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With Compliments

→ DAVID.

Copy of my report to my boss, Mark Clothier, for your interest. Trust all goes well for you.

Regards,

28/9/99

RFD

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Setting the Standards in Safety and Survival.

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DATE: 23/9/99

REPORT TO: Mark Clothier

FROM: John Ferris

SUBJECT: Liferaft research trials, Launceston, for Police report to Coroner
Re 1998 Sydney-Hobart Race.

Mark,

PREAMBLE

I hope the following will be useful input and of some benefit to the PROSAVER people. Their 6 person model, serial number 47959, was put through torture-testing over the past three days and, with minor exceptions, came out unscathed. It was finally and deliberately destroyed on the third day after the floor had been cut. Even then all buoyancy (top and bottom tubes and the arch tube) had remained fully inflated.

The research programme included testing and recording performances of other safety equipment such as inflatable lifejackets, inflatable sailing vests, with and without harnesses, harnesses and tethers and various forms of harness release clips. I will not comment on any of these in this report since RFD products were not directly involved. (I overheard many favourable comments by participating police divers when comparing inflatable lifejackets and clothing to COASTAL and/or SOLAS inherently buoyant lifejackets.)

THE BRIEF

We had been invited to attend the research trials by the NSW Water Police, specifically Senior Constable David Upston. David had made it very clear that we were invited only to observe the proceedings to witness the various tests they would be conducting. I had offered to be a "willing participant" but was not called upon for anything more than occasionally helping to capsize or right liferafts from the pool edge, video some testing of quick-release clips under load, etc.

The police had enlisted the services of the Australian Maritime College, their facilities and research staff to help conduct the various trials. I was very favourably impressed by both staff and facilities.

The various test results, video coverage of proceedings, comments by participants, etc., will form part of the police report to the coroner.

THE PROGRAMME

DAY ONE: Fifteen "trained" survivors' actions were to be compared with the actions of fifteen "untrained" survivors. All were required to perform the same manoeuvres on two liferafts (the 6 person PROSAVER and an old 10RBM SOLAS raft). They did so individually and out-of-sight of all other participants. They were then asked to complete a questionnaire (which I did not see).

All were dressed in fairly typical wet weather gear and all were required to wear COASTAL lifejackets (I noticed a few SOLAS lifejackets too). I suggested that very few Hobart Race yachts would have had COASTAL or SOLAS lifejackets but agreed for the purposes of the trials that a STANDARDS lifejacket would not be too unlike a COASTAL lifejacket when it came to restricting access or egress to and from liferafts.

Each participant, dressed as above, was requested to swim two laps of the pool (total of 50 metres) then board the PROSAVER. He was then asked to close-up the canopy entrance. The liferaft was then capsized with the participant inside. He was then asked to exit the liferaft "at his leisure", then to right the liferaft. He was then required to board the 10 person liferaft and, with the aid of another "survivor" already in the liferaft to take charge in rescuing someone in the water floating unconscious about 10 metres away. Finally a helicopter rescue sling was lowered and he was asked to don it and be hauled out.

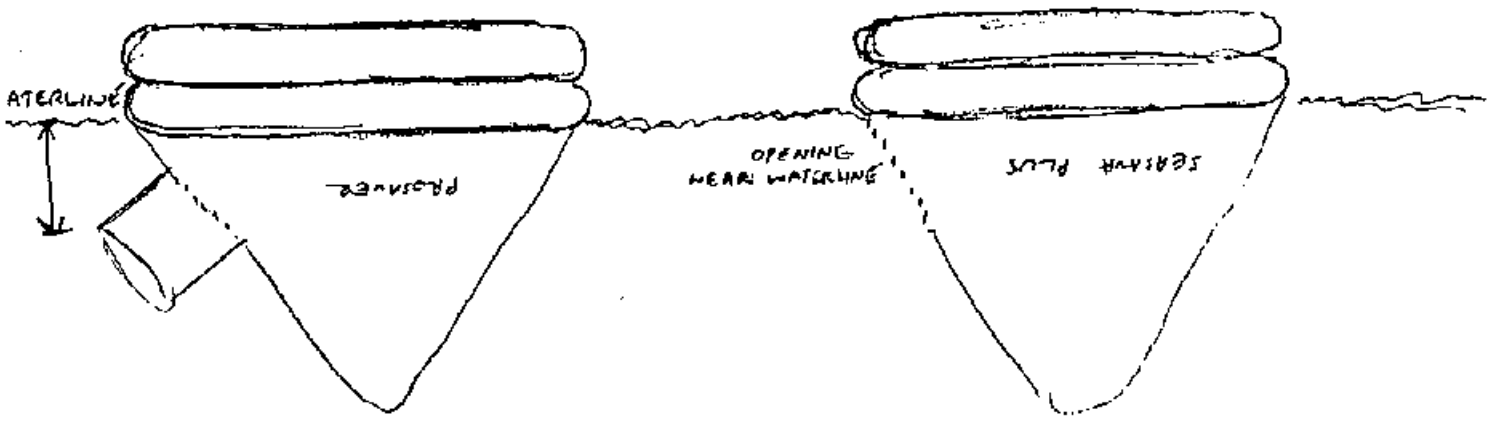
Exactly the same procedures as above were then conducted with the "untrained" participants.

