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NEW SOUTH WALES STATE CORONER'S COURT

STATE CORONER: J ABERNETHY

TUESDAY 18 JULY 2000

5/98 - EVENT OF THE 1998 SYDNEY TO HOBART YACHT RACE

INQUEST INTO THE DEATHS OF JAMES MICHAEL LAWLER
MICHAEL BANNISTER
BRUCE RAYMOND GUY
PHILLIP RAYMOND CHARLES SKEGGS
JOHN WILLIAM DEAN
GLYNN RODERICK CHARLES

Mr A Hill with Mr M Papallo assisting the Coroner
Mr R Stanley QC for the Bureau of Meteorology
Mr RJ Weber for the Cruising Yacht Club of Australia
Mr T Elsworth for the Australian Yachting Federation

PART HEARD

HILL: Today the first witness will be Mr Tony Mooney from the Australian Yachting Federation, followed by Mr Andrew Dovell, who is an expert yacht designer and qualified marine architect. I have set out various witness lists. I understand that still to come is a statement by Mr Green. My friend Mr Weber will undoubtedly tell you more about him. We have at this stage tried to meet the various desires for witnesses to be called on particular days. However, I think Mr Weber may have an application but I should say this, that we have only just received yesterday the statement of Mr Bush on behalf of the CYC. Mr Van Kretschmar's statement is being couriered to us this morning. It does make it extremely difficult.

CORONER: It certainly does.

HILL: Especially when they have as many annexures to the statements that we've seen from Mr Bush. So if there is to be any more I really would like a firm time if it's possible from my friends, because on the last occasion back in April we were told it would be two weeks and those statements would be on. Especially from the Bureau of Meteorology's point of view they have to contest a lot of those statements.

CORONER: That's right. Mr Stanley's entitled to have a bit of a look at them, Mr Weber. What do you say, Mr Weber?

WEBER: Your Worship, we've put on 14 statements, many of which are quite brief. They're statements of staff at the CYC on Boxing Day of 1998 who prove the negative, or attempt to prove the negative that they weren't called by the Bureau of Meteorology. That evidence has been on for some time. In addition, there are statements from what you might call

the principal players, the Commodore, Mr Van Kretschmar, Mr Robinson of the Racing Committee, the present Commodore, Mr Sommer, Mr Bush who your Worship will know, a former Commodore who undertook the review, Mr Thompson, the race manager, Ms Holt who works in the sailing office, Mr Elliott who is on the Race Committee. I think that's the extent of them, 14 in number. It's been quite a task getting them all together and I apologise if there has been some delay but I can assure your Worship that the delay was not in any way due to the lack of resources. There's been one solicitor working full time on the task throughout the whole period with a partner and in addition there's at times been up to five solicitors working on the task.

CORONER: Mr Van Kretschmar's statement is being couriered today?

WEBER: It actually is in the hands of the Crown Solicitor at the moment.

CORONER: Righto, good.

WEBER: Indeed--

CORONER: No.

WEBER: Your Worship I handed to Mr Hill's instructing solicitor this morning the originals of each of the statements which includes Mr Van Kretschmar's.

CORONER: Righto.

WEBER: So that counsel assisting and those instructing could deal with them as--

CORONER: We'll have a look at it.

WEBER: There is one outstanding lay witness, if I can call it that, and that's a Ms Radcliffe. She was in the media centre too. She's been tracked down and she will within a day put on another simple statement saying no-one contacted me. Mr Hill makes reference of Mr Green. We have been in contact with Mr Green. Mr Green is a former race director of the Royal Ocean Racing Club. He was involved in the aftermath of the tragic 1979 Fastnet Race, will give evidence about what occurred after that and will give evidence, if permitted to, as to what the current world practice is in relation to the organisation of ocean racing, with a view to allowing your Worship to see the Sydney to Hobart both as it was sailed in 1998 and as it was sailed in 1999 in a world context. We've tracked him down. We are communicating with him by e-mail in England and we hope to have a statement on Wednesday. He will deal with such areas as communication.

CORONER: We can then make a decision about whether to call him.

WEBER: Yes, of course, your Worship.

CORONER: Mr Hill?

HILL: Perhaps if I can try and get some sort of time on when we're likely to see a statement from him.

CORONER: Wednesday.

HILL: It will be Wednesday?

WEBER: That's what I'm told.

CORONER: That's tomorrow week?

WEBER: No.

CORONER: Tomorrow?

HILL: Tomorrow, yes, that's Wednesday, tomorrow?

WEBER: I think we might have forgotten today's Tuesday. Thursday, your Worship.

CORONER: Thursday, this Thursday.

WEBER: This Thursday.

CORONER: Righto, okay.

WEBER: I was labouring under the misapprehension that today was Monday.

CORONER: Okay, terrific, Thursday, okay Thursday 20 July 2000. Are there any other matters before we start to hear some evidence?

HILL: Yes, I call Mr Mooney.

CORONER: Hang on, before we get Mr Mooney.

STANLEY: Depending upon the content of the evidence to be given by some of the witnesses, we may wish to be excused.

CORONER: Yes, you can play musical chairs with gay abandon, Mr Stanley. No problems. I know you'll be here next week.

<ANTHONY JOSEPH MOONEY(10.19AM)
RESWORN

HILL: Q. Sir, would you give the Inquest your full name please?
A. Anthony Joseph Mooney.

Q. Your address sir?
A. 10 Davidson Avenue in Forestville.

Q. And your profession?

A. I'm the technical manager of the Australian Yachting Federation.

Q. Now you have given evidence on the previous occasion?
A. Yes I have.

Q. Do you have with you your statement that you made - it doesn't seem to have a date on it, I think you've only made the one statement. Do you have that with you?
A. I have.

Q. Before we go any further and go into the statement itself, I understand that weight in regards to liferafts is fairly important for racing yachtsmen, is that correct?
A. That's correct, any weight on board a boat is fairly critical.

Q. If the yacht was measured with the liferaft on board rather than measured without the liferaft, is that a possibility?
A. It is, in fact it was standard practice in old IOR days which was the International Offshore Rule. That was the practice for many years and what we found was that people were stowing the liferaft for measurement in the most advantageous position in relation to their rating rather than in the advantageous position in how to use it when it was necessary. So there was an attempt then to have what we call the boats measured naked. It was thought that we should take everything off the boat and physically measure it in a trim where there was nothing there. The disadvantage in that was time and effort in doing so and we worked out that the safety equipment that's on board the boat and the normal boat equipment, cushions and bunks and that sort of stuff, it was universal in any case, so there was no advantage in removing it all from everyone. But in boats that were not competing in longer races that didn't need liferafts, they were at a disadvantage in respect to the boats that did have liferafts and could move the liferaft to get a favourable rating. So that was why we decreed, I can't remember the year but it was somewhere about '74, '75, that we would take the rafts off the boats and measure them without the liferaft. It would been an equal - a more equal playing field for everybody.

Q. But if they were measured with the liferaft aboard then of course the weight of the liferafts would not be a problem for the yachtsmen, is that correct?
A. Providing they were sailing in races where the other boats also had liferafts and also were measured in liferafts but see the short races off Sydney Heads for example or Port Phillip liferafts are not required. So boats were accustomed to leaving the liferaft off for those races in any case. So it immediately affected their handicap regardless of whether it was - sorry, once they took the race off, if they were measured with it on, then it changed their handicap or should have, but it couldn't because that was the way the boat was measured.

Q. It's just that we've had evidence previously that the liferafts that the SOLAS liferafts and the USL code liferafts are heavier than the ones that were aboard say the Winston Churchill.
A. Uh hmm.

Q. The reason that the light ones were on board the Winston Churchill is the advantage you talk about, because of the weight. What I'm looking at is, is it possible to simply put the liferafts no matter how heavy they are on the vessel before it's measured and perhaps use two systems?
A. I think we're looking at two separate issues. One is a measurement issue and I think we could divorce the liferaft from the measurement issue because I don't think it's relevant in relation to the measurement. The issue is if we want equipment to be carried on board a boat at any time then we can specify what that equipment is. Our philosophy on a world basis as well as AYF is that we maintain minimum standards in relation to the equipment that's carried on board and that equipment varies from category of race to category of race and the category depends on the inherent risk involved in what you're doing. If it's a short off-shore race off Sydney Heads you don't really need a liferaft on board but you certainly do for a Sydney-Brisbane or a Sydney to Hobart or Melbourne to Hobart. What we would see there is and we internationally have tried to get a standard of liferafts. There wasn't one until the Fastnet Race in '79. We relied up till then on Department of Transport here which approved the liferafts in relation to commercial boats and aircraft. We relied on that standard to be used as our guide for what's acceptable for yachting. After the Fastnet Race in '79 we introduced the world standard which is the one that's currently in use now. If that world - the International Standards Association have been working for 11 odd years in trying to establish a standard - international standard for liferafts for pleasure boats, so far without success. But I think the answer to your question is that divorce the issue for measurement and address what it is we should be carrying in relation to equipment on board the boat.

Q. So simply make a guideline for the type of liferaft that you will have?
A. Sure. We do that with anchors. I mean the anchor is dependent on the size of the vessel, we don't simply say you've got to have an anchor. We in AYF regulations stipulate that it's proportionate to the displacement of the boat and we give a chart for ready reckoners so the guy can sit on his loungeroom floor and work out what size anchor he's got to buy. So a similar type of arrangement could be done in respect to any equipment.

CORONER: Q. Can you tell me this, if the same type of raft of minimum standard is upped so it's a heavier one and all boats have to have it--
A. Sure.

Q. --is that more of an advantage to the bigger boat,

depending on factors like the size of the boat? The raft might be standard but I imagine different types of vessels may or may not obtain an advantage?
A. It should still be proportionate because the liferaft size is dependent upon the number of people that are on board the boat. So if I've got five in a crew then I need a five person liferaft, if I've got 25 in a crew I need liferafts for 25 people. The difference is that the smaller the - the bigger number of smaller rafts you have the heavier the weight is.

Q. In any event I suppose if there is an unfair advantage because of the heavier rafts that could be - can the handicap take care of that?
A. No, because that's not--

Q. It's not a handicap factor?
A. Right on. Because the handicap I think are the crew half the time.

HILL: Q. So for argument's sake, if you adopted the standard of say a SOLAS liferaft, that would be the end of it?
A. Yes, it's something that we need to push for internationally. I mean the thing that was mentioned before we broke for recess was that the issue is that the Australian market is not big enough to influence world standard but our expertise in Australia is big enough to influence world standard. So we could have influence in what production there is, how it's produced, what standard there ought to be. For example, SOLAS requires an insulated floor. I'm not sure that we need that in a yachting context, whereas the USL code doesn't require the insulated floor. You talk a USL code to other people in other parts of the world and they say what, because it's an Australian standard. But I think there's a way through all that. Allan Green that we mentioned - you mentioned earlier, he's chairman of the special regulations committee of the offshore racing council as well as doing those other things and I'm a member of his committee, so we have some influence in respect to what could be done and at our last meeting in November we agreed that we would set up our own group to look at liferaft standards, because the International Standards Association haven't done their job. Greg Halls who will be giving evidence before you later on in the hearing, he's our representative on that group and we are waiting for the release of the various reports of Tony Boyle and others to be able to carry that forward, to be able to hopefully influence the world standards in how rafts are built and what's acceptable and what's not.

Q. The situation, as I understand it, is that you will be discussing with Mr Halls and possibly Mr Green as well and Mr Brenac and you will be putting forward a submission to this Inquest in regards to the standards on liferafts that you think should be adopted internationally and therefore by the AYF as well?
A. Yes.

Q. I'm going to move then to your statement and reading some of the statements that we've had, the AYF and of course the international body through the AYF set the minimum standards for safety matters in regards to yacht racing, is that correct?
A. Correct.

Q. You say there at page 10 of your statement that a club - and it's at the very top, a club has the right - I'm not actually reading it but a club has the right to increase any standard but they can't decrease it, is that correct?
A. Correct.

Q. You say there unless there's a compelling reason to do so?
A. Uh hmm.

Q. We know that a category 1 requires a limit of positive stability of 115 degrees in the yachts that participate, is that correct?
A. Yes.

Q. There was in the CYC a condition called grandfathering?
A. Uh hmm.

Q. And that allowed yachts with a limit of positive stability of 110 and above to participate in that race?
A. Yes.

Q. First of all, that appears on the face of it to be an alteration of what was required by the rules?
A. Not really. The limit of positive stability and the stability index are recommendations of the ORC in relation to IMS racing. I know that the waves out there don't say hey, this is an IMS boat and therefore we can treat you in a certain way and they don't say you're a CHS boat or a performance handicapped boat and we'll treat you differently, all the boats get the same sort of waves. So whatever hill you reach that's the hill you get hit with. So what's been happening is that internationally in any other part of the world the Sydney Hobart Race would be a category 2 race. So the CYC has already increased the safety requirements in relation to Sydney Hobart to make it category 1 but they've said when the limit of positive stability was first introduced it was about 105 degrees across the board. Gradually over the years they've increased that to 110, they've graduated according to the category of race to 110, 115 and category 0 is 120. The point there being that the inherent risk the further you get away they felt that the boats should be more self-reliant, the further away from help. The limit of positive stability that the Cruising Yacht Club determined was in relation to the boats that have already been to Hobart before the implementation of the 115 degrees and they said well, you know, you were allowed to go last year at 110, why have we now got to stop you going because the international body has increased the limit to 115. So that's the background of the grandfathering and the basis and reasoning behind it.

CORONER: Q. When did the change come from category 1 to category 2 for the race?
A. It's always been - CYC's always had a view that it should be category 1, at least in my understanding. Their thought is that there is a 180 miles across the paddock that is fairly open water and even though like Fastnet Race is category 2 and across the Irish Sea they go a bit further than that, but it's still relevant in relation to the Bass Strait problem and that's why they've said it should be cat 1. That's my understanding.

HILL: Q. So they didn't need to come to you, that is the AYF, to alter the 115 down to 110 for certain vessels?
A. No, according to the rules they could actually ignore it altogether but that'd be unwise for them to do so, because it's only a recommendation.

Q. You then at page 22 and I'm looking at question 113--
A. Uh hmm.

Q. --and you see there that it's 112 - it says right, looking at this document again, this attachment 1, is it right of me to say okay, we've got 112.9, from your experience and your background should that limit of positive stability rating be permitted to sail in the Sydney to Hobart Yacht Race and you say in my view no?
A. Uh hmm.

Q. So there's a vessel there that's 112 degrees point 9 and you in your view say that shouldn't race in the Sydney to Hobart.
A. Uh hmm.

Q. Why? What--
A. I get into trouble for being black and white and having no shades of grey, so if an international regulation says it should be 115, in my view that's what it should be and I respect the CYC's right to accept boats that are less than that, because the rule allows them to. It's not what my view would be and it's not something that I would encourage but it's quite legal for them to do it.

Q. I think that you say at the bottom there the regulations - you say 115 degrees and as far as I'm concerned that's what it ought to be?
A. Uh hmm.

Q. Then you said over the next page and indeed I withdrew from a CYC international jury on it, it might even have been a national jury some years ago wrote a letter to the Commodore saying why, because they accepted a boat as an entrant in a Sydney to Coffs Harbour race that in my view, because of the stability index, should not have been allowed to go and I wrote saying I'm out of here if I've got no control over the entries that you are accepting. You felt that strongly about this?
A. I did. I should point out that I serve on juries as me, as an individual, and I just happen to work in an AYF shop,

so I tried hard to keep the two entities separate. It doesn't always work but - so when I'm serving on juries I serve as me and my view was that I didn't have control if you like over what was happening with race management and I felt that my life was worth more than trying to get involved in issues that might arise as a respect of something like that. And I made a comment at the time when you get things sorted out I'll come back and help if you want me back and indeed was invited back in 1999 to serve on the international jury and willingly accepted, because I believed that those issues had been fixed as far as I was concerned.

