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# One Step Forward, Two Steps Back:

## *Blanket Adoption of the IMO Life-Saving Appliance Code for Survival Suits will lead to further Marine Fatalities*

BY DARREN WILLIAMS

Over the last five years our knowledge of the effectiveness, and ineffectiveness, of marine abandonment immersion (survival) suits has grown faster than in any other country. Touted to be the best in the world, we have learned through several recent studies that Canada's standard for the design and performance of immersion suits (CGSB 65.16-2005) is fundamentally flawed because, rather than testing suits in realistic conditions, they are tested and certified based on their performance in a "calm pool".

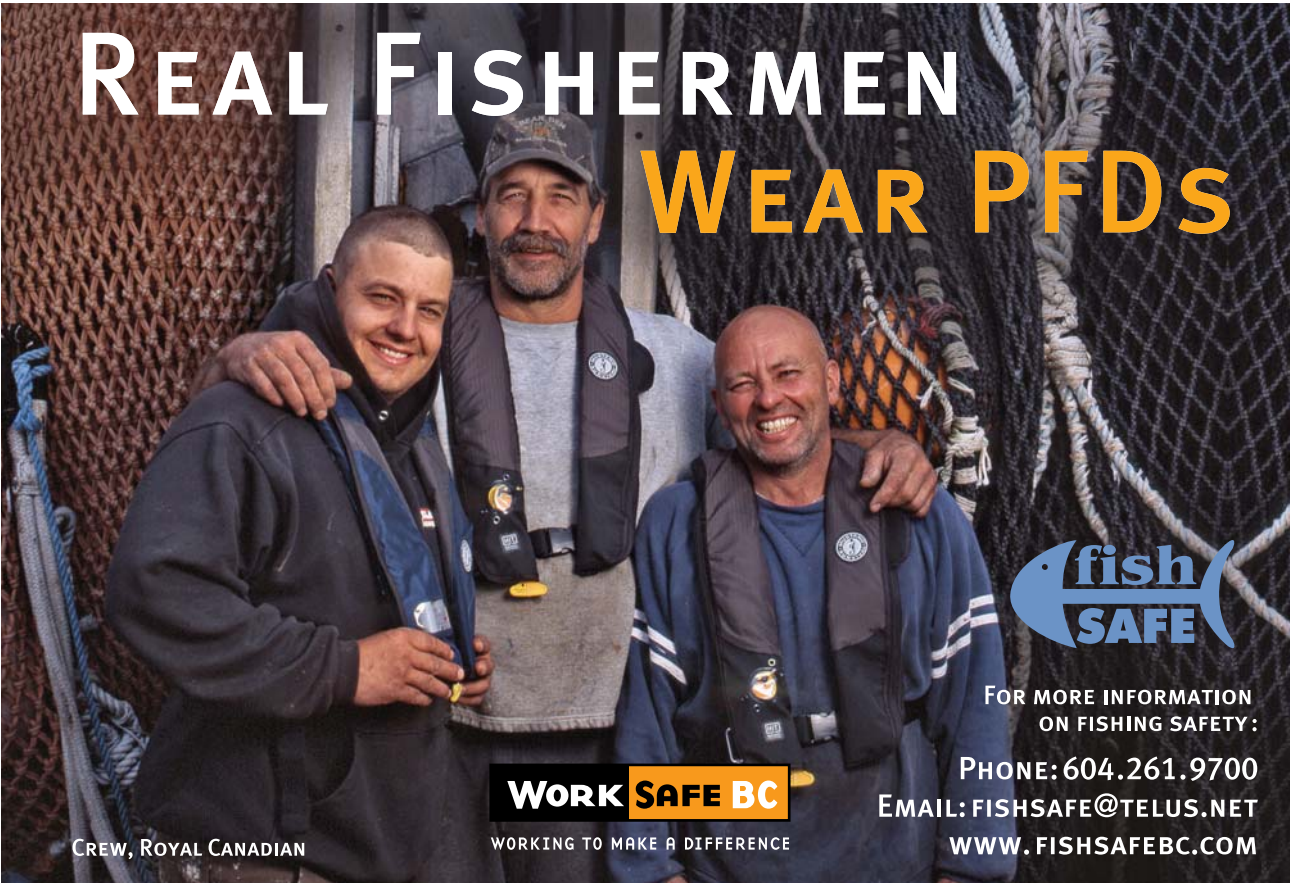
*"Had the immersion suits not been full of seawater and thus unable to provide sufficient amount of thermal protection, the suits should have sustained them until long after the SAR units arrived on scene,"* is a statement common to too many search and recovery missions in recent years (source: DND report on CHECKMATE III sinking, 2009).

Despite the knowledge that our current standard for immersion suits does not reliably predict the amount of water ingress to an immersion suit in realistic conditions, Transport Canada now proposes to adopt a similarly

flawed international standard as part of its mandate to align our marine safety laws with the international community. This standard is the International Marine Organization's Life Saving Appliance Code (LSA Code), which includes requirements for immersion suits. Be it a move motivated by political direction, regulatory uniformity, or administrative convenience, it is incumbent on Transport Canada, given the knowledge it now has and its mandate to encourage safety in the marine industry, to adopt the LSA Code only if buttressed by a new Canadian standard that requires immersion suits be tested to perform in realistic sea conditions.