Many different techniques were seen but overall it was obvious which people had had some previous involvement with liferafts. One or two "untrained" people admitted to having read something about survival and seemed to know to start righting from the CO^2 cylinder side, etc.

OBSERVATIONS

First and foremost was the way the PROSAVER stood up to the treatment. It was capsized and righted at least 30 times, with one person inside and at the end of the day was "as good as new".

Second – I could see on most egresses how the canopy "door" became a funnel after it was untied from inside. This did not seem to hinder exiting the liferaft to any great degree when only one person was involved although lifejackets caught on the drawstring occasionally. It did restrict new air entering the liferaft from a possible upward push when inverted because the raft could not be lifted high enough for the funnel to break the surface of the water. This is easy with our Seasava Plus and old ME models – I've done it myself. (See diagram).



Third – The righting strap on the PROSAVER goes from one corner of the raft to another corner – diagonally across the bottom if you like. When re-righting the liferaft it was obvious that this did not help (more about this later). Nevertheless all participants, trained and untrained, were able to right the liferaft with no-one inside. A couple of untrained people were unable to right the SOLAS liferaft.

Fourth – Boarding the liferaft was difficult for some participants, partly because of the lifejacket encumbrance, but mostly because the internal grab handles were difficult to locate and/or beyond reach. The "seal" method of boarding worked best for some people.

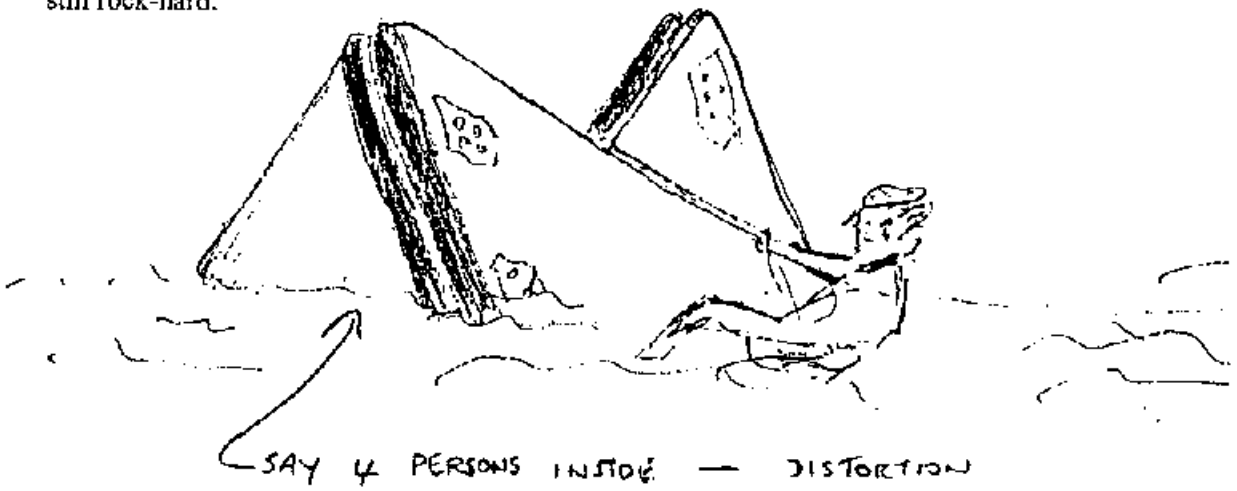
DAY TWO: Oxygen levels were measured in/under the capsized PROSAVER liferaft. This was done several times using professional Tasmania police divers as the guinea pigs. AMC staff used sophisticated measuring equipment and were able to take readings at 15 second intervals. Basically it seemed to me that CO^2 levels built up quickly and, for Occ. Health and Safety reasons the tests were stopped at about the 4 or 5 minute mark because CO^2 would have exceeded acceptable levels beyond that. The tests included aerating the water around the liferaft to simulate foaming sea conditions. The test firstly involved physical activity by the divers to try and feign a degree of exhaustion.