Q. This was in 1999--
A. Yes.

Q. --you were invited back where?
A. To serve on the international jury for the Telstra Cup and the Sydney to Hobart Race.

Q. The CYC invited you back?
A. Yes.

Q. You went back because?
A. I believed those issues that I expressed concern in that statement had been corrected.

Q. One of those issues was the--
A. Stability.

Q. --grandfathering?
A. Yes.

Q. I think that at page 24 you say that in about 1977 or '78, this is question 126, a boat called Siska failed to meet the international screen which was - and I refused to issue his certificate because he failed to issue the screen. Now what is that about?
A. It was in the old IOR days where there was a screening value, a limit of minus .25, which meant that if the boat got hauled down the effort required to bring it up would have meant that it would have self-righted. But Roley's boat, the Siska, failed the international screen and despite the press hoo-ha and other places we didn't issue the certificate and couldn't issue the certificate and he took off I believe five minutes before the rest of the fleet, sailed out through the Heads and I heard later that there was a bit of gust that they got down off Bondi and the mast sort of laid in the water for a minute or two. So it's purely to reinforce the fact that if there is an international rule it ought to be applied and ought to be obeyed.

Q. I think at page 26 and you were asked a question there, question 137, would you agree that this is a situation where a club or an organisation involved yachting has gone below the minimum standard and I think they're talking there about the - what was it that you thought they were speaking about?

A. The issue was whether or not I would decline entries that didn't meet a standard and my answer is yes, I would if I was the race organiser. But that's what I was I believe saying there.

Q. You say that in my view it's apparent that they've allowed people to go that didn't meet international standards?
A. Uh hmm.

Q. What people are you talking about there?
A. Boats that didn't meet 115 degrees.

Q. That's as far as you were concerned they've allowed them to go and the international standard said they shouldn't?
A. The international standard recommended that they shouldn't and we should emphasise that again, that the issue again in my view is you've set down an international minimum standard and the boats that are entering should comply with that. I know there's pressure from sponsors to increase fleets and all that other stuff but in my view that's what ought to happen.

Q. You were then - and I'm still on page 26, you were shown the IMS certificate for the Business Post Naiad?
A. Uh hmm.

Q. You examined that certificate and you saw that the stability ratings on them was the stability index of 102.6 and a limit of positive stability of 104.7?
A. Uh hmm.

Q. And you looked at that and at page 29 after looking at all that you were asked this question at question 149, so if you look at the international requirements of stability index, 102 that's certainly - and you said you wouldn't let him out of the Heads?
A. Yes.

Q. Now, is that still your opinion?
A. The international standard says for 103 under stability index and the boat shouldn't be issued a certificate. We have said over the years again for an historical reason that we would accept the minimum either the limit of positive stability or the stability index, because when IMS was first introduced, there was only a limit of positive stability, there was no stability index and when the offshore racing council introduced that, we found that there was a large number of the fleet that would be barred from competing at whatever level and whatever category, that it was quite safe for them to have done last year according to the minimum standard but wasn't safe for them to do it this year under the new minimum standard. So we've retained that until our current book and the view is at the moment that we'll decline to allow that parallel minimum to be used in future. Certainly the boat - if you get a certificate that's got 102 on it then you'd really be thinking should I really be accepting this entry.

Q. Now of course the certificate for the Business Post Naiad did in fact have 102 and I think 104.5 was it?
A. Yes.

Q. As far as you're concerned, if you saw that certificate what would your attitude be?
A. If it's a Saturday afternoon race of the Heads, not a problem, because it met the standard. I mean we issue certificates for a wide range of boats to do all sorts of things, including charter boats that are either in the harbour or even far north Queensland. It's a very economical way for boats to obtain a stability index to satisfy the maritime requirements of the authorities. So when we issue certificates, we don't necessarily know what the boat's being used for, and if it's only being used for short ocean races off Sydney Heads, not a problem, or Tamar River or wherever else it may have come from.

Q. But certainly that certificate would not allow it to go into the Sydney to Hobart?
A. No.

Q. At page 33 you actually talk about in another country this would be a category 2?
A. Uh hmm.

Q. Why do you say that?
A. Because that's what the other countries use. Sardinia Cup had a long race, the Around the Islands Race in Hawaii for the Kenwood Cup which starts in two weeks, that had a long race. The Fastnet Race, they're all category 2. It's normal internationally for category 1 only to be for quite some distance where you're exposed, like Sydney to Noumea or Sydney to Lord Howe Island for example would be what the rest of the world would see as a category 1 race. But where you're up and down the coast and if you look at the definition of what a category is, where you're close to shorelines, then the Sydney to Hobart race fits within that category which is category 2.

Q. When you say close to shorelines, how far close?
A. You're 90 miles from shore in normal circumstances, because that's the stretch across the paddock. I mean in some circumstances you can go way out to sea but it's unusual for people to go more than, you know, 50, 60 miles off shore in most circumstances.

Q. So it's the crossing of Bass Strait that brings it--
A. It brings it dangers. I mean it's a pretty dangerous part of the world in any case.

Q. I think at page 37 you say that you were upset about a vessel called Wild Thing?
A. Uh hmm.

Q. What was that about?
A. That was the one that I withdrew my services at the CYC on.

Q. Why? What was the--
A. Because it was a boat that didn't meet a standard that I believed should have been met in relation to the event that it was being run.

Q. What was the standard, can you recall?
A. There were two issues, one was stability and one was American Bureau of Shipping requirements of alterations that had been done to the stern of the boat. And they allowed the boat to go to - it mightn't have been Coffs Harbour, it might have been Southport, it was a race going north some time early in the season.

Q. When was this? What year approximately?
A. I can't remember the year. It would have been somewhere about '85 I guess.

Q. They allowed it to run against your--
A. I wouldn't have - in my view, I wouldn't have allowed it to go but that was - that's a personal decision, not - I mean the CYC from a stability point of view had the right to accept it. From the ABS, American Bureau of Shipping, point of view of construction standards I don't believe they did. But whether or not the owner declared that to the CYC at the time I have no idea but I felt strongly enough about it to say I just don't like playing that sort of game, as me, not as AYF.

Q. So what did you withdraw from?
A. From the international jury for the Hobart race. The same question as we addressed back 15 minutes ago or thereabouts.

Q. I think then at page 40 you were asked this question. It's question 197, you were asked from a common sense point of view, do you think it would be fairly a risk, a serious risk taken by a racing committee or an organisation, to allow a boat with an IMS under 110, I'm not talking 104, 110, into a race where it's required to be 115 or between 110 and 115 and your answer was if I was on the committee, I'd jump up and down and say no and probably resign from the committee if I lost. That's how strongly I feel about it. I mean it's not a construction standard, that's another issue that people are unhappy about with the APS requirements but they are they, they're a minimum standard and whenever we've got the rule we either change the bloody rule, right, or we stick to it. As far as you're concerned, if that was the situation you would probably resign over it?
A. I feel strongly that when we're addressing safety issues, I mean the minimum standard is a minimum standard and whilst a minimum standard might be a recommended minimum standard at least in my view I would be fighting to retain that minimum standard.

Q. I notice there that it says the APS. Should that be ABS?
A. Yes, American Bureau of Shipping.

Q. Page 42, you're talking about - you were asked about looking at the certificates et cetera of entrants?
A. Uh hmm.

Q. You say that it should be an administrative process that all due care in my view is taken to establish the bona fides of the entrants?
A. Uh hmm.

Q. Now, I understand that sometimes the entrants do need checking and their bona fides, I think at one stage the seagoing experience was put down at some 10,000 miles of ocean going experience?
A. I don't recall that bit but certainly - I mean yachties traditionally - well, I've got a saying that the only way to get yachties to read anything is to put it on the outside of the envelope and that's if Australia Post will then deliver it. So it's pretty hard to get them to come to the party in relation to documentation. You know, it's just a pain. It doesn't make the boat go any faster. And because it doesn't make the boat go any faster it's something that it's a drudge to quite a lot of them and quite often there's a defaulters list at the Sydney to Hobart briefing for example where this boat's missing this piece of paper or that piece of paper or whatever it might be. So that's what we're alluding to there, that it really is difficult and I don't envy the office staff of the CYC in trying to pull all these bits of paper together from reluctant owners.

Q. Over the next page you actually say--

CORONER: Q. But they could take a hard line with them, couldn't they? They could get a bit of discipline in them surely?
A. Yes. See, normally what happens is that there's the briefing on the morning of the day before Christmas, Christmas Eve, and traditionally there's a list of boats that are put up with please see me by midday or you won't start and that's normal.

Q. Be a few bruised egos if they actually carried it out, wouldn't there? Bit of time wasted by a few people?
A. It is time wasting but I mean I've not known anyone to have gone out there, been allowed to go out that hasn't ticked off all the boxes before midday.

HILL: Q. In fact, over the next page you actually say that if you were on the committee, if you were a member of the committee, you would need to know that the system of that checking was in place?
A. Yes.

Q. And that that's your opinion of that?
A. Uh hmm.

Q. In the new statement of Mr Thompson, at page 2 he says that the International Sailing Federation Race Management Manual is written for short offshore regattas. Do you agree

with that?
A. Yes. The manual is written for conventional sailboat racing. Offshore is part of the sailboat world but it's a small part of the sailboat world, so the international race management manual is written for regattas of around the tracks, Olympic type regattas, Olympic type class regattas, Botany Bay, Sydney Harbour, Port Phillip. There's no manual written for long ocean races.

CORONER: Q. What about the shorter ones, like you mentioned the Coffs Harbour one?
A. Same thing, it doesn't really address - it virtually tells you how to run a boat race, it doesn't tell you the overall nitty gritty of the administration. It'll tell you that you need to check measurement certificates because almost every boat has it, or has one, but it doesn't go into the offshore world at all.

HILL: Q. You just have to adopt as you go along and learn and put systems in place?
A. Yes, it's been a learning curve for many years and CYC's been I think in my view anyway world leaders in good practice in relation to Sydney Hobart particularly. I mean in '79 the Fastnet Race there were no radio skeds required, there was a whole lot of other stuff. It'd been the standard practice in our country for many, many years, led by the CYC. So the world learnt a lot from what was developed here. And again there are still things that are happening that the rest of the world's trying to catch up on in relation to race management. Last year by putting the - someone else can tell me the proper name for it, the little gismo on the back of the boat that told everybody around the world where all the boats were, through Satcom, that was a magic invention that the Whitbread Race had done years ago but it's the first time so many boats have been fitted with this equipment for tracking of the boats and that's a development that the CYC instigated and now the rest of the world are trying to work out how they can get in on this act and do the same thing. Because apart from the safety issue it was very interesting for the people sitting at home in front of their PCs and being able to follow it through the Internet.

Q. I want to take you to a letter that you sent to the Coroner on 16 June, do you have a copy of that?
A. I do.

CORONER: I have the original.

HILL: Perhaps if my friend could have a look at it and just follow it through and I'll get you a copy. There's nothing contentious in it, it's just there's a list of things that the Australian Yachting Federation have actually been doing.

WEBER: I've been provided with a copy from my friends and I return--

CORONER: Sorry, you've got it?

WEBER: I've just got a copy from--

HILL: Q. You say at about point 5 I can advise that the special regulations committee, that's the safety equipment committee of the offshore racing council, has already acted on some of the matters raised in the CYCA report.
A. Yes.

Q. That's the race review report?
A. Yes.

Q. The offshore racing council is where? Where are they situated?
A. Their office is in London, or in Southhampton. They're made up of the various national authorities, United States sailing, New Zealand and so on, all around the world. It's an international umbrella group that's set up specifically for offshore racing.

Q. These include and you say as from 1 January 2001 new boats will be required to have a special stowage built in for liferafts?
A. Yes.

Q. When you say new boats, what do you actually mean by that?
A. Boats launched after that date. The issue - we have an age date on our boats which is the date that the boat's actually either launched or first measured.

Q. The existing provision to carry rafts below decks will be withdrawn for boats launched after that date?
A. Correct.

Q. So that's the soft satchel?
A. Correct. The soft satchel was something that's developed the lightweight raft, the fact that we put a 40kg limit on rafts that were below decks up till four years ago or thereabouts, you could only get four man rafts down there because they were the only ones that would fit within the 40kg. And the fact - and that's where liferaft manufacturers were pressured to design something different that would be a six man raft that would still fit within the 40kg limit and we could still stick it below decks. From a competition point of view that's the best place to have it.

Q. Because you've seen Mr Boyle's report?
A. I have.

Q. There's a SOLAS liferaft that's in fact cheaper than one of the Prosavers but in fact was twice as heavy?
A. Yes. Not quite twice, it wasn't all that much heavier actually.

Q. Wasn't it?
A. No, about 16 kilos I think.

Q. But that would have put it--

A. It put it over the 40kg limit, no doubt about that.

Q. You say existing boats will be encouraged to retrofit this facility?
A. Yes.

Q. So as far as existing vessels are concerned, we're still left with a situation that at the moment they can carry the under 40 kilogram liferaft below decks?
A. Yes. The thought behind that is and Andy is better equipped at this than I am but engineering-wise and construction-wise it would be fairly difficult to retrofit that facility on existing boats, whereas it's reasonably simple at a design stage and a build stage to be able to make sure that there is a facility to hold the liferaft on or at the deck.

Q. Because it's not simply - as I understand the situation it's not simply you take a piece out of the deck and put something in because you could upset the whole stability of the vessel et cetera?
A. You could upset all sorts of stuff, the complete integrity of the vessel as well, structurally.

Q. So does that then if you like push us towards the back to the design of the liferaft, because we can't make people retrofit these things, you can do it for the future vessels, so we're back to really designing a liferaft that's better, is that correct?
A. Yes.

Q. You also say an additional 30 per cent of safety harness lines now required. What do you mean by that?
A. Tethers. One of the shortcomings from the '98 inquiry was the short - you really need two lines on your safety harness, a long one and a short one and the idea of increasing the number of tethers on the boat is to facilitate people that are on deck to have twin lines rather than just the one, so that we've got - we can hopefully get to a stage where we're very rarely unhooked.

Q. So basically you're just putting more--
A. More strings.

Q. --more tethers?
A. Yes, more strings, yes.

Q. A coloured flag is to be embedded in the safety line from January 2001 similar to that required for industrial harnesses. When you say a coloured flag, what exactly do you mean?
A. It's a device, material if you like, that's got less stretch capabilities than the material of the line. In an industrial sense if someone falls off a building, then normally this coloured piece of string would break. It's a bit like in a motor car when you have an accident and you've got seat belts then you should replace your seat belts because they've already gone a shock load and having gone

through the shock load they're not then as safe for the next time. And that's what we're trying to do here. All we're trying to do is say if you get washed off the boat and you stretch your safety harness tether, then that tether should be thrown away. Now one way of establishing whether it should be thrown away or not is if we build this flag in so that when the tether does stretch and the flag breaks visually you can say okay, that one we've got to replace.

Q. So you have a piece of cloth that's got less stretch in it than the line itself?
A. Than the surrounding material, yes.

Q. And that'll break, I see. A new requirement that before starting, every individual in the race in which the equipment is required shall have personally fitted an adjusted the safety harness and the personal flotation device which he or she will wear during that race?
A. Uh hmm.

