

INQUEST INTO THE DEATH OF LINDA ELIZABETH YARR.

Number 610 of 2001.

INQUEST INTO THE DEATH OF CHARLOTTE OPHELIA LENAS.

Number 623 of 2001.

Facts.

On 1st April 2001, "Rising Farrster" a Farr '38 fibreglass hull yacht, owned by "Flying Fish Leisure Management International" (LMI), a United Kingdom based organisation, which ran a sail training school, was being sailed down the New South Wales coast by Andrew Hunt. David Binks, principal of "Binks Yachts" of South Australia had built the vessel. Mr. Hunt was "Senior Yachting Instructor" on the vessel, which was operating as a sail-training vessel. With him on the vessel were five sail trainees, including Linda Yarr and Charlotte Lenas. The "trainee skipper" at the time was Jonathon Evans. The other trainees on board were Emma Stacey and Toby Arrowsmith. Hunt had been employed with Flying Fish for approximately three years – since September 2000, full time. The crew were completing a course, which involved both theory and practical sailing. It would lead, eventually, to a qualification of "coastal skipper". Charlotte Lenas was the youngest and the least experienced on board. She was not intending to complete this level of the course.

Mr. Hunt had qualifications, since 1999, as a "yacht master offshore instructor" through the Australian Yachting Federation. He had a yacht master qualification in the United Kingdom. In the Mediterranean he had worked as a "Flotilla Skipper" organising the sailing of a number of vessels. In the several years before 2001, Hunt had been working summers in Australia, essentially teaching sailing.

He examined "Rising Farrster" at the time the firm he worked for purchased her. Prior to its final voyage, Andrew Middleton and the principal of the company, Andrew

Fairclough, had also skippered the vessel. In evidence, Mr. Hunt said, "functionally, it sailed well". He indicated that it was a suitable boat for training and he saw no problems with it. He gave evidence of "groundings" at Yamba during an earlier sail but indicated that they were gentle and the seabed was soft and sandy. He said he cleaned the hull in March 2001, after the Yamba groundings, and noticed a "hairline crack" where the keel butts up to the hull. He told Andy Middleton, who, he said, told him: "Yeah, it's on the surveyor's report." He thought no more about it. The surveyor, Schofield confirmed the crack in his report. In evidence he said that he regarded it as insignificant.

The vessel set off with its crew from Sydney on Saturday 24th March 2001 and travelled to Southport via Port Stephens and Coffs Harbour, arriving on Thursday, 29th March 2001. On Saturday, 31st March 2001 the vessel and crew left Southport at about 10 am on its return journey via Coffs Harbour. According to Hunt there were two reefs in the main and a Number 4 headsail. Their details were given to the Coastal Patrol. The wind was at about 22 knots on a 1.5 metre swell.

In evidence, Mr. Hunt told of how he taught the crew (a skipper and navigator were appointed from amongst the students and he taught the various sailing skills such as safety checks, diving and the like). In his contemporaneous statement he spoke of "reefing, strong weather tactics and headsail changing".

According to Hunt, he approved a "passage plan" organised by Mr. Evans. Ms. Yarr was the navigator and Hunt checked her work as part of the exercise process, along with skills such as reefing and changing sails. Mr. Hunt indicated in evidence that he also practised evacuation drills on the leg from Southport.

The watch was set at three hours on and three off. On the way down the coast Mr. Hunt indicated that he checked some of the "fixes" marked by Ms. Yarr but that he "confirmed" others "by asking the navigator where we are, the depth, the barometer" and so on. The training was to the effect that the crew were allowed, indeed encouraged, to do as much as they could for themselves.

On the night of 31st March – 1st April 2001, the wind was blowing at about 20 knots. The vessel had two reefs in the mainsail and a number 4 headsail up. The vessel was approximately three nautical miles east of Evans Head.

The four survivors.

The four survivors gave statements in the days immediately following the incident by way of recorded interviews with police, and handwritten statements at the request of Mr. Fairclough.

In his contemporaneous statement, Mr. Hunt says:

"I was laying in my bunk on the starboard side listening to the watch change. I noticed Emma filling out the log, which is done every half hour, and Charlotte and Linda in the cabin. Charlotte was coming off watch and Linda and Emma were coming on. Toby and John were on deck. I heard a crack that I can only describe as a pane of glass breaking and the yacht falling over on its starboard side. There was no lurching to suggest an impact. My first thought was that the mast had broken so I told the three girls not to panic and I stood on the sink and looked through the companionway only to see that the mast was still there. I knew then that the keel had come off and I shouted to the girls "get out and get out now". I climbed into the water and as I did the yacht inverted 180 degrees onto its back. From myself getting out of bed to the yacht inverting took 15 to 20 seconds. I looked around to see John on the hull clinging to the rudder and Toby clinging to the propeller shaft."