The police divers were then required to wear wet weather gear and Coastal lifejackets and several trials at boarding the PROSAVER right-way-up and upside down were carried out. Exhaustive righting trials were carried out to determine the ability or otherwise of righting the raft with one, two, three, four and even five people inside. This became more and more difficult as more people were inside and the diagonal righting strap's natural tendency to want to pull from one top corner and rotate the raft in the process was the main problem. Finally, the strap pulled away from its top securing position tearing the doubler as it came. Interestingly, the whole doubler patch did not come away from the buoyancy – only about a quarter of it! This says something for the original gluing.

AMC staff then fashioned a make-shift righting strap which they attached to one of the boarding ladder attachment points. This gave a more conventional direction for the strap and the continuing righting exercises appeared to be much easier. However, the weight of the occupants was such that the boarding ladder attachment point eventually came away too.

OBSERVATIONS

I was astounded how well the product stood up to the treatment. At times the righting strap (or cord in the modified version) was distorting the buoyancy so much I was sure it would cut right through. I don't think anyone present with any knowledge of liferaft construction would have been critical of the tearing of the two attachment patches – it was inevitable under the stresses and strains being exerted. I doubt that any other brand or type of liferaft would have performed much differently. At the conclusion of the day all buoyancy was still rock-hard.



Righting of the PROSAVER was compared to righting a 6 MM Solas liferaft. This latter raft had two small fixed webbing handles on the underside instead of a strap. The handles were not immediately seen by the first diver but once he found them he had no trouble righting the raft.

The handles are more "positive" than the strap and can't move from side to side like a strap but are harder to locate and reach (you can't reach them unless you clamber up onto the upturned raft).

With the help of an AMC staff member (John Frearson) we repaired the damage as best we could so that sea trials could be conducted next day.

DAY THREE: Sea trials were conducted in Bass Strait using the 6MM, a 6ME (condemned) and 6 PROSAVER. Police divers were again used as guinea pigs along with Tony Boyle. Sea and wind conditions were slight on a low swell however boisterous, breaking seas were imitated by using the wake from the 75ft Tasmania police boat. All rafts performed well, including the PROSAVER.

Rafts were capsized by hand alongside the police launch and re-righting was measured for any appreciable differences in the motion of a seaway compared with a swimming pool. Righting the PROSAVER with several occupants inside soon tore the righting strap patch away where we had carried out the repair the night before. In one righting exercise (with 4 or 5 people inside) a couple of the divers found themselves face-down in water in the bottom of the righted raft with other bodies on top of them and unable to move quickly out of each others way.

John Stanley was asked to mark the floor where he recalled making the cut. He had done so between two doubler patches used for the boarding-assist handle. He said in hindsight it might have been better had he cut at 90 degrees to the way he had - that perhaps the further tearing of the material would not have occurred (or have been more difficult) because the patches might have prevented it.

——— = As cut by John Stanley

- - - - = John's preferred cut direction

Divers and Tony Boyle then boarded the upturned raft and cut the floor where marked – about 2 to 3 inches long. I noticed that the floor became concave as soon as it was cut where for much of the time on other upside down exercises air trapped under the raft tended to give the floor a convex look. Not much air entered the raft through the cut at first because one of the water pockets covered it. I soon saw fingers protrude and the water pocket was moved.

The raft was righted and, with the weight of its crew and water entering through the cut it soon settled in the water to float at roughly the level midway between the two buoyancy tubes. The crew started moving vigorously in the raft and within a few minutes the floor had torn right across. For some reason 4 x "corner pieces" remained intact and the raft retained its shape. Once these were removed and the canopy was similarly destroyed all integrity was lost and the raft took up any shape it desired! Further trials using the wake of the police launch had predictable outcomes with occupants finding it extremely difficult to stay with the remains of the raft.

The 6ME was similarly destroyed but the circular shape seemed to remain intact.

It amazed me to see that after all this mistreatment the PROSAVER's buoyancy tubes were still fully inflated. (John Stanley had told me some months ago that the same was true of his lifecraft).

SUMMING – UP AND OBSERVATIONS

a) No tests were carried out with or without streaming the sea anchors. I don't know why – John Stanley had told me in Sydney that he was looking forward to seeing the comparison performance. He says their drogue broke away early in the saga.

b) The PROSAVER righting strap could be improved by eliminating its diagonal pull.

c) It needs a better boarding system - perhaps ME style webbing to a central point on the floor inside.

d) The canopy entrance is small and that plus the "funnel" effect makes it difficult to egress when inverted.

e) I overheard comment from one diver that he would not like to be clipped on during capsizes because tethers, lanyards, etc., could tangle around each other and make it difficult/dangerous. (This could apply to any liferaft, not just the PROSAVER).