Q. I won't ask you a question about that but I'm going to go down to the storm sails. They're now required to be highly visible - in a highly visible colour, is that correct?
A. Yes.

Q. Such as Dayglo pink, orange or yellow or have a highly visible coloured patch on each side?
A. Yes.

Q. This will help rescuers to see them. Now I understand that the CYCA have adopted a procedure now where they have to - every yacht that's competing has to put up its storm sails and all the crew have to stand in their personal flotation device with all their gear fitted and I think one of the vessels go around?
A. That's the intention or the other way around, it's a sail-past.

Q. It's a sail-past, they all sail past in this way, so that in other words the committee can actually see them, they can see the storm sails and they can see the crew fitted--
A. I'm not sure whether we require the crew to do the other piece yet but that's certainly what the IRC are requiring as at 2001. That's something that I'm sure the - we will be bringing up as well in our new regulations effective from July 2001, so that will put the two pieces together. The CYC in '99 required the storm jib and trisail to be hoisted and to be - and to sail past the committee boat and say hey, here I am and I've got all my sails and they fit. Part of the reason for that is to make sure that the trisail actually does go up the mast or that the fittings are there and the bits of string are there ready for it to be used.

Q. You also then say on the basis that the ISO has been working on liferaft standards for 11 years a subcommittee has been formed to review and revise the ORC standard,

bearing in mind the issues raised in the CYCA report?
A. Yes.

Q. That's part of these recommendations that you spoke about as well, is that right?
A. That's Allan Green's committee. We appointed a committee in November last and the new regulations which were published in January of this year indicated in the liferaft standard that there was expected to be a review of this before June. We haven't met that criteria because we're still waiting to get the information that Boyle and others have presented to this Court. Once we can get that, we can - we've then got ammunition to go to the rest of the world and manufacturers and say hey guys, here's physical tests, this is what happened in these tests, let's work out how we can fix the problem.

Q. You then go on to say David Lyons from Australia and we've heard of David Lyons, I think he looked into the Business Post Naiad?
A. He did.

Q. Is investigating the construction standards of decks, coach roofs, hatches and windows?
A. Uh hmm.

Q. Have you any idea when there will be a report on that?
A. What they're trying to do is to analyse the ISO standard and try and - because the American Bureau of Shipping have withdrawn their certification process, there's a hole in that development and I know Andy's paper earlier this year - this year, last year also addressed those same issues. The report shows that there is a weakness in that area and we want to try and fix the weakness and improve the standard and we are hoping that we can simply adopt the ISO standard but there needs to be engineering comparisons done between one and the other and make sure we're not going backwards rather than forwards.

Q. You also say over the page then a minimum list of topics to be covered in training programs has been developed with at least 30 per cent of the crew in category 0 and category 1 races required to have undertaken training, both theory and practical. All crews will be strongly encouraged to do likewise. Are you saying that you want 30 per cent of crew, at least 30 per cent of crew, trained?
A. Yes.

Q. When we talk about trained and I don't mean any disrespect to some of the people that have gone before, they've got experience, we've heard them have experience but none of them had seen a liferaft inflated or got in them. Are we talking about actual training or are we simply talking about experience?
A. No, there's two separate issues. One is experience and that's seamanship experience that you can't train in, the only place to train for that is out there in the ocean. That's what experience of the crewmen means and therefore

there's a requirement that 50 per cent of the crew should be experienced and different organisations apply that in different ways. Some, again depending on the race, in some cases it might be, you know, 10,000 miles or 4000 miles or whatever else they want to come up with, or so many events in so many categories of race. So that's one issue. The other issue is training, hands-on training in some areas of things, the use of flares. I mean one of the first things that we did when we produced the Australian Standard for flares was go around and ask people had they ever fired a flare off and they kept saying what, we know we've got some on board the boat here some place but they didn't know what they were or where they were or how to use them. And there's different means of attacking different flares to get them to light. They're the sorts of things that we mean that we want 30 per cent of the crew to be able to experience and to be able to say right, at least you guys ought to know now how to let a flare off and what to do with a liferaft.

Q. So what you're looking at is you saw the video I think of Mr Boyle and the people he was putting through the liferaft?
A. Uh hmm.

Q. That's what we're talking about, we're actually talking about physically going through those sorts of things?
A. We didn't see it quite that way. What we saw was that the CYCA introduced a program that's nationwide, we've put some things on it, introducing a survival course also through the Australian Yachting Federation training program. The cost of people actually getting into liferafts and inverting them and inflating them and that sort of stuff can be pretty heavy. Flares is not a problem because you can use outdated flares within reason to achieve everybody to let a flare off. But certainly the cost of liferaft exercises and the cost of helicopter rescue process can be fairly heavy. What we saw was that if there was an awareness of how to do it by physical watching and by all means get in the water and do it if you can and if the facility's there and available. But if there are 50 people standing around a jetty and it was all happening in front of you, you can get a pretty good idea of what a liferaft was, how it operated, how to bring it back upright if it's capsized. So they're the - and you can hang people up on a winch to simulate a helicopter without actually using a helicopter and how to get into the slings and so on. So we didn't necessarily see that it needed to be physical in water everybody but certainly they had to be exposed to that in order to comply with the requirements.

Q. So that 30 per cent could in fact - it could contain people who had never actually physically done those things?
A. Sure.

Q. They'd simply watched it?
A. Yes.

Q. Do you think that is enough?
A. Better than what we've got now.

Q. It might be better than what's happening at the moment but is it enough in your opinion?
A. I guess you could argue that. Our view from an administration point of view was that we're dealing with people that are doing this as a sport. There's an inherent risk in any sport, in most sports anyway. And certainly if we can improve the standards of knowledge of the participants and it's interesting that the program that the CYC did in 1999 there's only 1500 people went to Hobart in the fleet and yet 3000 people went through that program that I've just described. So there is awareness out there that we as participants need to improve our own standards and if we can voluntarily bring those people forward to be able to enter into those sorts of programs, then the more people we're going to get exposed to safer sailing. And if we can get people physically in the water then that's great and if we can aim to do that then that's terrific as well but at least by doing it - by giving them some exposure, we're at least improving the standard already.

Q. So this 3000 that actually attended this, it was a demonstration was it, it wasn't actually a participation?
A. Yes. Some participated but the majority was a demonstration.

Q. Down the bottom there at marketplace, you say this. As I indicated to you in evidence in some instances the Australian market is not sufficient to be able to have a product designed around Australian requirements, so we need to be sure that what we've prescribed for use here is available. We can see - sorry, what we can do is seek to influence the manufacturer of these products so that they are better products for the world market. You give an example there about SSB radios and the requirement in Australia led to the fact that nobody would build them?
A. Right. A colleague of mine who runs a ships' chandlers in Sydney, he actually when this single side band radio was first mooted and promulgated in Australia as being used in the next 12 months or so went off to Japan on a business trip and talked to a radio manufacturer and he said now I'll become your agent in Australia, because Australia's implementing this single side band radio and the Japanese guy said how many you want and he said, you know, 3000 or something and he just laughed. He said that's about two hours' production for us, he said we're not going to change our production run to put this little component that the Australian regulatory authorities wanted in it. So they're the things we've got to be careful of, that if we are to say that - a silly example may be that liferafts shall be Dayglo orange or pink or green, that we've got to (a) have the material available world-wide to be able to do it and (b) allow sufficient lead-in time so that the marketplace can catch up with production in doing what it is we need. And we've got to try and influence the rest of the world to follow whatever that philosophy and recommendation is. It's

purely if we come out tomorrow and say every boat shall have a SOLAS liferaft, they won't be able to buy them, they just won't be enough on the marketplace available to be able to supply the demand.

Q. I notice as well that EIPRBs, you now need to be a 406 type?
A. Yes.

Q. Over the next page you talk about identification?
A. Uh hmm.

Q. You say that the AYF special regulations require that sail numbers and letters of the size carried on the mainsail must be displayed by alternative means when none of the numbered sails is set?
A. Uh hmm.

Q. Then you talk about regulation 4.26 requires that a standard orange sheet with a black V or black square above a black circle with lanyard attached shall be carried. This is a marker panel?
A. Mark of distress, that I'm in trouble. What we heard from the helicopter guys was that when they were overhead they couldn't find the boats, white boats in white sea, that just didn't look alright. It was - I remember we also discussed at the time the possibility of numbers like the police cars have. One of the problems that we have is the water out there is pretty unforgiving at times and a lot of the signs that we've been putting on boats of, you know, Telstra Cups and Kenwood Cups and Admirals Cups, sponsors' logos and so on, quite a number of those have been left in the sea which hasn't done us as a sport a whole lot of good. So we've got to be careful of whatever we put on equipment-wise to help identification of people that are in trouble stays there. We don't want to be looking for boat number 121 and the one's been washed off and we find number 21 and that's really the boat we've been looking for. They're the problems that we need to be looking at if we are to improve identification on boats. We could paint every boat Air Sea Rescue orange and that'd be one way of - but we still wouldn't solve the identification problem, is this the boat I'm trying to find, is this the boat I'm trying to get the crew off. We still need some other means of doing that.

Q. Some of the crew members and the statements that we've had from the people involved in this storm was that these sort of panels would have just blown away, there was no way that you could have maintained them?
A. Uh hmm.

Q. Has anyone come up with any ideas?
A. Our difficulty - the main difficulty I guess is that convincing the owners that we're going to deface their pride and joy in a form that we need to make sure that sticks. I mean we can bring out a requirement that boats have sail numbers on the side of their boat that are three foot high and six inches wide. That's easy to do but I suggest the

marketplace might have some reaction to that. So we've got to still progress down that path to improve the identification of boats generally and also to improve the identification of the boat that is in trouble, as distinct from the boat - when I say in trouble, the boat that needs assistance, because at that stage out there they were all in trouble in one way or another but only a certain number of them needed help.

Q. You then go on to say that one concern is that some of the suggestions made to the Court, while appearing to be desirable or necessary, may not result in safer sailing. What exactly are you saying there?
A. I guess an example is the safety harnesses where the quick release device is a great idea but the positive attachment of the device is a better idea. If I can go forward and know that when I snap my safety harness on that it's going to stay there, I think that's - more lives have been saved from that and some of them we've heard in this Court of people that have been stopped from being departed from their boat because of the safety harness, including the Winston Churchill if I recall where crew members were wrapped around the backstay on their safety harnesses. So whilst it might be desirable for the odd occasion to be able to better release your harness from your end, we just need to be sure that we balance that with the need to keep people on the boat rather than have them fall off.

Q. Perhaps if I can use this from the - what you're saying is that with the Business Post Naiad when it first rolled you had four crewmen actually washed off and hanging by their tethers, so that they were securely on?
A. Right.

Q. It may be that later one of them could not escape from underneath and a quick release may have aided his survival but at the same time the fact that the ones that were washed off in the first roll, that they weren't simply washed away from the vessel has to be looked at and weighed up?
A. That has to be balanced.

Q. You actually go on to say that to your knowledge over the years there have been two reported deaths caused by not being able to release. While those deaths are unfortunate and undesirable we have to balance that against those that have been saved by remaining attached to the boat, some of whom gave evidence before this Inquest. I note that there is nothing in here about hand-held VHF radios. Now I understand that's already in train and comes in I think in January of 2000, is that--
A. We gave notice of it four years ago in our current regulations - three years ago in our current regulations where we said that we would require from 2001 a water resistant as it was then because that's all the marketplace had. We will now be requiring that it be waterproof because there is one on the market that is waterproof and that will be effective to us in July 2001. We're six months behind the rest of the world in our adopting issues largely because

our sailing season happens to be different to the northern hemisphere.

Q. Then you go on to talk about minimum standards and you say over-regulation in itself can be counter-productive, the AYF and the ORC have been aware of the need to ensure that what is regulated as a minimum standard is what a prudent seaman would want to have on board?
A. Yes.

Q. You say for example we prescribe, and you're talking about the AYF and the ORC, we prescribe that a radio be carried and that certain frequencies be fitted. We do not proceed to list all the matters that this simple minimum regulation imposes. I take it what you're saying is that people who have this equipment should know how to use it?
A. Some of the equipment is required by law to have licences and have licensed people operate them, radios is the classic example for that. The radio should be licensed and the operator that operates it needs a restricted radio operator's licence. In each of those two volumes of requirement there are procedures on how one should use it and when and under what circumstances. So for us to reproduce that in our regulations and say hey, here's how you use a radio, the book would become I suggest not quite as big as the dossiers in front of us but it could get to somewhere near that stage. We need to be balanced again in what we require as mandatory equipment, what we make recommendations on and in relation to how we expect people to use them. We can't be out there with them as much as some of the time we'd like to be and say hey guys it's time to do this, it's time to do that, it's time to put your safety harness on. They're the things that we have to leave to the owners and the crews to be able to utilise the facilities that we suggest they should have on board.

Q. You say there that the AYF and ORC regulations do not go into that detail as regulations of other authorities which are beyond your control cover those matters?
A. Exactly.

Q. They're meant - that is the people who use the equipment, they're meant to know that?
A. Exactly.

Q. And abide by those regulations?
A. Uh hmm.

SHORT ADJOURNMENT

WEBER: Q. Mr Mooney, before morning tea Mr Hill was asking you some questions about the problems of identifying yachts in trouble in heavy seas, do you recall that?
A. Yes.

Q. You were speaking about the practical difficulties of getting something on the deck which will continue to adhere to the deck during the inclement weather?

A. Yes.

Q. It's right isn't it that the Satcomsea system to which you've made reference substantially overcomes that problem?
A. It does. I don't know the intricacies of whether or not when the helicopter comes in over the top that they'll be able to actually pick the boat that's in trouble, I assume they can, but I can't comment on that.

Q. As I understand it, the Satcomsea provides a specific identification signal to a specific boat, correct?
A. Yes.

Q. It has a panic alarm so that--
A. I don't know enough about it, I'm afraid, technically I don't know enough about it.

Q. Do you know whether it's got an inversion alarm?
A. Sorry, technically I don't know enough about it. I know it's a great idea as far as looking at boats are concerned. Whether it's compatible with helicopter transponders and others I have no idea.

Q. To the extent to which your technical knowledge allows you, it substantially overcomes the identification problems to which you were referring?
A. I would hope so but I can't say yes or not to that one, I'm afraid.

Q. On a similar tack to use a nautical expression the 406 EIPRBs also now provide a specific identification of the EIPRB which has been activated, doesn't it?
A. Yes.

Q. And the degree of specificity of the signal is much superior to the pre-existing EIPRBs?
A. It is.

Q. And so similarly if crew are in a liferaft or overboard and they have the EIPRB that provides a significantly superior form of identification than that which went before?
A. It does. The difficulty still is the 121.5 which is if they're all around going off in the same area it's the search helicopters and search planes being able to identify which one is which, if there's a number of them in one area.

Q. But that said, the 406 EIPRBs do allow the signal of the EIPRB which the helicopter's looking for to be identified?
A. Yes and no. What the 406 is doing is it's telling the satellite who owns this piece of equipment, right, because this piece of equipment is registered and it's got, you know, almost blood group on it. So it will tell the satellite where this EIPRB is but when the planes are coming out they're not coming in on 406s, they're coming to a position where this signal has been reported as and the difficulty as I understand it from the last Hobart - from the '98 Hobart race was that the difficulty was not in the 406 equipment but it was in the 121.5 which is where they

were coming in to try and home in on a position and when there were a number of them in the one area they had difficulty in saying which one's in which direction.