So Mr. Hunt has Charlotte and Toby Arrowsmith just coming off watch and Linda Yarr and Emma Stacey coming on. It should be remembered that Mr. Evans was "Acting Skipper" and thus not watch-sharing, but rather, responsible for each change of watch. Mr. Hunt's role throughout the voyage was training and supervising.

So, Mr. Hunt was in his bunk, just after 1 am, 1st April when he heard an "almighty crash" (in evidence he again spoke of "a crash like smashing glass inside the boat").

The boat simply turned on its side and quickly continued until it was inverted. It had lost its keel. According to the statements and evidence of each of the four survivors there was no sensation of impact, as with rocks, coral, container or debris. At best, Mr Evans felt a faint "retardation – as though the boat had gone over a rope".

It should be remembered too that Mr. Dovell was of the opinion that there was no impact.

In her statement made shortly after the incident, Emma Stacey says:

"At 1 am Sunday morning the watches were due to change over. John, Toby and Charlotte were on deck. Charlotte came below deck and was preparing to go to bed, while Linda and I were preparing to take over on the deck. Before going on deck I checked the log to see if an entry had been made at 1 am and to find out where we were and what we needed to steer. I found that the last log had been made at 12.30 pm so I started to write a log at 1.13 am. I looked at the hand held GPS and made a note in the log of our lat and long and was about to plot our position on the chart. Linda was standing on the right of me looking at the chart to see where we were. Charlotte was in the saloon close to us. Andy was awake in bed. We were heeling over already but all of a sudden we started to heel over more and more. I sensed something was wrong and looked over to Andy. He was up and told everyone not to panic. We heard a bang. Andy poked his head out of the companionway to see what was happening. By this time the boat was on its starboard side and everything was crashing around. Andy saw the mast was fine and John shouted something about the keel Andy ordered us all on deck. I scrambled up the steps and I saw Charlotte next to me. I could not see Linda as she was behind us. By the time I was at the top of the steps, water was pouring in through the hatch and I was underwater. When I came up the boat had completely turtled. There was a small air pocket between the water level and the cockpit sole and I had to lift my head to get my mouth out of the water. I was short of breath and was breathing heavily. I thought I could hear someone else breathing next to me and thought it was Charlotte. I was paranoid the boat was going to

sink completely so took a deep breath and tried to get out. I swam into the falls of the main sheet and then the steering wheel. I knew where I was then and so dived down deep so I could get under the port side guardrail. I swam out as far as I could before running out of breath."

There can be no doubt at all that Miss. Stacey was very lucky to be alive. Her statement graphically illustrates the position of the three women in the saloon area of the vessel. It is not surprising that Linda Yarr and Charlotte Lenas did not make it out of the vessel.

I won't detail the versions of Arrowsmith and Evans, but on a reading of the four versions I have little doubt that they amount to an attempt by each survivor to recount as accurately as possible, just what happened.

Cross-examination of various witnesses, from crew members to Mr. Dovell, sought to show that the vessel may have foundered upon either the North Evans Reef or the South Evans Reef. I am satisfied that it did not. There is, of course, a good deal of evidence to the effect that the vessel could not have hit a reef:

- a) The description of events by the four survivors;
- b) The fact that the "red" aspect of Evans Head Light House was not seen whilst they were aboard the vessel prior to the incident;
- c) On the calculation by Bancart, the vessel, on the chartings, would have to have been travelling very significantly faster than it was, on the evidence of the survivors
- d) The fact that it took all day to make land.

I am satisfied, to the contrary that the keel separated from the hull of the Rising Farrster unexpectedly and very quickly, causing the vessel to invert. Linda Yarr and Charlotte Lenas probably died within minutes by drowning.

Issues.

Could the survivors have done more to attempt to rescue the two deceased.

This has been a very emotional issue for the families of the two women and for the friend of Linda Yarr. I think it is fair to say that at the commencement of the inquest they felt that Mr. Hunt in particular, as skipper, could have done more to attempt to get to the two women, or at least to check their welfare.

Whilst neither Mr. Arrowsmith nor Ms. Stacey gave evidence, both Mr. Hunt and Mr. Evans did. The evidence of Hunt and Evans, as to events following the capsizing is very similar and essentially mirrors their statements made shortly after the incident at the request of Mr. Fairclough, and the records of interview made to police. Importantly it is similar to the contemporaneous statements and records of interview of Arrowsmith and Stacey. With the re-telling of events such as this it is perfectly normal that there will be variations in the versions of the four. In fact were they very, very similar one would tend to become suspicious of an attempt to fabricate or hide evidence.