*One Step Forward: Knowledge that the Standard is flawed*

For many years, we did not have the technology to design, build and test immersion suits to perform in realistic sea conditions. The current Canadian Standard (CGSB 65.16-2005) and its earlier versions avoided testing human subjects in realistic sea conditions out of concern for



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test-subject safety, and because wind-wave pool technology was not available or affordable. Mathematical models were applied to determine whether a suit would keep the wearer sufficiently warm, but these models were built on gross underestimates of how much water could enter the suit, particularly around the face seal. The result was that while a suit was approved for use because it prevented a core body temperature drop of more than 2°C over 6 hours in a 0°- 2°C swimming pool, this performance rarely held up when a vessel sank at sea.

However, since accidents like the HOPE BAY (Queen Charlotte Sound, BC 2003) and the CHECKMATE III (Trinity Bay, Nfld. 2008) resulted in deaths well within the expected survival time of mariners using approved immersion suits, Transport Canada has received advice on several levels that the standard was flawed. In the first example, the Transportation Safety Board, in reporting their findings (2004) on risks in the sinking of the HOPE BAY, stated: *“as the swim test used for testing immersion suits has never been validated against realistic weather and sea conditions, suit performance may be inadequate in conditions normally encountered.”*

Following on this advice the federal government undertook several studies to gauge the validity of the water ingress measured in the standard (CGSB 65.16-2005). One study (CORD Group, 2009) noted: *“the method used in Canada to evaluate the thermal protection offered by immersion suits currently involves measuring the amount of water that enters the suit system on 11 subjects after a minimum 4.5m jump into a calm pool followed by a 60 minute swim [on their backs].”* The CORD study utilized a wind and wave pool designed to replicate realistic abandonment conditions, and found that traditional face-sealing immersion suits allowed more than twice the ingress the current standard predicted. The report concluded by recommending to Transport Canada that *“a new water ingress test method be developed that will reflect the water ingress challenges presented by environmental factors [wave, wind and spray].”*

A second series of studies was conducted by another respected research entity, the National Research Council (NRC) of Canada (Power et al, 2010). This study concluded: *“testing the thermal protective properties of immersion suits and people in calm water pools will not provide accurate assessments of their performance in real world scenarios.”*

The National Research Council recommended shifting the testing standards away from prescribing how the suit is to be constructed and tested, to how the suit is to perform, with an emphasis on the effect of wind and waves and estimated rescue times. The NRC recommended standard wording such as: *“the suit must prevent a 2°C drop in deep body temperature in conditions representative of the area of operation for the amount of time it would take search and rescue to respond.”*

### **Two Steps Back: Ignoring Expert Advice and Refusing to Change**

Despite the knowledge acquired from several credible and qualified experts, Transport Canada proposes to phase out, rather than correct, the current Canadian standard (CGSB 65.16-2005), and to adopt the LSA Code

provisions on immersion suits, which provide no consideration for environmental factors like wind and waves. The LSA Code sets out many requirements for immersion suits similar to the Canadian standard (such as the suit must cover the entire body, be fire resistant, donnable within two minutes, have a light and whistle, and certain buoyancy characteristics). The LSA Code, however, divides immersion suits into two categories: those with inherent buoyancy, and those without inherent buoyancy that require the use of a lifejacket. In both cases though, the LSA Code provides that the thermal effectiveness of the suit need only be tested following one jump into the water from a height of 4.5 m, and either one hour or six hours in “calm circulating water” depending on whether the suit has inherent buoyancy or not. No account is given in the LSA Code for the effects that waves, wind and spray and the resulting water ingress will have on the performance of the suit. Whether under the current Canadian standard, or by adopting the LSA Code, it appears that Transport Canada will continue to certify (and require the use of) immersion suits that studies have shown do not maintain the required thermal effectiveness when used in realistic conditions.

### **A Solution: A Made in Canada Modification to the LSA Code?**

There have been many meetings attended and documents written on immersion suit safety in the last five years where Transport Canada has responded to criticism of our immersion suit standard by saying, “but it is the best standard in the world!” While this may be correct, and while it reinforces why Transport Canada should not simply phase the Canadian standard out, in favour of one they admit is less safe (the LSA Code), we will always be the “best” if we measure ourselves against mediocre standards. Being the best does not count, when the best is not reasonably safe.

If Transport Canada is to adopt the LSA Code, I would strongly urge they not do so without a Canadian modification that requires immersion suits be tested to perform in realistic sea conditions, and not simply in “calm circulating water.” A recent Supreme Court ruling in British Columbia (More v. Bauer and CSA - October 1, 2010) found a duty of care (in negligence) between an agency responsible for standardizing and certifying the design and performance of safety equipment, and the end-user of that equipment that was injured as a result of an inadequate standard. The Court’s recognition of such a duty and the requirement that a safety standard be reasonably safe, makes possible an action against Transport Canada for continuing to certify immersion suits against a standard it is aware in unsafe. Given Transport Canada’s apparent mandate to adopt the LSA Code and ignore the advice that an immersion suit standard must account for environmental factors, such a law suit may, unfortunately, be the only way to encourage change in Ottawa. Let us hope not. ◀

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