Q. But with the compulsory carriage of 406 EIPRBs on board--
A. Definitely an improvement.

Q. --the problem will be substantially overcome?
A. Definitely improved, absolutely.

Q. You gave some evidence about an incident where in a Sydney to Hobart that's entered into folklore the yacht Siska sailed before the fleet?
A. Yes.

Q. The skipper took that action, didn't he--
A. He did.

Q. --because he'd been refused entry into the race by the CYC?
A. Exactly.

Q. And he was effectively thumbing his nose at the CYC?
A. Not putting too fine a point on it, yes.

Q. Can I take you to your statement where a question that Mr Hill asked you, at 22 of your statement and I'm referring to question 113, you were asked whether a yacht which had a limit of positive stability of 112.9 should be permitted to sail in the Sydney-Hobart, do you see that?
A. Uh hmm.

Q. And your answer is, no?
A. Yes.

Q. And you started to explain your answer by saying that you get into trouble for being black with white with no shades of grey?
A. Mm,mm.

Q. Is what you meant to convey by that, if a race organiser says the race rules are LPS 115, that ought to be it?
A. Yes.

Q. I think you agree that if you were equally black and white in categorising the Sydney to Hobart, you say it's a category 2 event and not a category 1 event. Correct?
A. What I said was elsewhere in the world it would be classified as a category 2.

Q. Yes, but if applied the black and white criteria applying elsewhere in the world, in a black and white sense, you come up with the Sydney to Hobart being a category 2 event. Correct?
A. Yes.

Q. In which case the applicable LPS would be 110?
A. Yes.

Q. And so if you applied again a black and white rigour to that, a Sydney to Hobart being truly a category 2, it would be permissible to allow a yacht to sail at 112.9 wouldn't it?
A. Well even in a category 1, it is still permissible to sail at 109. The point I was trying to make is that if we go for braces and belt and if we say it is a cat 1 race then it's got to be, in my view, it should be full-on cat 1 race and not cat 1 with something else less than cat 1. That's my point. It's like the contract, I mean, if you agree to sail in those terms and conditions that's what you agree to.

Q. Save that the contract in this case includes as one of its clauses the grandfather clause?
A. Yes.

Q. You indicated in your letter to the Coroner of 16 June and your evidence orally, that there is a risk of over regulation?
A. Yes.

Q. As a concept?
A. Yes.

Q. Do you agree that in fact yachts that had a lengthy history of safely competing in Sydney to Hobarts which were LPS 110-115 ought not be excluded from a Sydney to Hobart?
A. I personally don't agree with that. But that's a decision that the Cruising Yacht Club made at the time as I said in evidence this morning. And it was their right to do so. It's not a decision that I would have been happy with

if I'd been part of that decision-making process. My argument I guess is, if the world says this is the new type of thing we ought to be doing, then we ought to be playing the game the world says we ought to be doing it. But the rules allow the CYC to do what they did, they exercised their discretion in accordance with those rules and that was the decision that they came to and the decision that they made. Nothing illegal about it.

Q. But to use your expression, didn't the world say the Sydney/Hobart ought to be category 2 event?
A. The description of the definition says it complies with a category 2 event.

Q. I just want to ask you a question or two about the off-set file. Could you explain to his Worship what the off-set file is?
A. I thought it would be helpful. In essence, what we do is with a machine that we measure each side of the boat in progressive stations of about 200 millimetre sections. What we're doing with this machine, is it's got an angling encoder and a distance encoder on it, and what it does is each time we push a button it measures a point on the boat. So what we're doing is we're getting the shape of the boat at these various stations along the boat as well as the shape of the boat fore and aft as we go down the side of each side of the boat and from those encoder counts we have a programme that converts that into a table of off-sets which means if it's got a theoretical water-line it gives us the distance of each of these points that we've pushed the button on the machine, the distance vertically and horizontally and that then becomes the table of off-sets. And the off-set from the vertical line which is through the centre line fore and after the boat, and the theoretical water line. From that we come up with virtually a lines plan which is a plan of what the boat - you can virtually go and build a boat from it.

Q. I don't say this in any critical way but you have used the word, plan. What you don't have when you're doing this form of measurement are the actual plans of the vessel, do you?
A. Exactly. All we have is a boat and we're trying to look at - find out what the shape of that boat is.

Q. And within the confines of what the computer can do, you are approximating what the hull of the vessel looks like?
A. Yes.

Q. And you've given evidence concerning Mr Lyon - or you mentioned him a couple of times in your evidence?
A. Mm,mm.

Q. Are you aware of his criticism of the off-set file in respect of Business Post Naiad?
A. No.

Q. He says - I'm reading from his report which is volume 7A

tab 19, he says that "it was a poor file lacking in more desire of the level of surface definition of hull and appendages keel and rudder". Have you got sufficient recollection of--
A. I'd agree with that, yes. The early days of the IMS rule and this boat was measured in the early days of the IMS rule, the world was not under the pressures of definition, I guess, as to what we are now. And therefore the early off-set files were measured in accordance with the rule which allowed for 400 millimetre centres, which meant you got 200 when you put one side to the other. I would certainly say that the early boats in the first two or three years until we found out that really we needed to take more stations and more points in each station, by current standards those off-set files are poor.

Q. Does that lead necessarily to the conclusion that an IMS certificate generated out of the first couple of years of off-sets has a greater margin for error than a more modern IMS certificate?
A. I guess the answer to that is yes, but it would be more in the handicap arrangement than reduced. It could be increased or reduced. Water volumes, body surface. It depends on which direction, I guess, that the file goes.

Q. But the hull structure and the detail of the keel and the rudder does play some part in deriving the angle which is ultimately the LPS, doesn't it?
A. Andy would be probably better at answering that question than I. My understanding is that a lot of it in limited positive stability is also the inclination values.

Q. But it does involve as part of the underlying equation, to your understanding?
A. Yes.

Q. The hull shape?
A. Yes.

<WITNESS RETIRED

<ANDREW CLEMENT DOVELL(12.10PM)
SWORN AND EXAMINED

HILL: Q. Would you give the inquest your full name please?
A. Andrew Clement Dovell.

Q. And your professional address?
A. Professional address. Suite 8, Royal Princes Alfred Yacht Club, Newport.

Q. And your profession is, what?
A. Naval architect.

Q. I think you have a Master of Engineering, Naval Architecture and Offshore Engineering, is that correct?
A. Yes.

Q. And you are a Bachelor of Science, Mechanics and Material Science, is that correct?
A. That's correct.

Q. And I think since 1989 you've been a partner in the firm of Murray Burns and Dovell Pty Limited. You have designed during that time over 40 complete yachting designs, ranging in length from 30 feet to 80 feet, is that correct?
A. Correct.

Q. And at present I think one of your designs, the Sydney 40, has been chosen by the RORC to service the middle sized yacht for the 1999 Admirals Cup. Is that correct?
A. That's correct.

Q. I think you also were consulted by Dr Reynoldson in regard to the stability aspect, the tests that he ran in regards to the Business Post Naiad, is that correct?
A. In a limited forum, yes.

Q. Now you have two reports, one which deals with the Business Post Naiad which was dated 7 February 2000. And the other report was given to the, I think, University of NSW seminar sometime in early 1999. Is that correct?
A. That's correct.

Q. Well I intend dealing with first of all the report on the Business Post Naiad. Now I see there that you say this at 1.2, "on review in the certificate for this yacht it was my suspicion that the displacement and righting moment combination was inconsistent for a boat of this type". Is that right? That's the IMS certificate of the Business Post Naiad?
A. Yes.

Q. As we know the situation is that it has an IMS certificate which is below what the requirement was for entry into the Sydney to Hobart yacht race?
A. Correct.

Q. Now what gave you that suspicion?
A. I've worked with boats of this type before and Naiad is not a sister ship but very nearly a sister ship to a whole group of production boats that were built in Australia, termed the Farr 40s - 541 tonners, and I've done some work on these boats so I knew the characteristics of these boats in terms of their response to internal ballasts being put in and taken out. So I knew when I saw this placement what I should be seeing for an approximate righting moment and therefore what I should be seeing for a limited positive stability as well. And her's was well and truly outside that frame of reference.

Q. And you then go on to say in 1.3, "it is important to establish if the data on the Naiad 15 October 1998 IMS certificate was correct or not, so that the inference is born from their experience in the 1998 Sydney to Hobart race are referenced to an accurate starting point. If the data

was incorrect it is important to establish what the relevant parameters to the yachts were at the time of the incident so that any research is reference to an accurate data point". And this tied in with what Dr Reynoldson was doing, is that correct?
A. Indirectly, yes it does. It certainly affects his research.

Q. You then go on to say "For a given yacht there is a set relationship between displacement righting moment when the only variable is the quantity of internal ballast that is carried". So as I understand it, an amount of lead was removed out of the keel of Business Post Naiad. You are aware of that?
A. I don't believe it was removed from the keel. I believe it was removed from the inside of the vessel. Internal ballast.

Q. Right, just the inside part of it?
A. Yes a lot of these boats, particularly the Farr 40s carried quite a bit of lead in the forms of ingots that were placed in the bottom of the vessel, glassed in or bolted in, and the owners used to play with lead continually to try to optimise their rating for a specific race.

Q. You then say at 2.3 "using the Naiad's 1997 IMS certificate for the baseline" and this is the one that wasn't current, is that correct? The certificate that wasn't--
A. This was the certificate that the boat had sailed on right up until this - the new one that was being issued, yes. And it was the valid certificate that had been raced on the year prior.

Q. "For the baseline data of displacement and righting moment and a set of hull lines fed to off-sets provided by the Australian Yachting Federation. I have calculated the effect of reducing the internal ballast in several steps". So what you've done basically is started off with the ballast in tact and its 1997 IMS certificate and then removed the ballast. Is that basically it?
A. I did that theoretically, yes, which is what I would do as a practice if an owner came to me and said what is the effect on my rating if I do this. And I would do this same exercise and calculate the effect on his rating. So it's a calculation that I am used to making.

Q. And you say "the table and graph presented in annexure 1 shows the resulting theoretical relationship between a displacement and righting moment for the Naiad". Perhaps if we go to 1 and you can explain that to us?
A. The little table is a table of my calculated results. In the left-hand column is the displacement of the vessel and the bold is the starting point data. And the next column over is a righting moment and the next column over is a limit of positives for each of those cases. You can see for the bold case which is our starting point of the 1997 certificate the boat had a displacement of 6,025 kilograms,

a righting moment of 142.9 and a limit of positive stability of 114.1. I then theoretically removed ballast from the bilge and then recalculated and re-ran her IMS variables for each of those other displacements shown on the left-hand side of that table. So for taking the lead out down to 5,620 kilograms should give us a righting moment of 132 and limit of positive stability of 112.6. And that graph shows the relationship with the displacement on the bottom of the graph and righting moment on the left-hand side.

Q. And you say "the corresponding graph of displacement of limit of positive stability shown in annexure 2", perhaps if you go to that and explain that to us?
A. That is based on the same set of data which is on the previous page. And it is actually a graph of displacement on the bottom and the limit of positive stability on the left-hand side shows the trend of those two variables. Their relationship, based on removing sets of amount of internal ballast. So that you can see that the point that's dark in the middle of graph is the baseline certificate value of 6,025 kilograms showing a positive limit of stability of 114. A little of 114. If you increase the ballast to 6.6 times the limit of positive stability it goes up over 115 to 115.5.

Q. Well basically what these graphs show us is that if we added more weight to it, we would get more - a greater limit of positive stability, if we take weight away we will get less?
A. That's right.

Q. Now you say then at 2.4 "the relationship between displacement and righting moment and limit of positive stability for a given boat is a function of internal ballast can also" - I think there might be a "be"--
A. Yes there should be.

Q. "Be established experimentally, by physically changing the quantity of internal ballast in several steps and measuring the freeboards and righting moment of each step. In fact this experimental procedure forms part of the IMS measurement process". Perhaps if you could explain what you mean - what you were going to do there?
A. The graphs that we just looked at were my theoretical calculations of what would happen if internal ballasts were added or removed. What I am saying in this paragraph is that you can obtain the same data experimentally by physically adding the lead to the bilge of the boat and measuring its displacement and its righting moment which then leads us to a limit of positive stability. And the mechanism of making those calculations once you've done the experiments in the water of measuring its freeboards and righting moment is using the IMS measurement procedure which calculates these things for you. Embedded in the IMS handicapping system are these hydrostatic calculations which are fundamentally just very straightforward hydrodynamics, hydrostatic calculations.

Q. And the IMS certification process you say is the standard procedure used today to assess the stability characters, this operation--
A. Yes. And I think it's a very good system in that it measures what is built rather than looking at plans that someone has drawn because invariably these boats and ships are never built to plan exactly. So that having a designer set of plans and doing calculations of limit of positive stability on a lines plan is not in my opinion the right approach. We should be measuring the boats after they're built and therein lies one of the inherent values of IMS measurement system is that it measures the boat, the object that we're dealing with isn't actually physically measured.

Q. And you say "so by running a series of IMS certificates based on in-water measurements taken with different amounts of internal ballast in place in the boat, the information required to establish the displacement, the righting moment relationship will fall out"?
A. That's correct.

Q. That's the concept that you've applied to this experiment that you did with I think another vessel?
A. Yes.

Q. I'll move on to that. And you say at 2.8 "in essence this situation exists in the present Australian IMS fleet. There are four sister ships and boats of the same hull form and construction". Is that correct?
A. That's right.

Q. And they were the Nadia Four, Witchcraft, Indian Pacific and Midnight Rambler, as well as several others?
A. Yes.

Q. And the Naiad was a one-off design and it was custom built in New Zealand. It is very similar in hull form to the Farr 40s built in Australia. And you say "the most significant difference is that the Australian 40s are approximately 7 inches longer in LBG". What's that?
A. It's a length measure. It is the most appropriate length measure for this type of vessel.

Q. Okay. "Then the Naiad, all of the other primary design parameters are almost identical". And you say "the greater difference in overall length of 14 inches is due to a longer transom scoop on the Australian 40s which has little to no influence on the stability characteristics of the yacht".
A. That's correct.

Q. So do I take it then that as far as you were concerned as you say there, for the purpose of the study the Naiad could be considered a sister ship to the Farr 40s?
A. Yes. To be clear on that, in the calculation of body moment and limits of positive stability I believe that's to be the case. That's my conclusion. In terms of a rating they will be slightly different. So when you talk about handicaps, there will be different handicaps, but when we're

talking about stability calculations and stability results they will be, in my opinion, sister ships. And that's shown in a follow-on graph that we will get to in a minute, I'm sure.

Q. And is that in annexure 3?
A. Well annexure 3 is actually a lines plan of the two boats superimposed and you can see how similar they are. These lines plans are drawing plans that are developed from the off-set files that were provided to me by the AYF. So you can see that the boats and beam are significant. The most important variable, when you're talking about stability characteristics of the vessel, are its beam characteristics. They play a much more important role in the righting moment characteristics of the vessel than does length. So you can see the length shows here in this drawing, in these sketches, but the beam at each water line is virtually identical. So that was the basis on which I made my conclusion that they could be considered sister ships for the sake of this study.

Q. You then say at paragraph 2 point 11, "most of the production built Farr 40s have been measured for IMS at some point over the last five years. While these boats are all configured slightly differently in terms of fittings and fixtures, the primary difference between them is the quantity of internal ballast carried. So the IMS certificate for these boats provide a fairly good guide as to the displacement to righting moment and the displacement positive limit of stability relationship of the Farr 40s as well for the Naiad". So what we're really looking at is what was internally bare, is that right?
A. Yes.