The statements requested by Mr. Fairclough are important. I have been referring to them in this judgment. In legal terms, if authentic and voluntary, they are said to be contemporaneous and thus more accurate. There is simply no evidence of collusion, or that in any way they do not represent an effort by each survivor to give his or her version of relevant events. Having found them to be voluntary and contemporaneous, the law requires me to regard them as likely to be accurate.

The inquest, for example, heard differing versions as to the extent that the fixed Global Positioning System (GPS) failed, along with the cockpit instruments. The differences do not mean that the truth is not being told. They mean in this case that the truthful recollection of one or other of the survivors is incorrect.

On analysis of their versions of events following the capsizing there can be no doubt that:

- a) They were abruptly pitched into the sea in the dark of night. There was very little light;
- b) Initially Ms. Stacey was separated from the three males, but after a short time made her way to them;
- c) They initially had no idea where the deceased were. They later realised that they may be in the hull but could not be certain;
- d) They quickly realised that the keel had separated from the hull. One noted the hold where the keel had been "hissing water" like a whale's spout, indicating that water had reached the hole made by the keel separation indicating that there was unlikely to be a "breathing space" for anyone trapped in the hull;
- e) When all put their combined weight on the boat they had a sensation that it could not take their weight and might sink;
- f) They gave priority to freeing and launching the lifeboat, a feat achieved with some difficulty;
- g) It quickly deflated leaving them to find other options (life rings and the survival pack from the life raft) to save themselves;
- h) Once found, they considered diving under the vessel in an attempt to ascertain what had happened to the deceased, but were simply afraid for their own lives.
- i) They eventually elected to leave the vessel and strike for shore. They swam, generally supported, virtually all day before reaching shore at approximately 6 pm (17 hours after the capsizing), at a remote place. Once achieved they set about raising the alarm but that was not achieved until the following morning.

In those circumstances, no criticism can be made of the fact that they did not, beyond banging on the hull of the vessel, attempt to reach or make contact with the two deceased they believed to be trapped inside the vessel. In order to enter the cabin of the upturned hull, one of them would have had to dive down approximately two metres, make his or her way back up through the companionway, in the dark, and ascertain whether or not the deceased were in the vessel and if so, were alive. He or she would expect sheets and other ropes and gear as a hazard to overcome. That person would then have had to continue to swim back and down, out the companionway, to a point where he or she could swim under the gunwale of the vessel and return to the surface. The four knew that with water "blowing" through the hole

in the hull, there would be little likelihood that there would be air to breathe inside the hull. It follows that any attempt to reach the two women would be risky in the extreme.

In examination of Mr. Hunt, some criticism was made of the fact that he did not grab the EPIRB kept adjacent to the companionway. On my reading of the totality of his evidence he simply did not have time to think to do so and may not have had the chance to do so.

I assess Mr. Hunt to be a truthful witness. There is little evidence before me to indicate that he was not a competent yachtsman and trainer. In relation to training he spoke of the relative inexperience of Charlotte and the consequent need to give her more attention. He spoke generally of "self-directed learning". One criticism, perhaps, is that he appears to have left collection of the EPIRB out of evacuation drills.

The loss of a keel at sea is not a circumstance to be expected and consequently closely trained for. Despite the loss of the two women, Mr. Hunt continued in his role as yacht master after the keel was lost. Somehow he and the other three managed to make land in quite extraordinary circumstances, without further loss of life. You will recall, for example, the evidence of Mr. Evans about the three to four attempts he had to make to free the life raft. That alone must have been quite a difficult exercise at night and in that sea.

Mr. Evans appeared to me to be quite a confident witness, perhaps a little more confident than skilled. He seemed to me to be rather cavalier about the rather horrifying "gybe" which clearly was very dangerous, especially to Miss. Yarr and whoever else may have been on deck at the time. I can find nothing in his evidence, however, that merits great criticism of him.

Where did the survivors make land?

It is impossible to find just where the four survivors came ashore. It may have been, as Mr. Morris asserts, between North Evans and South Evans Reef. On the other hand it may well have been south of South Evans Reef. They certainly landed on the long beach situated between Evans Head and Woody Head, and probably well to the North of Woody Head.

The failure of the fixed GPS and the cockpit lights.

