

# A Closer Look at The Immersion

## The Physiological Reaction

Randy experienced classic cold shock responses, but hypothermia wasn't a factor in this incident. When he finally reached his car, he was *severely chilled*, but he wasn't clinically hypothermic. That's why the car heater, hot packs and warm drink “*worked wonders*”. The physical effort of paddling the half-mile back to the put-in also produced heat and helped keep him from getting even colder. His torso protection and the absence of wind were also important factors. When he reached shore and stopped paddling, heat production by exercise declined and he began shivering violently.

A very important point is that it wasn't until he *got out of the freezing water* that he even *began* to get any real control over his breathing. Keep in mind that he had to struggle to make the Mayday calls and that was done just before he finally managed to get back in the boat.

A more likely explanation for his vision getting dark around the edges and hearing a loud “roaring” in his ears is hypocapnia – a reduction of carbon dioxide in the blood caused by deep or rapid breathing (his gasping and hyperventilating). Among other things, hypocapnia results in cerebral hypoxia - a reduced supply of oxygen to the brain. Symptoms include dizziness, visual disturbances, impaired thinking and a reduction in short-term memory – all of which he experienced. And loss of consciousness – which might have happened if he failed to get out of the water in time.

One thing that stands out in Randy's struggle for survival is his sheer determination not to give up - to keep trying, over and over again, to save himself. That counts for a lot in survival situations, but may not be enough – no matter how hard you try. It all depends on the circumstances, which are often overwhelming.

## Protective Clothing

His outfit was totally inadequate, but not totally useless. Cold water immersion is a race against time, and his clothing *bought him a little time* in his desperate struggle to get out of the water. It offered him *some* protection and was certainly one hell of a lot better than denim pants, wool gloves, and a down jacket – which would have become useless immediately. The layers, material, and thickness – including PFD – covering his torso briefly delayed the development of cold shock responses, allowed him to make two unsuccessful roll attempts, and also delayed the gasping until his head was above water.

**His Head:** Although his watch cap wound up in the water, it provided some protection while he was immersed, and it probably covered his ears – important protection against vertigo.

**His Torso:** Polypro, fleece pullover, rain jacket, PFD, hydration pack.

- 1) It delayed the entry of cold water. Although water got in very quickly, it didn't make immediate contact with his entire torso at the moment of immersion. That's critical.
- 2) It provided a substantive buffer against *cold water re-circulation* next to his skin by *slowing* water movement in and out of his clothing once he was immersed. His PFD was snug fitting.

**His Legs:** Polypro, splash-proof nylon pants.

Not as substantial as his torso protection. That's why he *immediately* felt “*the icy water on my legs*”.

**His Hands:** Neoprene gloves. “*Only my neo gloves worked well in the water*”.

They worked pretty damn well, too! He was able to dial his cell phone and work his VHF radio.

**His Feet:** Rubber-soled booties with waterproof socks. His feet weren't numb and useless back on shore.

## Self-Rescue

**Rolls Failed:** “*While both attempts got my head above water...*” Whether consciously or unconsciously, he was understandably desperate to get upright & failed to keep his head down – a very common mistake in rolling, particularly under duress; bringing the head up first is a classic component of the blown roll.

**Paddle Float Succeeded on The Third and Last Try:** Even though he didn't practice the paddle float rescue with regularity, he *knew* the drill. And he tells you how:

“I demonstrate paddle-float rescues at our club's safety clinics...” He had done a lot of them! He also tells you that he felt the third attempt was his last shot at a successful self-rescue. If it failed, it's likely that he wouldn't have had the physical ability to make a fourth attempt. Failure would have been fatal.

## Reduced Ability to Think Clearly

**Overview:** Following his capsize, Randy made lots of mistakes, one right after the other, both in the water and later back on shore. His ordeal is an excellent example of how cold, pain, stress, fear, pressure, anxiety, sheer physical effort, and adverse physiological responses severely compromise both thinking and performance. Immersion victims commonly report a sensation of thoughts racing by at 90 mph and they have great difficulty staying focused and on track long enough to formulate – let alone complete – a clear, sequential plan of action.

### On The Water:

He alternated between paddle float attempt / cell phone 911 attempt / swimming with the boat / second paddle float attempt / Mayday call on his VHF / and finally, on his third attempt, the successful paddle float rescue. A+ for tenacity and determination.

### Back on Shore:

Working on loading his boat vs getting warmed up, keeping his wet shorts on when he changed into dry clothes, turning on the fan but not the car heat, not staying in the car – where it would have been warmer if the heat had been turned on – all of this provides a very clear picture of the cognitive challenges he still faced even after reaching shore. Given the hellish experience he'd just been through, it was a remarkable effort in which he also did a number of things right – like breaking out a heat pack and calling his friend Mark.