Q. The only main different between them--
A. Is internal ballasts, that's correct.

Q. And you say "a table and graph of IMS derive stability data for these boats and the Naiad is presented at annexure 4". I think we go to annexure 4, you show the stability for all these vessels. That is, Midnight Rambler, what stability does that have?
A. It's righting moment is approximately 100 - well I'll just check the graph - 137.

Q. Okay, then Naiad 97, what was that?
A. 112.9 - sorry. 142.9.

Q. Then there is Witchcraft 99?
A. Mm,mm.

Q. That's at - what?
A. 148 kilograms metres of righting moment at 6.3 tons.

Q. And Indian Pacific?
A. Six and a half tons, and 151 kilograms metres of righting moment.

Q. So they're all roughly around the area?
A. The graph actually is very descriptive. It shows how long would best fit through that group of data and how well the boats abide by this relationship and I'm referring to displacement of righting moment being theoretically--

Q. Right, so the greater the displacement the stiffer the vessel, as it were?
A. Correct.

Q. Now you say "several boats show up more than once as they have been reconfigured with more or less internal ballast over the years". And you say "copies of the IMS certificates from which the data has been extricated are presented in annexure 5". I won't take you through those, but that's what you worked on. And you say "the graph in annexure 4 shows good agreement between the theoretical displacement to the righting moment relationship". Now you then go on to the Business Post Naiad's 1998 certification. And you point out that on 18 July 1998 the Naiad was remeasured in the water for 1998 sailing season. And it is your understanding that the internal ballast was removed from the yacht for this measurement. And the amount of lead removed is unclear from the documents that you've reviewed, you are not sure how exactly how much there was?
A. I'm not sure.

Q. And you say "after a fair volume of correspondence between the Tasmanian measurer and the AYF, a validated and final 1998 IMS certificate was issued for Naiad on 15 October 1998". That's the final one, if I can refer to it that way?
A. Yes.

Q. And that was the certificate that was issued to the CYC or went to the CYC for entry into the Sydney to Hobart Yacht race. Now you say "it is of note that there was a certificate issued by the AYF dated 29 September 1998". And I think this becomes very pertinent because it is after that Mr Fisher looks again at his measurements and we get the October certificate. Is that correct?
A. That's correct.

Q. And it was based on measurements taken on 18 July 1998. So he measured it on 18 July. It goes off to the AYF and they issue - if I can refer to it as the first certificate, on 29 September 1998. Is that your understanding of the sequences of events?
A. That's right.

Q. Then the October 1998 certificate does not appear to be consistent with the displacement of righting moment relationship discussed in the previous section of this report, neither in comparison to the older stability data for Naiad itself nor with the other Farr 40s. It seems just out of proportion, is that what you are saying?
A. It's just not behaving the way it should behave for a boat that's had lead removed.

Q. And you say "this becomes very evident when the October" - that's the last certificate "October 1998 data is proffered on the displacement Vs (?) righting moment graph with the other data referred to in the graph annexure 8". Perhaps if you could take us to annexure 8 and point out what it is that you--
A. Well the first thing of note is that there are comments, although there is no quantification of the amount of lead removed. There are comments in the correspondence that state that there was lead removed, and I believe that there has been evidence since that tries to quantify that at somewhere around 350 kilograms in the reduction and internal ballast. So if the boat has had lead taken out of it, it should have a displacement that is less. In fact the certificate in October, on which he entered the race actually shows an increased displacement. So that's the first sign that there is something wrong.

Q. It's become heavier yet they've--
A. Yet they've taken lead out. So there is something funny going on there. This is a secondary piece of evidence in annexure 8 where I've shown the displacement on the graph again showing all that data that is consistent with this boat and her sister ships showing a trend line up to the right and yet when we plot the two bits of information that we have from 1997 to the October 1998 certificate, it shows a trend the other way, which is impossible in my opinion. Well it's not impossible, I shouldn't say that. The way to get to that point is to add the indicated amount of weight which is approximately 250 kilograms or just under 300 kilograms, somewhere around the first spreader.

Q. So this is somewhere right--
A. So these two certificates indicate that the boat has had lead added to it, very high. In other words the first suspicion that I would have there, if someone told me that these were true certificates is that the mast has been replaced with a very heavy one. But yet the truth of the matter - well what we're told is that in fact the mast is the same but internal ballast was taken out, in which case it should follow the line that we've described earlier.

Q. Because you say there at 3.4 "the inconsistency of Naiad's October 1998 and 1997 IMS certificates also becomes apparent when considering the vertical centre of gravity for the two configurations". And that is of course, as you've just said, there would have to weight added way up the mast somewhere?
A. Correct.

Q. You then go on at 3.5 and say "as part of its stability data, the IMS certificate also calculates the vertical centre of gravity for the given configuration. In the case of Naiad's 1997 certificate the displacement was reported as 6,020 kilograms at .081 metres below the reference water line". So that's below the water line as such, is it?
A. That's right.

Q. For the October 1998 certificate the displacement was documented to be 6,278 kilograms at .106 metres above the reference water line. So it's added weight and yet come up in the water. Is that basically what's--
A. The boat hasn't come up in the water, the boat - the centre of gravity has moved up some 7 inches which is only possible if weight is added quite high, and that's contrary to the indications that the only changes have been to the internal ballast package. So if there had been an internal ballast package, the change in the vertical centre of gravity would have been very small. And it also would have been either direction.

Q. You go on to say "to effect this change would require adding 258 kilograms, 4.1 metres above the water line" and that that's not a realistic scenario. I mean, where would it have to have been added?
A. Like I say, somewhere halfway up the mast. Well not halfway up but about a third of the way up the mast. So it is very unlikely. In fact the indicated number of 258 kilograms is more than any change in mast weight would account for. So the mast on these boats only weigh in the order of that anyway. So it's not a possible scenario.

Q. Looking at that you've said, given both of these bits of evidence you suspect an error in either the flotation measurements, the freeboards, or the righting moment experiment associated with the October 1998 certificate. If I can put it this way, it's those items that led you to have the suspicion that that october 1998, that IMS certificate, is simply wrong?
A. Correct.

Q. And you go on to explain the various differences in the displacement and you say this at paragraph 3.10 "I strongly suspect the latter to be the case based on Richard Fisher's the Tasmanian IMS measures notes, and his correspondence". And that was that the fleet data presentation in annexures 5 and 8. So what was it that was the main mistake as far as you were concerned there?
A. It appears that his forward free board measurement is in error on the October certificate.

Q. So where exactly on the vessel do you say is the wrong measurement?
A. To establish the water line on the vessel, to calculate the hydrostatics, the measurer measures free board, the height from the shoreliner(?) vessel to the water, at the front of the vessel and at the back of the vessel. And that's the process which draws the line across the lines plan and then the calculation is made of the volume of the hull and keel. If one of those is in error on displacement calculation, the displacement calculation will be in error. And it appears to me that it is the forward free board measurement.

Q. It's the one at the bow is it?
A. That's right. The forward free board, yes. The bow.

Q. So what you say at 3.11 is "when Richard Fisher submitted his data sheets to the AYF for the in-water measurement taken on 18 July, 1998 which is attachment 9, that he notes in the comments section 'boat re-inclined after removing internal ballast'. He also makes a note of this change on the 1998 measurement inventory, which form the second page of IMS certificate with nil internal ballast, previous ballast removed, refer to the second page of annexure 6. Therefore it would be reasonable to expect that the displacement of the boat to come down by some amount from the 1997 certificate value and for the righting moment to also come down by a corresponding amount".
A. Correct.

Q. This is how it must be, is that not so?
A. Correct.

Q. And you say that "the measurement inventory for Naiad's 1997 certificate dated 18 November 1995, but remain invalid for the 1996/1997 certificates noted lead ingots glassed-in" and that's fibre glassed-in, is it?
A. Correct, yes.

Q. But with no note as to the amount. We don't know what it is. And you say, "regardless of the amount of lead removed the displacement of the boat in 1998 should be less by some amount than for 1997, not more". You then went to the correspondence leading to the October 1998 certificate and it appears that there was some confusion about the forward free board measurement taken on 18 July 1998. This is the one at the bow. "Eventually the original measured forward free board of 1.321 metres was changed by 90 millimetres to 1.231 resulting in the final 1998 certificate for the boat dated 15 October 1998". So Mr Fisher went back and he remeasured that. Is that correct?
A. Yes he did. And I think we will get to it, but he measured it in conditions that were not the same conditions that the boat is measured in when it's measured for IMS purposes.

Q. And of course you point out that annexure 9 has Mr Fisher's notes and his worksheets. And you say "based on this submission the AYF produced a certificate dated 29 September 1998". This the first certificate if I could refer to it as that, is that right? This is the one before the October one?
A. Yes that's right.

Q. Now this certificate - that's annexure 6, reports a displacement of 5,546 kilograms with a righting moment of 130.7 kilograms and a limit of positive stability of 105.6?
A. That's an error in the report. That number should be 109.5. I thought we'd gotten that one fixed up. The stability index is 105.6, that was--

Q. So if I can just stop there. So far Fisher's measurements that were done in July would bring out a limit of positive stability of 109.5?
A. Yes.

Q. That's it. Now he goes back after that I take it and re-measures?
A. Yes.

Q. Do we know why he went back?
A. From my conversations with him and with others involved, there was concern about the result, that certificate, in that it didn't have a positive limit of stability of over 110 or 115, I'm not sure which they were referring to at the time but there was concern about the limit of positive stability. There was also concern about the crew weight limit. Because he'd taken so much lead out of the bilge, the boat weighed less and the IMS rule has - places the crew limits that you're allowed to carry are calculated based on the displacement of the vessel as well as other things but that's one of the variables that goes into that equation. He had a set crew that weighed a certain amount from previous years and he was obviously planning to use that same crew again or another crew with a similar weight. When that certificate - that September certificate came out, it showed a crew weight limit that was below the amount of crew weight that he had and he didn't want to have to either change crew or tell someone they couldn't go in the race, so between - for those two reasons he went back to Richard Fisher and said surely there's a mistake somewhere in this process, can you chase it up and they've had a discussion. I believe that what happened was that they talked about when they were taking the freeboard measurements and that perhaps what Richard had done is taken the forward freeboard and written it down where he should have written down the aft freeboard and written down the aft freeboard where he should have put the forward freeboard. That was his first suspicion and I believe that was a suspicion that he and the owner developed together. That request went to the AYF, could you please run a certificate with those two freeboards inverted and that certificate I believe was run although you'll have to ask Tony Mooney, because it wasn't actually printed. But it's my understanding from talking to Mr Fisher that that certificate was run and that it was considered too ridiculous to be realistic and so they abandoned that line of thought and they went to suspect the forward freeboard as being the one that was possibly in error and then that was when Richard Fisher went out, they discussed the forward freeboard and that maybe it was - he'd super - that he'd changed the numbers around in the forward freeboard measurement and then he went out - so he told the owner he would go out and check that number on the boat on its mooring in the river. I believe he paddled out there in a dinghy and measured the forward freeboard in the river. The problem there is that at that stage the boat would not be in measurement trim because to get a boat in measurement trim requires that all the sails be taken off, all sorts of equipment be taken off and that no mooring lines be

attached. So the boat was not in measurement trim when he went out to check it and that difference in weights of the sails being up the front, of the mooring line pulling down the bow would easily bring that freeboard down some 100 millimetres, four inches, which is approximately what they were looking for, for an error, and made him believe that okay, I've found it. It was the fact that Mr Fisher didn't understand how sensitive the freeboard measurements were to the weights included on the vessel that I would attribute this confusion to.

Q. I think you've summed up that in paragraph 3.24 when you say given the poor conditions and the lack of preparation and incomplete nature of this check you would consider it invalid?
A. Yes.

Q. That's that second measurement from the bow?
A. That's right.

Q. You then went on with experiments with the Nadia 4, okay, this is a - if I can use the term the sister yacht of the Business Post Naiad. What you proposed was a series of inclination experiments to be conducted on that yacht. What exactly were these experiments? How did you do it?
A. These experiments were conducted exactly the way that you would carry out an on-water measurement for IMS, it was exactly that set of - that experiment that we were going to conduct in just doing several of them in sequence with different quantities of internal ballast.

Q. How exactly do you do them, can you tell us?
A. The experiments themselves?

Q. Yes, the experiments themselves.
A. Once a boat is prepared for measurement and in its measurement condition the freeboard is measured at the bow station and at the stern station on both sides, port and starboard, and those numbers are averaged to give you the forward freeboard and the aft freeboard measured and then that will draw the line on the page for calculating displacement. The second half of the experiment is to incline the vessel using jugs of water that are held out away from the vessel with spinnaker poles and those are rigged up with halyards and the spinnaker poles are stuck out the side of the vessel and water is - five cans of water are put on one side and then the - then one by one shifted around to the other side, so that the shift in weight equates to an inclining of the vessel and that's how the righting moment is calculated.

Q. There was also a secondary goal and that was to evaluate the measurement procedures used by Richard Fisher to the more practised techniques of the New South Wales Measurer, John Anderson. When you say more practised techniques, why is that, what's the situation with Anderson?
A. Like with any experiment the accuracy of the experiment is somewhat in the hands of the practitioner or the person

that's conducting them and John Anderson has done this experiment probably hundreds of times on boats for IMS measurement certificates, so he's seen - he's used to using the equipment, he's used to knowing when the - he knows the experimental errors associated with the process and so on, so he's got a feel for it, through years of experience, whereas Richard Fisher wouldn't have done as many and so he wouldn't have quite as good a feel for when he makes a mistake how much impact it will have on the certificate.

Q. There was a third objective and that was to see if it was physically possible to modify the internal ballast to achieve the changes implied by Naiad's 1997 and October 1998 certificates, is that right?
A. Yes.

Q. The Nadia was towed up to Royal Prince Alfred Yacht Club, it was - you had intended to remove the internal ballast but you found that had been glassed in so you stripped down the vessel as best you could to get it within the displacement of 5982 kilograms, is that right?
A. That's right.

Q. And that was - it was slightly higher, that is the centre of gravity, than the boat from which the internal ballast had been removed, that was the Business Post Naiad?
A. That's right.

Q. But you made various adjustments on that, is that correct?
A. No, we didn't make any adjustments. What we - I just - we tried to get the displacement down as much as we could. I believe if you look at annexure 9 it might be a little easier to explain the differences. The lower line is the same graph we've been looking at through the report and that's all the data from the various certificates of the Farr 40s and of the Naiad. That upper group of solid dots and the X that's noted as baseline point for Nadia 4 and ..(not transcribable).. is the data that we achieved during this experiment. You'll note that it's all set off upwards and that's because the centre of gravity of that boat was lower, which means that the righting moment on it will be higher. So it's offset but the point of the experiment is still to show what that trend is and the trend is shown to be parallel to that of the Farr 40s and the Naiad data.

Q. You say there the first group of experiments were conducted by John Anderson and the results of those presented in annexure 11. You talked about it shows the same trend I think, it shows how the righting moment changes with displacement, so you're quite happy with that?
A. Yes.

Q. You then go on to say this at 4.11, this result reinforces the theoretical calculations and fleet data for the righting moment to displacement relationship for the Farr 40s. So in other words they all perform the same if you remove lead or add lead?

A. That's right.

Q. And it further supports the argument that the change in righting moment at displacement implied by the 1997 to October 1998 IMS certificate for Naiad was not possible, it just didn't - it could not happen?
A. Correct.