This was not known until Mr. Evans gave evidence, and consequently any possible relationship between this failure and the keel loosening was not investigated either by police or the experts. I now have versions from the four survivors. The evidence is somewhat in conflict. There appears to have been a limited failure though the hand-held GPS was being used and plotting of position was probably reasonably accurate. I cannot say that the electric failure was relevant in any way to the keel beginning to come adrift from the hull.

The legality of the operation of "Flying Fish LMI" as a sail trainer.

I am satisfied that "Flying Fish" Leisure Management International" owned the vessel Rising Farrster and that Andrew Hunt was qualified to skipper her in a sail training capacity. The organisation, however, was not qualified to use her for sail training. In fact the Australian firm "Club Sail" had successfully applied to use the Farrster as a sail-training vessel. From what I can see that organisation had nothing at all to do with the voyage involving Miss. Yarr and Miss. Lenas, the vessel being owned by LMI and skippered by an employee of LMI. Club Sail played no role at all in the education of the trainees, or provision of the vessel or skipper.

Mr. Fairclough was at times quite a believable witness. He is, however, to be criticised for continuing to assert, even in the witness box that the issue of the right of LMI to use the vessel as a sail trainer is a "grey area".

Christopher Jonathon Sutton Brown, Principal of "Club Sail" gave evidence. His evidence was truthful so far as it went, but it is difficult to believe that the issue of the unlawfulness of the last voyage of Rising Farrster did not occur to him. Like Mr. Fairclough, he appears to have closed his mind to it.

Exhibit 15 is the "Operating Agreement between Flying Fish and Clubsail School". This document was drawn up six months after the incident so it is difficult to see its relevance, except on the basis that there may have been a similar verbal agreement, which I take LMI to be asserting. Its description of the business relationship is put this way:

"As part of its International Yacht Training program, Flying Fish undertakes to supply professional sail training to its customers. *Flying Fish has engaged the services of Club Sail to assist in this training provision and to provide specialist local knowledge in relation to operating in and from New South Wales.*"

How did Club Sail assist in the training for this voyage? What specialist local knowledge did it provide? The answer has to be that it did not assist in any way and it provided no specialist local knowledge.

To my mind, it is simply a basic contractual matter. There appears to me to be no contract at all between LMI and Club Sail in respect of this voyage. No consideration was involved. That being so, Club Sail had nothing at all to do with the final voyage of the Rising Farrster whilst LMI had everything to do with it.

Whilst in the agreement Club Sail agrees to provide Flying Fish with vessels that are approved for sail training by the YA of NSW & Waterways Authority (Rising Farrster was so registered by Club Sail as a vessel it charts from time to time). It can hardly be said that it is "providing" Flying Fish with its own vessel.

At the time of the voyage LMI had not obtained a certificate from YA as an approved sail training school. Therefore, its use of the vessel as a sail trainer was not in accordance with the MOU. Club Sail had, but played no role in the voyage.

I have carefully considered the submission of Mr. Cox but cannot accept that LMI was using the Rising Farrster in accordance with the Memorandum of Understanding. I do, however accept the second part of that submission that the user was not in any way relevant to the loss of the keel and thus causative of the deaths of Linda Yarr or Charlotte Lenas.

As Mr. Cox puts it: "there was no piece of safety equipment or regulation which would have had any effect on the loss of this keel or the deaths". The vessel was fully approved and the skipper was fully qualified. The non-compliance with the MOU had in this case only a legal, and not a practical result.

Mr. Manion also makes this concession in his submission.

The building of the Rising Farrster.

In April 1993, David Binks of Binks Yachts contracted to build a Farr designed IMS 38 yacht, described as a "cruiser/racer" for Mr. David Baker, a New South Welshman, who had selected the vessel to race in the Sydney - Hobart, but also to be a comfortable cruising retirement vessel.

Mr. Baker gave evidence of some initial problems with the vessel that were rectified by Mr. Binks. The first, which is of no significance to the failure of the keel, was a defective keel. The first keel had "cold shunts" which in the opinion of the surveyor, Doug Brooker, indicated a problem in the pouring of the lead, which could lead to later weaknesses.

Mr. Binks agreed to replace the keel. A replacement keel was shipped to Sydney and fitted by shipwright Paul Fisher. No issue has been raised in relation to the fitting of that keel, which was the same in size and design as the original keel.

Mr. Baker was considering entry into a Sydney – Hobart Yacht Race and ultimately contested the 1994 Race. So when the Rising Farrster underwent a flotation test in November 1993, the vessel only achieved a Limit of Positive Stability (LPS) of 113.1; stability index of 112.3. It had been agreed between Mr. Baker and Mr. Binks that the boat would have a LPS of 116 in order that it might qualify comfortably for the Sydney – Hobart requirement of 115.

