

Safety

I have reviewed this book because of its informed clarity and would recommend it to anyone who spends a lot of time on the sea.

Review: Essentials of Sea Survival by Frank Golden & Michael Tipton

ISBN: [0736002154](#) / [0-7360-0215-4](#))

Catalogue of Disaster

This book starts with a catalogue of disaster including the final report on the loss of the MV Estonia; which is referred to through out the book, and also the British and other research following the alarming loss of life at sea in WWII especially during the survival phase. They identify that even today there is a “general lack of understanding of the nature of the various threats and the reaction of the body”, and the lack of preparedness or consciousness of it happening. The majority of these lives could, in their view have been saved with proper action and understanding.

Physiology of Survival

With regard to the basic physiology of survival – especially in cold surroundings; we are still, in evolutionary terms very close to a hairless species that evolved in a hot climate of 26-30 C (79-86 F) and that our core body temperature needs to be maintained at +/- ½ degree of 37 C. Wherever they live human beings are most comfortable with a skin temperature of 33 C. The authors describe how the body maintains that system as a priority, sometimes at the expense of others such as hydration.

In the chapters on hypothermia, survival time in cold water and the search and treatment of casualties, they explain what the body does when it struggles to maintain core temperature. It becomes apparent why the warming of hypothermic subjects is a complex business; for success is dependent on a number of factors including the overall state of health of the survivor and their deep body temperature.

Clothing

The third chapter looks at the way clothing provides an adaptation of the environment to help the body regulate itself and the effect of moisture on this. The adage “if you want to stay warm in the mountains, stay slightly cold” being particularly applicable through the prevention of sweating and consequent insulation loss.

Cold water Immersion

In chapter four the authors quite rightly devote a major part of the book to the effects of sudden immersion of the body, especially in cold water. This chapter has a lot of relevance to canoeists, for the effect of cold water immersion is profound to say the least. The authors suggest that it is this rather than hypothermia that is the primary cause of mortality on the sea through what is known as Swim Failure. It is in these circumstances that good, experienced swimmers drown.

There is much in this chapter for canoeists to note. For example the maximum breath hold times of normally clothed individuals falls from an average of approximately one minute to ten seconds on immersion in cold water.

Although a canoeist is generally more suitably dressed than this I know from experience how much more difficult it is to roll in Cold water than a pool – especially in cold white water which is even colder in effect.

Three phases of cold water immersion

The authors go on to explain that there are three phases of cold-water immersion in water of less than 15 C, which is really the norm as it only rises above this between late June and October in the UK.

The first phase is on entry and lasts up to about three minutes, the initial shock to which the reaction is breathlessness, raised blood pressure heartbeat, panic etc. The second phase takes place a while after the swimmer has acclimatized to the first phase, and is due to the outer muscles and nerve pathways becoming cooled and the effect is numbness and incapacity – loss of grip etc in 20 minutes in 12 C water, obviously the rate at which this happens is dependent on the water temperature and the acclimatization of the swimmer. It is only at the third stage, after the outer muscles have cooled that the subject becomes hypothermic when the core temperature is threatened.

Effect of Cold water Immersion

The authors highlighted that 55% of annual open water immersion deaths occur within 3 metres of a safe refuge, 42% within two metres of safety, two thirds of those who died having been regarded as good swimmers; and in doing so argued that it is the debilitating effects of cold water immersion – which led to drowning or other cause of death such as heart failure, and not hypothermia which killed them.

Implications for canoeists

There are implications for the way instructors plan for capsizes in cold water, especially for older people, the unfit or those with a heart condition. There was such a fatality in the USA with instructors trained to BCU standards a few years ago, for example. Consider that when the new year 1*2* instruction starts at UK clubs around about May, the sea temperature is still 10 C. Golden & Tippett describe how cold has an effect on other apparently simple things also, like the articulation of the hands: when your hands are really cold you wouldn't for example be able to get a flare out of its polythene wrapping, and if you had a folding knife; would you be able to open it in order to cut the polythene - that had also become stiffer in the cold too? It is the strong possibility of swim failure in cold water that makes the wearing of a buoyancy aid so important, and simply holding on to the boat until the ready to take action.

Acclimatisation is mentioned as one way to deal with the threat of cold water. Hardened all year round surfers and play-boaters will roll regularly in cold water but who else? Are deep-water rescues or re-entries practiced outside of an assessment, and in cold water? I know how hard it is to get into the discipline of trying to, for example end sea trips with a roll; its not a time when you want to get wet. (*The Tulick – mentioned in other parts of the site is well worth considering in this respect.*)

Drowning and near drowning

The fifth chapter on drowning and near drowning makes harrowing reading; the reader having to digest what would happen, bit by bit when they irrevocably overcooked it. The effect of salt water on the lungs is destructive due to the effects of reverse osmosis, fresh water less so, but still harmful to the lungs. You don't need to have your head under water to drown. The Lyme Bay victims, for example drowned wearing Life Jackets not buoyancy aids. Life Jackets incline the wearer so that they inhale the splash of each little

wave that passes, as they drift, headed to wind by the device designed to save them. More modern designs have a canopy to prevent this.

For those saved before drowning in the sea, there remains a strong possibility of drowning after having been pulled out of the water due to the inflammatory response of the lungs, to produce fluid in these circumstances.

On the slightly brighter note people have survived total immersion under water – under the ice is most common, for over half an hour, due to what is called the “diving response”, in which the body goes into suspended animation following sudden immersion in very cold water.

Other aspects of survival

The chapters on survival over a long period, starvation, necessities for survival, water food etc, and on illness, injury and psychological trauma are more useful in understanding the body’s reaction to stress than of practical sea canoeing activities in the UK, although it is worth noting how easy is to get a non freezing cold injury (NFCI). With regard to psychology, although the authors make it clear that the book is not about this, the way we are affected by disaster is covered, and it is no surprise to learn that those who are prepared for disaster are the best prepared psychologically to deal with it. Like everything else it’s a matter of training.

Treatment of casualties

The passion of the authors concerning the unnecessary, avoidable loss of life at sea really comes through in the final chapter – search and rescue, treatment of casualties. They address the high incidence of death on being rescued, immediately before and soon after. There clearly remains a considerable debate in this field. They argue their case well, in that this phenomenon is not simply a feature of hypothermia, but more to do with the stress of rescue on an already weakened system.

For example, on immersion the body has to reduce the increase in blood volume from the hydrostatic compression of the surrounding sea – generally via the kidneys and urination. Consider then the rapid reverse of this in being pulled from the sea, especially vertically – as in a helicopter strop. Suddenly the body is short of blood volume and pressure falls dramatically – causing the heart rate to rise correspondingly. Temporary loss of consciousness or heart failure can result. Add on to this, the effect of hypothermia, as the body tried to preserve core temperature by reducing blood volume further, and it’s hardly surprising that people fall out of helicopter strops and die. I know of at least two such cases in Cornwall over the years. In fact on recalling the accounts of other drownings in the local papers, I now see a different picture.

Respect

One cannot read this book without gaining an appreciation of the risks one takes on venturing on the sea in the UK, which is on the whole cold enough to make survival an issue quite soon after something goes badly wrong. The book brings a complex series of processes into focus and with it the importance of trained medical assessment at the earliest opportunity after rescue. Its now several years since I read this book and wrote the first draft of this review. I still take risks, but at least I know more about the stakes when I do and can calculate whether it’s worth it or not, and more importantly – be prepared. As Prem Rawat once wisely remarked, “problems should be faced not embraced”.