elements
an easier life with wind and water

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Cold Shock

Definition

Cold shock is the body's response to the sudden immersion into cold water. This response varies from person to person. Cold shock lasts for about 1 - 3 minutes.

Three response types are distinguished:

1. Initial automatic gasp reflex in response to rapid skin cooling. If the head goes under water, the result maybe breathing water into the lungs, which can result in drowning.
2. Hyperventilation, like the gasp reflex, is a natural reaction to the cold. Although this physiological response will subside, panic can cause a psychological continuance. Prolonged hyperventilation can lead to a faint.
3. Vasoconstriction - cardiac related response. Arteries contract as the body reduces blood flow to the extremities in order to minimise heat loss. As a result, the heart has to work harder to pump the same amount of blood through the body. Especially for people with an underlying heart disease, this additional work load can cause the heart to go into cardiac arrest.

Drowning

People can drown from the effects of cold shock through water entering the respiratory tract while hyperventilating or gasping for air.

Suitable PPE

to prevent cold shock are

- lifejackets, that keep head, mouth and nose above water and keep the face in an angular position with the nose pointing down;
- suits that reduce the sudden exposure to cold water, such as SOLAS anti-exposure suits or CE constant wear suits (EN 15027).

Ki-Suit is a CE constant wear suit (EN 15027) that protects against cold shock.

- Water entering the respiratory tract - The integrated lifejacket will be fully inflated in less than 5 seconds after contact with water. This buoyancy together with the air trapped in the suit will cause the wearer to resurface very quickly. The lifejacket will then keep the wearer in a stable position with mouth and nose well above water.
- Delayed exposure - The outer shell of the suit is waterproof and has sealed seams. It also has elasticated cuffs at arms and legs, as well as a high collar that can be closed with an adjustable flap. Upon entry into the water, this design will allow only a gradual influx of water into the suit. It takes 2 - 3 minutes before the suit is filled with water. This prevents the sudden exposure to the cold water and thus reduces or eliminates cold shock reactions by giving the body time to adjust to the cold water.

Comparison between SOLAS anti-exposure suits combined with a lifejacket and Ki-Suit 310.

1. The initial phase (immersion, submersion, re-surfacing, stable in-water position) with a duration of approximately 5 seconds is exactly the same for both suits.
2. The next phase that is relevant for cold shock lasts 1 - 3 minutes, i.e. the time intervall in which cold shock reactions (gasping, hyperventilation) are observed. If the drysuit is correctly donned and all openings closed, less water will be in the suit and it is reasonable to assume that the cold shock reaction will be less pronounced than in a wet suit. Independent of the type of suit, the 275 N lifejacket will bring the wearer in a stable in-water position with the head, mouth and nose placed well above the water, so that water cannot easily enter the respiratory tract.

Conclusion both suit systems are suitable to protect against the risk of drowning from cold shock.

Sources

http://beyondcoldwaterbootcamp.com/4-phases-of-cold-water-immersio

http://completeguide.rnli.org/cold-water-shock.html