After some discussions as to how to add weight, Mr. Binks told Mr. Baker that he proposed doing so by way of addition of a 145 lead shoe to the bottom of the keel (Mr. Baker did not want further weight placed forward as he felt that might effect the vessel's racing performance). He indicated to Mr. Baker and gave evidence at inquest that he had had discussions with both Bruce Farr, the designer, and the American Bureau of Shipping (ABS) about the modification. Leaving the question of Farr aside for the moment, I shall concentrate on the correspondence between Mr. Binks and the ABS on the issue of approval of the heavier keel.

The relevant plan for the keel and hull shell layup in way of the keel at the time the Rising Farrster was originally built was what has been referred to in evidence as "Plan 21" – that is the Farr drawing 21 entitled "Keel Geometry and Construction." The yacht was, other than the keel, originally the "Farr 11.6" which had a sump keel. Various modifications were made to the arrangements of keel bolts, the floor frames and the layups to produce the plan for the keel of the IMS 38.

When the Rising Farrster was built, Mr. Binks sent a letter to Mr. Baker dated 5th August 1993 "to confirm that we have received plan approval from the ABS" for the plans of the Rising Farrster, and further stating "I confirm that the yacht was constructed in accordance with these plans approved by ABS".

In his original report, Mr. Dovell noted the following in relation to the as-built vessel as compared with Plan 21. He noted at paragraph 14.7 that the two off-centre line longitudinals specified in plan 21 (that run between the keel floors) were not built into the boat thus reducing the shear capacity of the hull.

Mr. Binks gave evidence about this. He asserted that when he received the new plans for the IMS 38, he wished to try and re-use the floor mould he had been using for the 11.6 yachts. He says he spoke to Farr who said that as long as he reinforced the aft two keel floors further (with layers of bonding laminate) the omission of the two extra longitudinals would not have an adverse structural effect. There is no written confirmation of this variation to Plan 21.

I note at this point that in terms of its effect on the ultimate structural failure, the omission of the longitudinals has been put aside. Mr. Dovell gave evidence that if he accepted that Mr. Binks had added the additional longitudinal layer of fibreglass he asserts (and there was some evidence of this in the samples taken) then the reinforcement provided by that could have "made up for" the omission of the longitudinals.

On a number of matters, Mr. Binks' evidence appeared to me to be at odds with the documentary evidence before me. An obvious example is his assertion in his letter to Mr. Baker of 5th August 1993 (and a similar assertion would have been made to the ABS before the certificate of compliance was issued) that the boat had been built in accordance with the plans. In fact the hull shell was thinner than designed, and the floor frames were omitted. He gives explanations for variations such as the omission of designed floor frames, but these are based upon telephone conversations he says he had with the designer. Another example is the letter of 5th July 1994 to Mr. Tamura of the ABS in relation to the lead shoe. In that letter Mr. Binks states:

"We are now building another vessel of the same design for a customer who wishes us to add an extra 145 kg of lead in the form of a flat sheet of lead 45 mm thick attached to the bottom of the existing keel."

Mr. Binks readily acknowledged in cross-examination that this statement was not true because at the time of the letter the Rising Farrster had already been built. He does not give an explanation for the misrepresentation and so I cannot say what effect he intended it to have on Mr. Tamura.

Annexed to Mr. Binks' letter of 5th July 1994 as a sketch showing the intended location on the keel of the additional 145 kg.

The response from ABS was on the same day and read *inter alia*:

"Having quickly reviewed the drawing 21 "Keel Geometry and Construction" with reference to your attached sketch indicating the additional weight of 145 kg of lead at the bottom of fin keel, we advise as follows:

- 1) Stress in the lead fastening bolts slightly exceeds the allowable limit. It is required that the bolt material having min. yield tensile strength of 23.2 kg/mm² or more.*
- 2) Strength of all other supporting members are confirmed to have adequate strength against the increased ballast weight.*

Kindly submit the revised dwg for our approval "

At the bottom of this letter appears handwriting of Mr. Binks pertaining to the strength of bolts. His evidence was that he telephoned his steel supplier ASAB to ascertain the strength of the keel bolts already in the keel on the Rising Farrster and satisfied himself that they met the specifications as set out in (1) of the ABS letter above.

The keel bolts assumed a significant degree of importance in the initial investigation and report of Mr. Dovell. However as the inquest proceeded, further information in conjunction with the evidence given by Mr. Binks has enabled me to reach a view, to the balance of probabilities, that the keel bolts used in the keel (which of course cannot be verified given that the keel has not been recovered) did meet ABS required specifications. Given this factual assumption Mr. Dovell has excluded the question of

inadequacy of keel bolts from his overall analysis of the keel failure (Paragraph 17 of Report of 26th October 2003).