f) I overheard that Tony Boyle had a copy of early PROSAVER literature. I have since sent him a copy of their later brochure in which they suggest their product is suitable for "offshore and ocean voyages".

g) David Upston commented on black colour of liferafts. I can only but agree, particularly when upside down. A bright yellow or orange would certainly be far more visible – like our aviation liferafts.

h) AMC staff were critical of our emergency pack order. Important items such as torch, instruction leaflet and paddles which could be needed first were at the bottom of the equipment bag.

i) They were also critical of "glove" paddles although they acknowledge that AYF specs do not even call for paddles. One criticism (apart from probable mediocre performance) was that they are not obviously paddles! Perhaps we should stencil them with "PADDLES - WEAR LIKE GLOVES FOR BEST RESULTS". John Stanley had been critical of bailer. Maybe he was referring to the paddles and trying to use them for bailing because the bailer would be quite good!

j) AMC staff were well-aware of various liferaft types and differences. They know that the PROSAVER meets the "Blue Book" AYF requirements. They know of the bent tube construction method and the role the floor then plays in maintaining shape. They know that righting liferafts with people still inside is not the preferred method, etc. They impressed as being very knowledgeable about our gear.

k) PROSAVER can be proud of their product. The liferaft took a hell of a beating over the three days and would probably still be going strong if part of the exercise had not involved its deliberate destruction. There would be no comparison between PROSAVER and 100's of old Beaufort "Dolphins" (manual canopy) still in service!

l) All liferafts are small when filled to their rated capacities with large police divers complete with COASTAL LIFEJACKETS !! This goes back to the various maritime authorities but maybe as manufacturers we should advocate a different formula to give more space. I know the USL Code has a rating formula "A" divided by 0.372 where A = surface area of floor in square metres.

m) I had an opportunity to ask John Stanley what they had used to initially tether the two rafts together. He said it was "something with a sort of blue fleck through it". It had been taken off the yacht and was not cordage from either liferaft.

I do not know what "agenda" John Stanley and John Gibson have – if any! They were present in Tasmania but did not attend all sessions. I guess their interest was more to do with the liferaft assessment rather than the other equipment tested. The conditions they experienced must have been horrific and would be very difficult to replicate. Losing three mates would make you look for something to blame.

I firmly believe the testing conducted by the AMC and police must have shown them that ALL liferafts have their limitations and that their performance expectations were beyond the product's capabilities. Neither Stanley or Gibson knew much, if anything, about such capabilities before they found themselves sitting in the Prosaver in the last Hobart Race.

Similarly, I do not know what mind-set the Water Police might already have but I think it probably is in favour of Category 'O' for future Hobart races. The last Whitbread around-the-world race boats had 10 person SURVIVA SOLAS rafts in large flat packs but Category 'O', to my knowledge, does not require SOLAS rafts. It requires insulated floors but that can be achieved without going to SOLAS specs. Indeed, the Melbourne to Osaka two-handed race earlier this year was Category 'O' and they accepted Prosavers including the 4 person which the two crew off GREEN HORNET were rescued from after 16 hours adrift.

I just hope the Police investigation will be as thorough on aspects such as crew training, experience, eligibility, etc. and boat design and construction as it is on liferafts. The CYCA has put a limit on young age but they should also consider OLD age! Just how physically fit are people like John Stanley when it comes to righting liferafts? He is probably about 60 and has two artificial hips. Similarly, I hope the Police acknowledge that it has been the failure of yachts to withstand the conditions which sees crews in liferafts. Yachts have been capsized just once and they are stuffed! We saw the PROSAVER capsized about 50 times and it was still quite OK (until floor was cut)! Even then it did not sink like yachts can. I think it is a pity CYCA does not insist that an EPIRB be **IN** each liferaft. We are recommending to owners that that be the case but CYC's new rule just says there must be an EPIRB **FOR** each liferaft. Maybe one day John Stanley and John Gibson might just acknowledge that in spite of the problems they experienced they might not be here today had it not been for their PROSAVER liferaft.

Regards,

KEY PERSONNEL PRESENT FOR RESEARCH TRIALS:

Detective Senior Constable Stewart Gray – NSW Police Service
Senior Constable David Upston – NSW Water Police Branch
Mr Tony Boyle – Senior Lecturer – Australian Maritime College
Mr Hugh Hurst – Lecturer – Australian Maritime College.
Mr John Frearson – Technical Manager – Survival Centre (as above)
Mr Teki Dalton (2nd & 3rd days only) – representing CYCA
Mr John Stanley – Winston Churchill
Mr John Gibson - " "
Mr "Johnno" Gibson - " "
Several police divers from Tasmania Water Police