Q. Then you had Richard Fisher repeat the final experiment, the heaviest displacement, in order to compare the two measurers' techniques, so you looked at what they would do and you say while his final result for the experiment was very close to that of John Anderson's I noted the following differences as significant. Richard's freeboard measurement tape was truncated at approximately 100 millimetre mark where it was replaced with a light string with a knot tied near where the zero would have been and a lead sinker below that to hold the string and tape tight. Now, is that a normal sort of instrument to use?
A. I've not seen that one before. I was very - I was concerned by it when I saw it straight away because it was cotton string and it was stretchy, so its ability to stay 100 millimetres long is not very likely.

Q. I'd often wondered how long a piece of string was. Now I know. This knot was not exactly 100 millimetres from the 100 millimetre mark on the tape, so a correction was necessary for accurate freeboards to be measured. In his first report of the freeboards I noted a significant difference to those taken by John Anderson. When I pointed this out to Richard Fisher, he checked and found his correction for the string had been made incorrectly.
A. Which he subsequently fixed and that's why his final results are closer to John Anderson's.

Q. Richard did not check his zero setting for the inclination monometer after the inclination, a standard procedure for John Anderson and all other measurers I am aware of. Not checking it? What would that--
A. Monometers are basically a bottle of water with a tube coming out of it up to some distance away and then there's a ruler on the water level on the other side. Monometers are known to produce incorrect results when air goes into the line. So to check to see if that's happened or not during the process, you go back to your first measurement and make sure that you can repeat it. The waterways authorities won't allow monometers to be used when inclining vessels for a survey for this very reason, they use a pendulum, which basically is just a plumb bob on a known length of string. But because of the problems with monometers they won't use them. Monometers are potentially more accurate if they're used correctly, so all of this is known in the development of this measuring technique which was basically set up by the ORC in England and so their recommended standard practice is to check your zero. If your zero checks, then the experiment stands. If the zero doesn't check, you repeat the experiment until it does.

Q. You also say that Richard positioned the monometer on the transom of the boat as opposed to on the bow pulpit, it's more stable on the bow and much easier to read accurately. So that was something else you noted. How different was it going to be though?
A. The ability to read the thing accurately, when you're standing in a dinghy getting blown around slightly by the wind and you're ankle deep in water trying to bend over and read a ruler with a bubbling meniscus of a water level going past a ruler you're trying to identify what that reading is, if you put it in a place where it's not easily accessible it makes that job even harder. So putting it on the bow makes it easier because it's up higher at eye level and you're standing more straight up in the dinghy and so forth, so it just makes the procedure easier to get an accurate answer. So I just noted that as a potential source of error.

Q. You then go on to say this, that it is your opinion that Richard Fisher is qualified to be an IMS measurer but his lack of experience and practice increased the likelihood of an error being made during the measurement process. In the case of the Naiad, his only error was allowing himself to think he had made an error, perhaps something he would not have done with the confidence of more experience. So the last experiment was that - and I'll come back to that paragraph, the last experiment was to see if we could recreate a ballast shift that would result in the change implied by the 1997 to October 1998 certificates and annexure 8 illustrates that. Now, you say that at 4.16 in our experiment we added 250 kilograms to the boat relative to the starting point condition as high as was practical, this being on top of the coach roof, directly over where we had been adding lead in the bilge for the first battery of tests. So that's where that lot went, is it? And that you then say at 4.18 the conclusion from this experiment is that if the October '98 certificate were valid, then the implied change of ballast is an increase of approximately 250 kilograms and it would have to have been added well up in the mast as that in ballast even on top of the coach roof causes the righting moment to go up albeit at the lesser rate than when it is added in the bilge. Your overall conclusion is this, that - and it's at 5.1, the Naiad's 1998 certificate dated 15 October was in error, because of what you've described, and at 5.2 you say the original measurements taken by Richard Fisher on 18 July resulting in the September '98 certificate agree well with the theoretical calculations and the Farr 40 fleet data for righting the moment at a displacement of 5550 kilograms, therefore I consider it most probable that these measurements were not in error and that the certificate dated 29 September 1998 was an accurate representation of the condition in which the yacht entered the 1998 Sydney to Hobart Yacht Race. You go through the relevant parameters there and you point out the limit of positive stability of 109.5 degrees and a stability index of 105.6 degrees. Going back to that paragraph where you say the only mistake Fisher made was allowing himself to think that he had made a mistake. So he measures correctly in the first place, after

the lead has been removed by Mr Guy, he gets the IMS certificate which shows 109.5 and 105.6, that is then questioned by Mr Guy because of the crew problem and the stability rating, because we need the 110, it's then that we have this sequence of errors that appear to be - that lie in the measurement that he re-takes which gives us the October IMS certificate?
A. Correct.

Q. So in your opinion, looking at all that, when the Business Post Naiad went into the race, its limit of positive stability would have been 109.5 and that was the measurements as at September - rather the IMS certificate as at September 1998, is that right?
A. Yes.

HILL: I note the time, Mr Coroner. There is the second report that I will be going onto with Mr Dovell.

CORONER: Are you going to re-examine on this issue?

WEBER: Yes, your Worship.

HILL: I'm also quite happy to actually split that, because it is an important issue and if my friend wants to sort of, while that's still fresh in his mind, ask him questions on that--

CORONER: Yes, I'm happy to go that way.

HILL: --or clean it all up--

WEBER: I'm in your hands, your Worship. I'm quite content for both reports to be done at the same time in chief.

LUNCHEON ADJOURNMENT

HILL: Q. Mr Dovell, before I move on to the second report which is the yacht design related safety issues, just so that it's clear in my mind, at 109.5 degrees the Business Post Naiad would have been simply ineligible to go into this race?
A. If that certificate had been issued it would have been in the same result - it should have been the same result as if it had issued the certificate that it did, it should have been denied entry.

Q. What would be required, supposing that the Business Post Naiad had - someone had looked at the certificate and said there's something wrong here, what would have been required to right it, to put it right so that it could have--
A. If the certificate that was drawn up in September had been issued, it would have required only the addition of a small amount of internal ballast, 100 kilograms in the bilge approximately.

Q. And that would--
A. But the certificate that was issued, I don't know,

because it's such a strange--

Q. But presumably someone could have looked at it immediately and the matter could have been resolved fairly quickly?
A. If they'd discovered the error and gone back to the certificate of September it would have been a very - it would have been a matter of a day to rectify the problem, to put 100 kilograms in the bilge of the boat to achieve 115 degrees positive limit - sorry, 110 degrees, over 110, it would have been in.

CORONER: Q. It would have been in under a grandfather clause?
A. That's correct, yes. To get the boat to go at 115--

Q. You'd need a lot?
A. About a tonne.

Q. That's an enormous difference, isn't it?
A. Yes. Some of those boats did carry that. One of the graphs shows that, there was a boat there that actually had a positive limit of stability - one of these sister ships actually had a positive limit of stability over 115 degrees.

Q. Witchcraft II had 114.1 at one stage.
A. There it is, yes. Sorry, I can't find my own graph.

SPEAKER: Annexure 4.

WITNESS: It's annexure 4, is it?

CORONER: Q. I'm sorry, yes, annexure 4.
A. Yes, there we go, yes. No-one was--

Q. No-one was over 115 but--
A. They were awfully close but not quite there.

Q. But it would take quite a considerable amount of extra ballast to get the Naiad anywhere near 115 but not a great deal to get it over 110?
A. That's right.

Q. Is it common ground that it could have been grandfathered into the race? Yes, your solicitor's nodding his head.

SPEAKER: Yes, your Worship.

HILL: Q. Just so that we've finished with that aspect of the Business Post Naiad, you had something to say about the lead acid in batteries, you wanted to say something about that on account of you've heard that vessels that did roll 360 degrees et cetera, some crews were affected by the battery acid?
A. It might be better to comment on that at the end of my - a view of my second report or my first report actually but yes, that is an issue that I think is one - a safety issue I

think we need to look at or I would like to see focus on surviving these incidences of rolls rather than trying to avoid them, because I think the conclusion of the crews is that if you're in the way of one of these breaking waves that knocked them over, that no matter what your limits of positive stability were, you were going to get rolled over, or knocked down severely. And in which case the issue is surviving that experience rather than avoiding it, so that I think issues like lead acid and there's several others as well, to try to keep the - so that the boat survives the incident and can be - can sail on, or at least find their way home on their own power rather than requiring outside assistance, because most every boat that had a roll received outside assistance. I believe there was only one that--

CORONER: Q. The evidence seems to show that they received a great deal of trauma, particularly the inside of the boat, gear moving, gear shifting, the lead acid problem, coachwork, windows being stove in by the pressure of the water to such an extent that perhaps a metre of water has poured in under great force, like a tap, straight into the boat, that type of thing. That's what we've kept hearing about the ones that suffered 360 degree rolls. Plus of course being dismasted.
A. Yes. It's just a great big pole looking to battering ram a way through the boat somehow.

HILL: Q. Perhaps if we do then go to the yacht design related safety issues which was the paper that you presented to the workshop of the New South Wales University. I think the scenario at that stage, there was a great deal of discussion from opposing camps as it were that said that traditionally designed vessels faired better and the reality was it was the modern design vessel that was the cause of all the problem, whereas in fact part of this paper shows that it didn't really matter what sort of design vessel you were, if you were caught in that storm, in that particular area, you got rolled over whether you were a new design or an old design. Is that - that was part of this paper that you presented?
A. Yes. It was immediately after the event, there was quite a big cry from various quarters about the danger of light boats. That frustrated me because a lot of the boats that I design are light although they're moderate compared to some others but I still didn't think that it was an accurate accusation, so I went and did this report and actually went through every IMS certificate available in order to find out the facts. I think chart 1 of that report shows at best, which is a plot of the fleet in terms of its displacement length ratio which is a measure of a boat's weight relative to its length and that shows that the boats that were rolled over were really just scattered all throughout the fleet and that there was no real correlation to be made between the weight of a boat and its likelihood of being rolled over.

Q. That's the second last page, isn't it, of that document?
A. Yes it is, yes.

Q. That shows for instance the Winston Churchill is there, the Kingura, the Margaret Rintoul. What was it about the Margaret Rintoul that you--
A. I just identified her on the chart, the boat was not rolled, I identified it on the chart to just show that that was where the older, heavier boats--

CORONER: Q. Were?
A. --lived on that chart and that down the bottom you see the names of the more modern boats. I mean if - yes. You just could not - the scattering is so much across the graph there's no way that you could draw a conclusion about the likelihood of being rolled and your weight.

HILL: Q. I think the only conclusion you drew out of this was that if you just happened to be in that part of the race field at that particular time there was a good possibility you would be knocked down?
A. That's exactly right and that's shown by the fact that the boats between 11 and 14 metres is where all the action was, except for the one exception of Team Jaguar, which I believe was coming back anyway, so it may have found its way back into that same area. But that tells you that that's where the worst conditions were, was when that part of the fleet got to that piece of water, the bigger boats were already past that part of the water and the smaller boats hadn't gotten there yet. So that's the only conclusion I can draw from that and there's certainly no conclusion about displacement of the vessels.

Q. In the introduction to that paper on the first page, you say about the Sydney to Hobart Yacht Race and you say that sporting endeavours, especially those where man is pitted against the elements of nature are potentially dangerous. It is the job of those providing the equipment and those involved in setting out the rules to do all that is possible to reduce that level of risk. So you see it as a two-way situation, in that not only do we talk about designers looking towards these problems but also the rule setters as well?
A. That's right.

Q. Going down to the bottom paragraph, you say the facts of the event indicate other areas of concern. Based on first hand interviews of those involved in the race, in particular the owners and crews of the 12 Murray Byrnes and Dovell designed boats participating and from what has been published to date on the incident, all considered in the framework of the design parameters of the boats involved, the main lessons to be learnt are (1) the deck structural scantlings need to be increased to reflect the dynamics associated with a severe knock down. Now, what do you mean by that?
A. If you go and look at all the boats that were knocked down, I think it's the 10 boats or 12 boats that were knocked down or rolled, I believe it's 70 per cent of those boats sustained severe deck damage. I think several of them that was the primary - that was the main cause of

abandonment and/or requiring rescue. That's just not good enough. The decks need to be stronger than that. We shouldn't be seeing that sort of relationship of deck damage to being rolled over and so it's my opinion that we need to make the decks stronger, the scantlings refers to how heavy the bits and pieces are that make up the deck structure. And so the rules that we design these boats to need to increase the requirements on deck strength is what I'm saying. Unfortunately at this point in time there are no rules, because the American Bureau of Shipping has withdrawn its service for building - for the structures of boats, so the whole game right now is open slather really. All that's required to get into any race is a letter from the designer that says I did my best to meet these rules, which are no longer being supported or administered.

CORONER: Q. When you talk about deck, you talk about the mast structure and housing and all that as well, are you? I don't know the terms.
A. Yes. The deck where the mast goes through the deck would be part of the problem area.

Q. And the mast itself perhaps?
A. The mast itself are presently not covered by any rules actually, there's no rules on the masts. There's been talk of bringing rules in regarding mast structures and that would - I would welcome that as well but at the moment there are none. Decks - to me the mast is not as big an issue because if you lose your mast you still live. If you break your deck you're in big bad trouble.

Q. I suppose if you lose your mast, if your mast breaks, it's not - or snaps it's not so bad but if the mast is affected at its base it becomes a serious issue?
A. That's right. The structures that support the mast are important. The keelstep itself in the bottom of the yacht should be subject to scantling rules, as should the deck partners which is a problem on a couple of boats where the masts actually ripped a great big hole in the boat. So those areas need to be addressed in the decks. But just the pressures alone, I find it amazing at this point in time there is no - that we don't have the right pressures for the decks, the decks stove in, these decks stove in as a result of their experience and that's just not acceptable.

HILL: Q. You heard Mr Mooney this morning talk about because the American Bureau of Shipping have moved out of that area and will no longer look at it, at least for these size vessels, that the ISO will look at them. Now, you in fact have some comments upon that. They have looked at something, is that correct?
A. The ISO codes, I've spoken to the people at the ORC, which is the Offshore Racing Council, we have representatives for Australia at that organisation, the international technical committee. I've been informed from our representatives that this code is within a year of being completed, although I must say I've heard that for the last three or four years, so it's a bit discouraging that it's

not a bit closer. They claim within a year it'll be out. The draft is presently available for review. There has been a review conducted by a third party in England, the Wilson Unit, which is a yachting technical centre in England, and their assessment is that the deck structure requirements of this new ISO code are actually lower than the American Bureau of Shipping standards when they were abandoned. So that's of great concern to me. And the other thing that's missing on my review is that there is no address at all made to keel structures and rudder structures, which were covered by the American Bureau of Shipping. So we're going to have a code when this comes in that doesn't address any - that has no change or actually goes backwards on decks and a code that doesn't cover keel attachments or rudder attachments. Those are the two areas where historically you have - before all of a sudden these decks popped up as being a concern, prior to that the biggest concern we had in ocean racing yachts was keel attachments. There's a long history of boats sinking because their keel attachments have failed. So we're going to go back to a situation where that's not covered under the regulations. To me what's happening is extremely retrogressive, it's not a healthy environment at all to be designing yachts in.

CORONER: Q. I suppose the only organisation you can really turn to to look at this sort of thing is the ISO, is that right?
A. As far as I can tell. I've looked around to try to see who can help us. I means perhaps AMSA can help us patch it up so that it's useful for Australian conditions and put some patches on whatever they come up with or maybe Australian Standards can do that, I don't know, but it's - I mean to do that, it's going to take - what are we going to do in the meantime?

Q. It's a big job.
A. We're in a situation that boats are getting built every year.

HILL: Q. So basically what you're saying then is that the old American Bureau of Shipping guide, the ISO standard that's been brought out as far as decks are concerned, it's less than--
A. That's correct.