The next document in the chain is a letter from ABS enclosing a Certificate of Hull Scantling approval dated 27th September 1994, and an invoice from ABS for:

“Review of Dwg 21A: ‘Revised Keel Geometry and Construction’ and issuance of a Certificate of Hull Scantling Plan Approval”.

An issue which has assumed considerable importance in this inquiry is the “missing” Plan 21A. When enquiries were made with the Farr office in the United States of America, by police, what was produced was Plan 21B. This is not surprising as Revisions to plans are generally done on the original version, which then may no longer exist. Working back from Plan 21B, and with reference to the “Revisions” notes on that Plan, one is able to ascertain that certain changes were made in the bolting arrangements and bulb geometry, and that additional floor frames were designed to produce 21A from 21.

Mr. Binks denied ever seeing Plan 21A. It was put to him that he saw it when he visited the Farr office in late 1993, and was engaging in discussions with designers about possible modifications to the Farr 38 to produce a competitive racing yacht. He denied this.

21A could not be the drawing which Mr. Binks made to send to his metal supplier. It is a sketch not a plan/drawing and does not contain relevant design information. Mr. Binks himself acknowledged that he could not be certain that he sent this document, but was attempting to reconstruct a sequence of events from his files.

The difficulty which presents itself is that the ABS approved the heavier keel on the basis of a “Review of Dwg 21A “Revised Keel Geometry and Construction.” ABS must have received such a drawing from either Mr. Binks, or possibly Mr. Farr. The stronger inference, based upon the correspondence is that it was from Mr. Binks.

The Binks letter to David Baker of 28th September 1994 states: "we have received plan approval from the ABS relat[ing] to your Farr 38 IMS with the modified keel which now weighs an extra 140 kgs. I confirm that the yacht was constructed in accordance with these plans approved by ABS."

Whether Mr. Binks saw a Plan 21A or not, he certainly did not build the Rising Farrster in accordance with Plan 21A because it was built before 20th October 1993 when 21A was drawn. The shoe was added to the keel with no modification to the boat at all.

Plan 21A included the fore and aft longitudinals adjacent to the keel washer plates. Mr. Dovell had not done a calculation of this structure but said that the arrangement would have provided additional laminate to resist interlaminar shear failure, having a similar effect to Guideline 7.3.1 of the ABS Guide for Building and Classing Offshore Racing Yachts 1994, and may very well have prevented the keel's loss.

Was the vessel built "under/in survey"?

Having heard the evidence of Mr. Wright and Mr. Binks, I am satisfied that the vessel was not built under survey. Of course, it did not have to be as it was built for private sale to Mr. Baker.

Mr. Sandy Schofield, a shipwright, "surveyed" the vessel in order that it might be approved as a sail trainer by the YA. In this sense, "surveyed" merely means "inspected". Mr. Schofield agreed that in order to become a marine surveyor one is not required to obtain any formal qualifications. Both surveyors, Schofield and Brooker, describe their role as conducting mainly a visual inspection of a yacht in order to comment on its seaworthiness. There is no structural analysis undertaken.

This can be contrasted with the inspection required to be undertaken during the building of a yacht in order that either a Statutory Authority such as Waterways or South Australian Transport, or an International Society will certify that a vessel has

been built under survey, that is, it has been built in accordance with its plans. This type of inspection would identify issues such as inadequate hull shell laminate thickness during the yacht's construction. Already built vessels can be put "in survey" either by taking drillings and the like from the hull, or they can be subjected to an ultrasound. It seems to me that such a step would provide a far more reliable survey than a mere inspection. Sail training vessels are exempted from the *Commercial Vessels Act 1979 (NSW)* and so can merely be "surveyed" by inspection.

Mr. Anderson of YA NSW gave evidence on a number of issues. Having read the submission of Waterways Authority I accept its submission as to the issue of the effect of the inserted "condition (d)". Waterways says at 5.3.17:

"The effect of Mr. Anderson's evidence set out above and contained in pages 15 to 19 inclusive of the transcript in relation to the vessel construction paragraph suggests that that paragraph formed an amendment to the 1998 Exemption Order and required the operators of Sail Training Vessels to provide a report concerning the vessel construction to the Authority. This suggestion does not represent the reality of the status of the 1998 Exemption Order and misunderstands the effect of the document dated 15th May 2002 which appears to be a document created by the Association for its own use".

