency moves in advance.</b> Ask yourself what you would do if an emergency arose. Where is your nearest exit to the deck for escape? Where is the nearest available immersion suit, lifejacket, SART, emergency location beacon and survival craft? How would you quickly get to your foul weather gear, insulated clothing, gloves, etc.?</li> <li>• <b>Know how your survival equipment works.</b> The time of the emergency is not the time to learn.</li> <li>• Even in the tropics, before abandoning a vessel, <b>put on many layers of clothing</b> to offset the effect of the cold. <b>Wear an immersion suit</b> if available.</li> <li>• <b>Put on a lifejacket</b> as soon as possible in an emergency situation – and adjust it correctly. In cold water you will quickly lose the full use of your fingers.</li> <li>• When abandoning a vessel, <b>try to board the survival craft dry</b>, without entering the water.</li> </ul>
<b>Survival in water</b>	<ul style="list-style-type: none"> <li>• If immersion in water is necessary, <b>try to enter the water gradually.</b></li> <li>• The <b>initial response</b> to immersion in cold water <b>will only last a few minutes</b>: rest until you gain control of your breathing.</li> <li>• <b>Try to get as much of your body out of the water as possible.</b></li> <li>• Swimming increases body heat loss. <b>Only swim to a safe refuge nearby</b> if the likelihood of early rescue is low and you are confident that you can reach it. <b>Swim on your back, using your legs</b> if you can.</li> <li>• <b>If trying to reach a floating object, swim towards a point downwind of it</b> rather than straight towards it, letting the wind bring the object to you.</li> <li>• If not swimming to a refuge, try to reduce your body's loss of heat: <b>float in the water with your legs together, elbows to your side and arms across your chest.</b> Blow a whistle or shout to attract attention.</li> <li>• <b>If you are not wearing a life jacket, do not wave to attract attention.</b> You will lose buoyancy.</li> <li>• <b>Force yourself to have the will to survive.</b> This can be the difference between life and death. Keep your mind occupied and focus on short-term objectives.</li> </ul>
<b>Rescue</b>	<ul style="list-style-type: none"> <li>• <b>Do not over-exert yourself during the rescue process:</b> let the rescuers do the work – they are in a better condition than you.</li> <li>• Even while being rescued, <b>do not relax too soon.</b> Maintain your determination to survive throughout.</li> </ul>

Emergency preparedness training programs, including on-board musters and drills, have the objective of preparing a qualified and organised response to situations of great difficulty, which may unexpectedly become life threatening. It is important that such training is carried out as realistically as possible, as if there was an actual emergency situation. During abandon vessel drills, it should always be checked that crew are correctly dressed and that they are familiar with the use and application of the specific safety/personnel protection equipment available on board the vessel.

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