CORONER: Q. And it's not going to cover keels and--
A. Nor rudders.

Q. --and rudders.
A. The keel attachments being the biggest concern I have.

Q. So your opinion is that the ISO is really going backwards, it's looking at it much--
A. That's right. They're trying to cover too much. They're trying to cover - this one code is trying to cover power boats down to the size of, you know, small outboard boats and it's trying to cover all that in with racing yachts, whereas at least the American Bureau of Shipping

rules were very pointedly targeted at racing yachts and offshore sailing yachts which are - we need that.

Q. And it's again your opinion that boats - many, many boats are putting to sea in events such as this, which in extreme conditions are going to sustain severe deck damage?
A. Correct.

Q. And perhaps keel and rudder damage?
A. What happened in this race is pretty - it's an interesting thing to me because the rules had been edited, they were written in 1987 I believe and edited in 1994. In 1994 they entered - in that period of time, between the two editions, there were keel problems. In '94 they increased the scantlings on the keel attachments and we haven't seen any of those problems. All of a sudden this deck damage shows up and so many of these boats were designed in that period of time when those rules were in place. So it's proof to me that people are using the rules, they're not using their better judgment, they're not using any other source of information, they're using these guides to build - to design the vessels by. So therefore we had - because the deck scantlings were under-specified, all of a sudden we've got all these decks damaged. So whatever comes out, that's what people are going to build boats to, so if they don't have a keel rule, keels will again be poorly attached. If the decks are structured the same way, they will fail again.

HILL: Q. How would a club such as the CYCA decide on what vessels were safe to go in if there's no guide for the actual builders?
A. I don't know how they would do it. I don't know how you would do it. We need regulations. Every builder - every industry needs regulations and the building industry can't be without regulations for how much a floor can hold, it's insane.

CORONER: Q. There are Australian Standards covering - forgetting the international or American standards, there are Australian Standards covering everything from, you know, fire in highrise buildings, these sort of vents in the wall, nearly everything you can think of, yet in something like this there's nothing?
A. There is an Australian Standard that was written for pleasure boats and if you ask the Australian Standards people what - because this came up and when the American Bureau of Shipping failed or decided to no longer maintain the code, the question came up, who do we go to and Australian Standards was one place we went and asked the question. They gave us - there is a standard and they said it should work for yachts, but again in that instance there's no specification for keel or rudder and the rules are not really--

Q. What about the deck structure or scantlings under the Australian Standard?
A. The Australian Standard applied to decks may be an answer, I can't comment as to where they fall in terms of--

Q. You see, at the end of the day I've really got to look at the problem and see whether there's any way I can suggest as a Coroner that there be something done to ensure that the boats that enter are strong enough to withstand extreme conditions.
A. From my own viewpoint what we do now is we still use the American Bureau, it's the best rule for this type of boat. But what we do is we - basically I'm doubling deck structures.

Q. Yes, you're building boats--
A. I'm ..(not transcribable)..

Q. --that go on from the American standard?
A. Yes.

Q. Are you saying then that other boat builders probably aren't?
A. That's possible and I think probably - I think my biggest concern is for the young - for the newer designers, the newer offices, they're going to look for something to design to and it's going to be whatever's written down in the regulations and if it's the American Bureau of Shipping Standards that's what they're going to build - that's what they're going to design to.

Q. And you think--
A. And they don't have the benefit of the lesson learnt.

HILL: Q. You then actually go on to say at point 2, personal harnesses need to be reviewed both in terms of design and use. Now, we've had evidence on this and certainly it is required but have you got anything in particular about these? It's just something that needs to be looked at.
A. I think the experts that know more about it have dealt with it, it's not an area of my own personal expertise, I just looked at what was going on and it was an area identified as needing work.

Q. Liferafts also need to be reviewed, both in terms of design and use. When you say use, are you talking about them actually being in the water, or are we talking about them being on - carried on the yacht itself?
A. Again, probably better people, more qualified people have dealt with this problem since I wrote this paper but from my own viewpoint the only thing that I can add is that I think it's mandatory that the rafts be carried on deck and I believe that's been incorporated in the - I believe that was incorporated in the '99 event and will be used in future as well. The rafts need to be on deck, not below.

CORONER: Q. The year after next, not till the year after next, 2001.
A. They're on deck.

HILL: I think that you may be at cross-purposes Mr Coroner.

Q. Vessels that exist at this particular moment you'd want them on the deck, on top?
A. Stored on the deck.

Q. Stored on deck.
A. Stored on deck.

Q. Whether in a hard case--
A. Whether it's in a hard case that's provided - some of our boats we have provided such a well for placing these rafts but in lieu of that, if a boat isn't designed to have that fixture, the rafts can still be lashed down on deck.

CORONER: Q. That's not envisaged, is it, with boats that are existing?

HILL: I think that Mr Mooney's evidence was that there is an intention for new vessels to have the wells and there is a discouragement, as I understand it--

CORONER: Yes, that's right.

HILL: --for carrying them below.

CORONER: But it won't be mandatory.

HILL: But that is to be faded out I believe. I'll just clarify that. You're still going to carry them?

MOONEY: We haven't put a cut-off date on it.

HILL: So there it is.

Q. But as far as you're concerned, you think they should be on deck.
A. On deck.

Q. What do you see as fundamentally wrong with carrying them in the lease below?
A. I think you saw what happens when you carry them in the lease below, on the Business Post Naiad it inflated in the companionway and I can see just great difficulties trying to - you've got a boat that's damaged, I assume at this stage of the game the boat's damaged and you're having to get the liferaft out. The liferaft may be right in the way - the damage may be right in the way of getting to wherever it is that you've put the liferaft down below. It's going to be low, so it's going to be underwater, so you're going to have to find it underwater in the dark, covered up by sailbags, floorboards, personal gear bags, rubtails(?). I mean it's going to be in the bottom of all the racing activity so all the other stuff's going to be on top of it, where is it and now we've got to move all the stuff to get to it. I think the mustering times would be quite slow.

CORONER: Q. The last witness spoke of the difficulty - the fairly complex job of changing so that the liferafts would be stowed above decks on existing boats. Do you agree with

that, that it's quite a significant alteration to the craft? Or it could be?
A. Potentially it could be. I've seen it done many times without great problem, that was on boats that had a fairly large afterdeck where it was the logical place to strap it down but it doesn't mean - I can envisage a lot of boats out there that would be problematic, because the cockpits are small and no real place to tie it down.

HILL: Q. The next thing you talk about is the race category and general safety standards applied to the Sydney to Hobart race need to be re-evaluated. I want to start off with the grandfathering clause, the 110. That has now been removed and it is now a category 1 with the stability of 115 degrees. Is that good enough?
A. I think that's something that the club and its members and the sailors need to decide, knowing the facts of what it means to be 115 degrees, what does it imply to be 115. What's the correlation between my positive limit of stability and how much time I spend upside down potentially. How close is that correlation. I think it's a decision that the sailors to make, are they willing to take - you know, to be on a boat that's going to potentially stay upside down for five minutes or do they want to be on one that's going to come up in 20 seconds or - I just - my personal views are that 115 should probably grow to 120 but that we have to be careful in doing that, because if you - and I can see the value in the grandfathering historically applied, because if you say we're going to be 115 now and last year we were 110, there's going to be a mad scramble to make boats 115. The way you do that is you strap lead to the bottom of your keel, which then imposes greater loads on the yacht itself, which then imposes greater loads on the rigging. Even the forward panels of the yacht become more suspect because the boat will be going faster, because it's stiffer, it will leap into waves harder. So those changes to a yacht need to be done with great forethought. Just to go next year we're going to be 120, I think you're inviting a problem. So if it happens, my personal thought, I think 115 is okay. If the yachting community seems to think that that - because of its associated performance inverted is too long a time to be inverted or too dangerous, then it should grow to 120 but it needs to be done carefully and over some period of time to allow yachts to catch up.

Q. You have seen the report of Dr Reynoldson?
A. Yes, I haven't read it in great detail but I'm aware of his work and I've reviewed it with him.

Q. But the situation is that what he says is that the higher the stability the less time you spend under the water but it's not a direct correlation, you can't say that at 115 every vessel will spend say one and a half minutes underwater, because there may be a particular design that will spend the same time underwater as the next design, being at the 114 stability, as opposed to the 115. But what has come out of it is that the higher the stability of the vessel then the less time you do spend under the - in the

inverted position. Is that your understanding of--
A. That's right. The time you spend inverted is a function of many things. But probably the strongest variable, the strongest driving variable there is the positive limit of stability. I believe that that's been shown. Yes, there are issues with deck shapes and yes there are issues with beam of the deck and the base camber and the cockpit designs and all sorts of things. But all those things are going to be pretty much the same for our boats because the boats have to do the same function, so I think some of the correlations that Martin saw in terms of deck shapes and so on perhaps were over-stated because he was working with academic shapes, I'll call them, in that these deck shapes were not necessarily those that would go on a racing yacht. So we're all of a like type, so therefore this limit of positive stability is then the overriding variable that correlates to time inverted.

Q. I note that you said in conference that the Newport to Bermuda race in the United States, that's a category 1 but that has a stability - limit of positive stability of 120?
A. Yes, my reading of that book of regulations is that it's guidelines. If you read the category of races, it's obviously subjective as to how they're applied. I think the CYC have rightfully - have correctly applied a category 1 to what is if you read directly those things a category 2 race, because of the presence of Bass Strait. So I think that's the right decision. The question now is do we need to go further and adopt even some elements of category 0 or just some other higher standards that are appropriate for our race. These guys that are setting down these regulations don't know any more about it than what the CYC know. In fact the CYC probably know more because we race every year in rough conditions across Bass Strait or typically every year and these instructions, these guidelines and regulations are being set down by groups of clubs that don't race in the roughest conditions around the world, they're very moderate conditions typically. There's the Newport to Bermuda race and so on. So we're at the forefront of this problem.

Q. I think the - this is the last question, you've told us about the acid in the batteries and I take it what you're saying is you've got to design for the fact that you will get knocked down and the best method is to design so that you will survive and be able to continue on as it were?
A. Yes.

Q. One of the things would be the battery acid. What would you put in its place?
A. There's technology for batteries called gel cell and they're a solid gel that packs - there is no lead or acid, there's no liquids that will pour out, if that boat inverted there would be no lead - there would be no acid dripping from those batteries. So that kind of measure I think are the kind of measures needed to be taken.

Q. We've also looked and there are various submissions

about for instance the radio batteries should be completely separate from the motor, the engine batteries, in a different place. Is that something that lies within the realms of the designers?
A. Not typically, we don't typically state where batteries are to go on a boat, it's typically left to the builder and owner to decide where they want to put them.

Q. So that's the builder themselves and the owners, that's part of their responsibility?
A. We'll talk to them about it if they ask the question but typically it's not something that I would put on a plan this is where your batteries will be stored.

Q. Going too far to set a rule say that in order to take part in a race you will have a separate area for radio batteries and engine batteries?
A. I'm probably not an expert enough to make--

Q. Okay, that's fine. The other thing that's been put forward is this, that you are far safer in the yacht than in a liferaft so as long as the yacht is afloat that's where you're safest. Someone has put forward the proposition that why not incorporate within the yacht itself, for want of a better word, airbags, so that it doesn't sink. It may not be getting very far but it doesn't sink and it's certainly far more safer than having actually the liferafts. Now, is that a possibility?
A. I think it is, yes I think it is a possibility for a boat like Business Post Naiad would require probably an additional - there's a fair bit of flotation offered by her full structure, that is the foam core and so on. I'm guessing that it would probably require about three cubic metres of air to keep Business Post Naiad afloat, which is certainly possible with airbags, a series of airbags in the bow and stern.

Q. There are helicopters I understand that have these airbags fitted so that if they go into the water they just don't sink, they remain there?
A. I think in the case of the yachts you'd need the airbags to be internal rather than external because the same problems would exist for external airbags that would exist for liferafts in that they would be torn apart. I think if it was to be applied it would need to be inside the vessel and the vessel would be very low in the water but it probably still would be safer than a liferaft.

Q. So is that part of the realms of designers?
A. I think it's the kind of thing that could be tested in a towing tank for instance, if you filled a boat up with water and sank it right down and compared its performance with the boat before it was damaged, to see if it was a viable option. To say - for me to state right now that it will be as safe or safer than the boat in its sort of nominal condition, I couldn't say that.

Q. I'm just asking for its feasibility.

A. So I would say that it was worth - I think it's certainly worth studying because I think everyone would agree that they'd rather stay on a boat than be in a liferaft.

Q. So it's certainly something that requires - shouldn't be dismissed out of hand or anything like that?
A. Yes, that's right.

WEBER: Q. Mr Dovell, could I just keep you on your first report for the moment and the recommendations that you see which might be made arising out of your analysis of what occurred. I think your evidence was that you now design boats to double the ABS standard for deck scantlings, is that right?
A. That's correct.

Q. Should his Worship infer from that that you think that the ABS standard for deck scantlings is underspecified to a degree of two?
A. Without spending a great amount of time studying the problem and really working out what the heads are, my conclusion of the type of damage that the boats were subject to, that my reaction was to go to two and yes, I think it's approximately half, I think the deck structures are presently half as strong as they need to be.

Q. One of the vessels which was knocked down and suffered deck damage in the 1998 Sydney to Hobart was B52, was it not?
A. That's right.

Q. And you designed B52?
A. Yes I did.

Q. Can you assist us with giving an impression as to how you designed the deck scantlings of B52 compared to the ABS standard?
A. Yes. With that boat, that was a production boat, a Sydney 41, and I designed that deck with approximately 30 per cent margin on the American Bureau of Shipping minimums, because I was aware from my - from having done work on boats that were built right down to the minimums that those minimums were very spongy underfoot, they were very soft underfoot and crews don't like that. And it also means that the boats aren't stiff enough in general sailing terms. So if a boat flexes it goes slower, so to make it stiff we put - we made the deck stronger, as well as to make them stronger underfoot and typically we just rounded up 30 per cent over the mark the American Bureau of Shipping standards.

Q. And so was your experience as to what happened to B52 something that led you to conclude that ABS plus 30 per cent wasn't good enough?
A. That's right.

Q. Research into deck scantlings, would that be a

particularly expensive type of endeavour?
A. You could make it as expensive as you like I suppose if it was put in the hands of an academic but it could also be quite cursory - not cursory but it could be done quite simply. Just based on the evidence given by these people who experienced these incredible conditions, if you asked those guys how long did you - how big was the wave that threw you on your coach roof, how far did you fall, you can work out pretty quickly what the implied pressures are when you fall 20 feet as opposed to 25 feet and from the stories I'm getting it was literally a case of being thrown by the breaking crest--

CORONER: Q. Down?
A. --down onto your deck. So calculating those pressures on a flat panel which is basically what a deck is, it's not trivial but I don't believe it would amount to a great deal of work. I think quite a reasonable scope of work.

WEBER: Q. If I could just take you back to B52 in your first report, if you go to page 3, you see that you give a thumbnail sketchy of what happened to these illfated yachts that were rolled, all six of them. You see on the top of the right hand column that B52 rolled 180 degrees and stayed inverted for approximately four minutes?
A. That's right.

Q. She had an LPS of 119, didn't she? I think that's - you nodded your head, you'll need--
A. I'm nodding my head that yes, I believe that's right.

Q. I can help you because you've got table 2, you've got a table which helpfully sets forth a lot of the important data about the fleet and right in the middle of the page you see B52 you note as having an LPS of 119?
A. That's right.