As a result of this incident, I am satisfied that the Waterways Authority immediately restricted the plying limit of vessels operating under the Exemption order to Class 2D ("designated partially smooth waters") until it was satisfied that the construction of Sail Training Vessels enabled them to be safely operated laterally along the coast and up to 30 nautical miles to sea. That restriction has now been lifted.

Waterways is looking at this issue at present. I heard evidence from Mr Pengilly, a naval architect employed by the Waterways Authority, indicating that Waterways were considering amendment to the MOU so that sail training vessels would need to be in survey under the *Commercial Vessels Act 1979*.

The submission by Waterways does indicate that the matter is under consideration. I believe that such an amendment ought to be finalised and implemented as soon as possible in the interests of the safety of sail trainees.

What happened to the vessel?

There is quite convincing evidence that the voyage, apart from a gybe on the way up was relatively uneventful. There was certainly no recollection by any of the four survivors that the vessel grounded, or was hit by flotsam, large fish or mammals or struck a reef of any kind. The four survivors, as I have indicated, certainly felt no jolt as when striking something, and no rapid, sudden heeling over by the vessel at any time. The relative lack of damage to the hull points to the keel separating from the hull, rather than an impact by the keel with anything.

There were groundings (in sand) at Yamba in February 2001 whilst the vessel was under Mr. Hunt's command. Those are described in various statements including that of Louise Pratt (S.48), Stuart Abernethy (S.46) and Vicki Jackson (S.48). By all accounts they were very gentle groundings.

Jonathon Matthews (S.49) refers to a "slight grounding" out of Southport in November 2000, where the vessel was taken astern back into the channel". He also refers to swimming under the vessel and seeing no sign of damage. Robert Willock (S.44) and Nicholas Fawle (S.45) also refer to that grounding.

The previous owner Mr. Baker asserts that he never grounded the vessel during his ownership of it and that "his son (who occasionally used the yacht) would most certainly have told me had he done so".

It is fair to say then, that the evidence discloses a number of groundings, all very gentle. Did these have a bearing on the loss of the keel?

In evidence before me Mr. Brooker and Mr. Binks gave evidence that such groundings were not of concern and did not require investigation. Neither surveyor suggested that these were matters for concern. Most importantly Mr. Dovell did not regard those incidents as significant to the failure of the keel.

Overall the evidence of earlier groundings, slippings and the like does not assist me to come to the conclusion that the vessel struck something with force, either during its ultimate voyage or earlier.

Naval Architect Andrew Dovell read the brief of evidence and gave convincing evidence that it more probable that the keel simply parted from the hull during sailing.

His report is complex, but it is difficult not to accept his findings.

If one accepts the proposition of keel separation rather than impact, Mr. Dovell provides a convincing failure mechanism. In essence he says, that given all the evidence, including that of keel bolt remnants, and hull laminate and taking into his account his own analysis of the keel bolts and hull structure, the most likely sequence of events leading up to the loss of the keel is as follows:-

- "a) Given the weak nature of the hull shell in way of the keel, I would suspect that the hull shell was flexing in way of the keel bolt pairs in response to the keel side loads;*
- b) While the hull was flexing slightly in way of the bolt pairs, it is likely that in way of the aft centre line bolts the hull held rigid and the centre line bolts flexed in bending side to side. (a bolt pair configuration is inherently stiff, while a single centre line bolt arrangement is not);*
- c) This cyclic loading of the aft centre line bolts led to those bolts starting to fatigue;*
- d) Eventually the 16 mm centre line bolt failed in fatigue, putting more load on the forward bolt pairs which in turn increased the shear stress along the edge of the keel washer plates;*

- e) *The hull shell then failed in sheer on the port side along the edge of the washer plates and in bending on the starboard side;*
- f) *Some of the outermost plies on the starboard side remained in tack with the portion of the hull attached to the keel, as they are closest to the hinge point between the hull shell and the keel. These plies then peeled off the hull to the sheer as the keel fell away and the yacht heeled onto its side”.*

Mr. Dovell then came to his initial conclusions:-

- “a) the primary cause of the catastrophic loss of keel from the yacht Rising Farrster was insufficient hull shell thickness in way of the keel attachment;
- b) In several critical areas the content and quality of the yacht structure was not in accordance with ABS approved plans. These deviations from the plan and specification detracted from the structural integrity of the hull and contributed to the failure;
- c) The keel bolts were of marginal strength and were a contributing factor to the failure;
- d) The evaluation of the keel bolts as part of the 1993 ABS plan review process was in error”.

The builder, Mr. Binks, on reading Mr. Dovell's Report, arranged for another Naval Architect, Mr. David Lyons to give an opinion. Sadly that opinion only came to me during the inquest. In an effort to resolve any differences between the two experts I decided to have them meet to discuss their reports, with Sergeant Upston as mediator.