Q. That coincides with your recollection of its actual LPS?
A. Yes, it does.

Q. You'll see that the first mentioned yacht, which is on the left hand side of page 3, Business Post Naiad, she rolled through 360 degrees and remained inverted for four minutes but you're aware aren't you that that was the second time that she rolled?
A. That's right, the first time apparently she rolled straight back up.

Q. On page 4 you say under the subheading stability, from chart 2 it is clear there is no correlation between a yacht's positive limit of stability and its susceptibility to being knocked or rolled or severely knocked down in extreme conditions. In layman's terms is that simply saying if you are in the wrong spot when a 15 metre breaking wave wants to break over you, you're going to get knocked down?
A. That's exactly what I'm saying.

Q. And it doesn't matter what your LPS is, if you're in

that sort of situation you're going to get knocked down?
A. That's correct.

Q. Then you go on to say that it was noteworthy that the time spent inverted by each of the yachts' roll was in line with the correlation established by the USYRU. Is that the US Yachting - can you tell me what it is, I'm sorry?
A. United States Yacht Racing Union.

Q. Thank you, in 1989, and one of the boats report being kept upside down for more than four minutes, which is the expected value for a yacht with an LPS of 115. What literature did you go to, to come to that conclusion?
A. The USYRU report, it's in the back of the USYRU report, there's a curve that correlates the time inverted with the limit of positive stability.

Q. I don't mean to put words in your mouth but does the learning suggest that at 115 degrees LPS you can expect to be inverted for four minutes?
A. It's a small graph and it's full of scatter but that's right, roughly that's where it is for 115 is about four minutes, four to five minutes. Actually that depends on the sea state, whether you're in - every spectrum of waves has calm spots and rough spots and if you're unfortunate enough to roll just before a light patch in the wave pattern then you're likely to stay upside down significantly longer. So the scatter around that mean value is going to be quite large, in the order of minutes, not in the order of seconds.

Q. And of course as we've established B52 with 119 LPS herself stayed inverted for four minutes?
A. That's right.

Q. I think you were just coming to this point yourself but ultimately to right any yacht the appropriate size righting wave needs to come along, correct?
A. That's correct.

Q. And that's an element of lady luck?
A. Yes it is.

Q. I think it's right isn't it that if you were to put a yacht in a tank in test conditions and expose it to no - invert it then expose it to no wave action at all it would stay over and inverted forever?
A. That's correct, as long as it's range of positive stability was below exactly 180 then it will stay upside down, if it's ..(not transcribable)..

Q. The evidence that his Worship has heard from some of the crew of Business Post Naiad was that there was in fact a lull in the wave action after she rolled the second time. If that is the evidence, would that be consistent with your expectation that the appropriate righting wave had not come along?
A. That's right.

Q. Could I then take you to your first report Mr Dovell which deals with the certificate which was ultimately issued for Business Post Naiad. Do you have it available to you now?
A. Yes.

Q. The principal aim of your research which is summarised in your report of 7 February was to establish whether the IMS certificate which suggested an LPS of 104.5 was correct, is that right?
A. Yes and also to find out what it was, so that we could make proper conclusions.

Q. As to the latter, attempting to find out what it was, the best you could do was your best estimate, correct? I don't mean to say that in any way denigrating what you did but what I want to suggest to you is the only way that one could ever find out what Business Post Naiad's limit of positive stability was, would be to analyse the vessel Business Post Naiad?
A. That's right.

Q. Your view as I understand it is that on balance you think that the certificate which was issued in September 1998 which is annexure 6P1 was more likely than not to be correct?
A. That's right.

Q. That's an LPS of 109.5?
A. That's right.

Q. Mr Hill asked you some questions this morning concerning annexures 1 and 2 of your report and he put to you that what they showed is that if you added weight or therefore displacement you increased the LPS and if you took away weight it decreased the LPS, correct?
A. That's right, on the premise that that weight is in the bilge.

Q. Certainly. Could I suggest to you that your research as shown in annexures 1 and 2 go a little bit further and they show that the addition or subtraction of weight leads to conclusions which are close to linear?
A. Yes.

Q. And so if you'd be kind enough to go to annexure 2, if you hypothetically postulated that Business Post Naiad's displacement was 5546 kilograms, that would lead to a conclusion wouldn't it that its LPS would be of the order of between 112 and 113?
A. That's correct.

Q. And you will see if you'd be kind enough to go to the annexure 6P1 which is the 109.5 degree LPS certificate, that the figure that I've quoted, 5546, is the disclosed displacement?
A. With that first issued certificate, yes.

Q. Which you have a preference for?
A. Which I believe that's as close a picture of that boat as we're going to see, yes.

Q. Just recounting but if we were to extend your line in annexure 2 to a figure with a dot at 5546, we would come up with an LPS between 12 and 13?
A. That's right, a little higher than what we get on that certificate, that's correct. The difference is within the error bands of this measurement system.

Q. Let's deal with that. You indicated that the task of measuring a yacht in company with all scientific experimentation is only as good as the quality of the person who undertakes the experiment, is that a fair summary of what you said?
A. Yes.

Q. Assume that a yacht is measured by a measurer of considerable ability and experience. What would you say would be the margin for error in LPS that would be inherent in such a measurement?
A. I believe the measurers can read freeboards to within two millimetres and I believe they can read pendulum deflections to the order of one or two millimetres. I've calculated the impact of that on the limit of positive stability for a boat such as Business Post Naiad and it basically gives you an error band of plus or minus three-quarters of a degree, so say a degree.

Q. So with the best measurers there's a one degree LPS margin for error?
A. Maybe a little lower for the best, for the average I would say it's a degree.

Q. I don't want to be unkind but it's reasonably clear isn't it from your description of the way Mr Fisher undertook his measurement task that he's not one of the best of the class of measurers?
A. That's correct, that was my conclusion.

Q. Indeed, on a spectrum of measurers, he'd be down the poorer end of the category as at the time you saw him?
A. Yes.

Q. Have you got a view as to the sort of margin for error which would be inherent in a measurement undertaken by Mr Fisher?
A. Probably double that at the best. Two degrees.

Q. Of the order of two degrees?
A. One and a half to two degrees.

Q. The work that you did to attempt to test the 104.5 certificate and come to a view as to the more likely true reading involved comparison with what you called a sister ship of Naiad, correct?
A. Yes.

Q. The sister ship was an Australian built production line, if I can use that expression, Farr 40, correct?
A. That's correct.

Q. Production line is probably quite an inappropriate expression to use, isn't it?
A. The hulls are quite well built, the rest of them is going to be a much more sort of one-off type of installation, but the hulls and decks were actually out of a mould so they are pretty close to the same shape and in fact they're allowed to use the same offsets--

Q. With true mass production say producing a Holden Commodore, one Holden Commodore is going to be the same as another Holden Commodore to quite an exacting degree isn't it?
A. Yes.

Q. The same can't be said of yachts, can it, even yachts that are built to a plan?
A. That's true.

Q. What sort of margin for error or tolerances would be built into any comparison of one so-called production yacht to another?
A. The tolerances on dimensions of the outside skin of a hull on the Farr 40s is potentially very tight but once they're out of the mould it would not be uncommon for those boats to be bumped just lightly for a different rating or for the decks to be - the sides of the yacht to be sprung slightly or what have you. So you could get variations in some dimensions of maybe three and maybe four millimetres, five millimetres.

Q. Could you assist us, and I realise it's probably a hard task, in giving a sort of percentage variation that one Australian production Farr 40 might have from another?
A. In terms of their stability relationships I suppose that's not - let's stick with the dimensions of the hull, as far as I'm aware those boats were all from the hull painted and that was it with maybe some small changes to the bumps which I think that model shows the creases that I call bumps where they potentially would be massaged a little bit. Aside from that I think you'd probably get - I think those boats would all be within five mil of each other dimensionally.

Q. Naiad of course wasn't an Australian production Farr 40 was she?
A. No, she was a custom built boat in New Zealand.

Q. So it would be reasonable to expect wouldn't it that there would be a material difference when it comes to the precision that's involved in IMS measurement between Naiad on the one hand and her sister ships in Australia?
A. I've shown that, those lines plans are in one of the figures, I've given a lines plan showing what those differences are. These lines plans were developed from the

Australian Yachting Federation's offsets files which are not the designer's plans, these are the as measured offsets so that it's an objectively determined set of lines of what was built, not what was planned to be built. So we've got the darker lines are Naiad and the lighter lines are the Australian Farr 40s. On that body plan you can see the body plans are almost identical. They are very, very similar. Mind you, the length is an issue but to cut to the chase of what happens when you relate displacement to righting moment, I believe the evidence is that Naiad fell right in line with the Australian Farr 40s so it was - that was between this and my knowledge of stability and the evidence that the boat had the same limit of positive stability and the righting moment characteristics as the family of Farr 40s, I concluded that it would behave the same. I think that graph, I think the one that shows it best is probably figure 4, annexure 4 shows Naiad '97 certificate right in line with all the Australian Farr 40 data for that, for righting moment displacement relationship.

Q. You heard Mr Mooney give evidence this morning that the offset - that he agreed with the criticisms of Mr Lachlans of the quality of the offset file for Business Post Naiad?
A. Yes.

Q. Do you share those criticisms?
A. My comments there are that to get a fair rating I agree, for that boat to get a better or more accurate rating for speed potential, which is what this game - the IMS game is all about in the first instance, I would agree with you that offsets file was not adequate for proper definition to give her what we would consider a proper standard today. But from a hydrostatics viewpoint, the offsets file is more than adequate. If you compare a table of offsets that a designer used to provide five years ago to build a boat from, the table of offsets would have been maybe 200 numbers, 200 data points on the hull surface, whereas the offsets file that was - that this boat had was probably some over 1000 points, so we're talking a good file would have 5000 points. So we're overstating the problem from a hydrostatics viewpoint. From a performance viewpoint it's another issue.

Q. What I'm endeavouring to ascertain from you is the extent to which the inadequacies of the offset file affect anyone's capacity to say Business Post Naiad had an LPS of 109.5?
A. The file was definitely good enough to do that.

Q. Good enough to do that?
A. Yes.

Q. Does the fact that Business Post Naiad when she rolled the first time, stayed inverted for less than a minute, say anything, give you any hint as to what its true LPS was?
A. Probably not on its own.

Q. His Worship's heard evidence that - and to understand this evidence you need to go to annexure 5 page 1 which is

the 1997 IMS certificate, have you got that?
A. Yes.

Q. And you'll note that it shows an LPS of 112.9. Following that LPS certificate, it's thought that some 680 kilos of lead was removed from its ballast, right, and then there's evidence that some 250 to 300 kilos of new fitout was inserted?
A. Yes.

Q. So taking the upper of those two, the evidence suggests that there was a 380 kilo net weight loss. When you take into account the way in which Naiad reacted when she rolled first time and a loss of 380 kilos of ballast from the yacht as measured in July 1997, does that help you to get any further impression about what this yacht's actual LPS was?
A. I think if you look at the '97 certificate and you look at the both times inverted, both the four minute and the very short period of time, the 20 seconds and you look at the calculations of how the boat should behave with added and subtracted weight as related to this '97 certificate, and you compare all that evidence against the certificate of September, you would say that the weight of evidence is that it's the limit of positive stability of the boat was perhaps slightly above what that September certificate stated.

Q. Just taking that a bit further, as we started out really in this area of discussion, your annexure 2 suggests does it not that by extending the line - probably you don't need to extend the line at all for a net weight loss of 380 kilos that it would have an LPS of somewhere between 112 and 113?
A. Yes, that's part of the evidence I was referring to as this behaviour that would indicate that if someone said the only information we have about Naiad today is this '97 certificate they took this 300 out of the bilge, Mr Dovell what's your opinion of what the LPS would be, I would have gone to this curve and stated 112. But we have that other evidence and so it's probably - it's all - this by the way, that curve could be different depending on where the internal ballast is, bow to stern, so this is not gospel for that boat. It could be a slightly different curve for ballast forward or ballast aft, so it could be slightly differently so that's not the answer.

Q. No, I accept that but just straws in the wind, to use that expression, you've got the way we know that she actually reacted to roll one and roll two, agreed?
A. Yes.

Q. And we've got a reasonable understanding of the amount of ballast that was removed after 1997?
A. Yes.

Q. And we've got your close to linear annexure 2 and am I right in understanding your evidence to be that all those straws are blowing in the wind towards a conclusion of an LPS of 112 approximately?
A. Somewhere in the range - I think all those are - I would

say on balance that the limit of positive stability of the boat as it raced was slightly above the certificate value of 109.5. As to what it - whether it was 112, I think this is probably calculated on a ballast position that wasn't exactly where the ballast was in that boat. So I'd say it would be greater than 109.5 u to possibly 112, one hundred and twelve and a half.

Q. All right then, let's come at it from another angle - test it from another angle. You said that even with the best of yacht measurers, you'd factor in a three-quarters of a degree to one degree margin for error, correct?
A. That's right.

Q. And I think you said that with Mr Fisher you would factor in a two degree margin for error. So on that basis alone you would say that there is a realistic possibility that to factor in the two plus, that the LPS would be 111.5?
A. That's possible, yes.

Q. And while the two degree plus or minus is hypothetical I think you'd accept, wouldn't you, that it is highly unlikely that Naiad's LPS was two less than 109.5. In other words, 107.5?
A. Based on the way she behaved and based on the knowledge of all the other boats of its type, I'd say that's right.

Q. You placed some store on the September 1998 certificate, that's the 109.5 certificate - because I'm reading from your paragraph 414, that you thought that the only error that Mr Fisher made was allowing himself to think that he made an error. Do you recall that?
A. Yes.

Q. Is that the central plank in your reasoning as to why you came out to suggest that the 109.5 might be an appropriate--
A. That is the central - yes. He did a measurement on July - whatever day it was, he took the information that is required to generate the certificate and that is freeboards at the front and freeboards at the back and the righting moment, and submitted that to the AYF and this is the result. And that result makes perfect sense with all the other data we have on this boat. So it's a great system.

Q. When you witnessed the extent of technical error in the way about which Mr Fisher went about his task of measuring, why was it that you concluded, implicitly, that error wasn't also evident in the September 1997 measurement to some degree?
A. The 1997 certificate and the September 1998 certificate both agreed with the sister ships, and behaved consistently between themselves. The sister ships aside, those two certificates are consistent in their performance of displacement, to righting moment displacement to positive limited stability. So the evidence to me is that those two certificates are correct. Pretty unlikely that they're both in error of the same - so that they match, if you know what I mean. If you have two certificates - if he was making error, significant errors in 1997 and in 1998, it's very unlikely that they would agree in terms of the behaviour - the theoretical behaviour and the behaviour of the sister ships. So these two certificates agree well with each other, the 1997 certificate and the September 1998 certificate.

Q. And that's your annexure to the linear correction?
A. It agrees well with that. Very well with that and with the sister ships, so it's the consistent pair of certificates that's why I believe that these two certificates are a fairly good picture of--

Q. But recapping that 109.5 being measured by Mr Fisher it carried with it, in your view, an inherent risk factor of plus two degrees?
A. It's plus/minus but yes. But because of what we've seen in the way of behaviour et cetera in the family of curves, it's more likely that this was on the low side.

Q. Just one further topic Mr Dovell, when a vessel is dismasted it's LPS rises, doesn't it?
A. Yes it does.

Q. And so after the first roll, Naiad had a higher LPS than beforehand?
A. Yes it would have.

<WITNESS RETIRED

DISCUSSION AS TO WITNESSES REQUIRED FOR NEXT DAY

ADJOURNED UNTIL 19 JULY 2000

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