The initial Lyons report, it must be said, appeared critical of aspects of the Dovell report and more in line with the “Blakelock Report” of Waterways.

The two closeted themselves away on 22nd October, and in due course produced a document, which indicated, on my reading of it that there really was not a significant difference between them (Exhibit 24).

- 1) They agreed, based on re-measurement of the hull shell that the hull shell bottom thickness averages 5.5 mm. (In his report (Summary S.1,) Mr. Lyons appears to be saying that the hull shell was not proven to be of insufficient thickness in relation to the 1986 ABS minimum requirement of 6.8 mm – in the later agreement he resiled from this proposition).
- 2) They agreed that flexural tests of the hull bottom would be worthwhile. These were urgently carried out by Mr. Ayres.
- 3) They agreed that three of the four off-centre line longitudinals shown in the Farr Plan 21 were not in fact built into the vessel.
- 4) They agreed as to bolt diameters, but that minor diameter could not be firmly established.
- 5) Significantly, they agreed that the analysis of the keel bolts by ABS was in error both in relation to the original plan approval and in relation to the approval specific to Rising Farrster.
- 6) They agreed that the as-built laminate stacking sequence³ was as per design with the exception of the orientation of the unidirectional plies.

Both then prepared supplementary reports.

In essence Mr. Dovell did not alter his “likely sequence of events”. He did, however come to the following conclusions:-

- “a) it is my professional opinion that the primary cause of the failure was inadequate hull shell thickness in way of the keel washer plates;
- b) The 1986 revision of the ABS guide does not properly account for the shear loads at the edge of the washer plates in the case of the Rising Farrster. In fact the 1986 ABS required minimum hull shell thickness of 6.8 mm is only

37% of the 18.5 mm of thickness required to produce a safety factor of 2 on shear stress in way of the washer plates;

- c) The agreed to as built hull bottom shell thickness of 5.5 mm is **1.3 mm thinner than the ABS approved laminate of 6.8 mm**, or 30% of the 18.5 mm of thickness required to produce a safety factor of 2 on shear stress in way of the washer plates;
- d) The 1996 revision of the ABS guide does not properly account for the shear loads at the edge of the washer plates in the case of Rising Farrster. **To comply with the later revision, the hull shell laminate in way of the washer plates would have been required to be a minimum thickness of 27 mm."**

Mr. Lyons too generated a supplementary report following the initial conclave with Mr. Dovell and Sergeant Upston.

Without itemising his conclusions he said this:-

"When these facts are taken into consideration I am unable to agree with the statement made by Dovell that "the primary cause of the catastrophic loss of the keel from the yacht Rising Farrster was insufficient hull shell thickness in way of the keel attachment", nor were there actually substantial departures from the ABS approved plans, again with the exception of the missing longitudinals already noted. My investigations do not prove these assertions either completely or beyond reasonable technical doubt. Nor can I agree that the keel bolts "were a contributing factor to the failure", although they were in my view incorrectly approved by ABS, a fact I would not expect the builder to have appreciated or been able to determine."

Given the complex nature of the discussions between the two naval architects, I formed the view that a further meeting between them would be more beneficial than lengthy examination of both.

Finally Exhibit 24A was produced late on 28th October, again following a long conclave.

They agreed:

- 1) That the ABS 1986 minimum hull bottom shell thickness based on strength using the USQ test value for flexural strength is 6.1 mm;
- 2) That the ABS 1986 minimum hull bottom shell thickness based on laminate stiffness, using the USQ value for flexural stiffness is 7.3 mm;
- 3) That in order to comply with the 1986 ABS hull shell minimum thickness requirements, the hull shell must be thicker than the greater of the two values stated above (viz: 7.3 mm);
- 4) That the agreed-to value for the as-built hull bottom thickness of 5.5 mm was not in compliance with the ABS minimum;

They appear to agree as to what shear stress can be withstood by the as built laminate, based on the USQ test results. However they differ as to the value for the shear stress that this structure would be subjected to in actual conditions. The differing modelling techniques appear to be the reason for this difference and these cannot be resolved in the absence of the actual keel. Mr. Dovell rates the shear stress as 10.2 Mpa, implying a Safety Factor of 1.36. Mr. Lyons calculates it as 9.2 Mpa, implying the slightly higher Safety Factor of 1.5.

As I understand the evidence, the Safety Factor, on either calculation is very substantially lower than that suggested by the 1994 ABS rule, which is 2.857. Mr. Dovell, of course stated that prior to 1994, in his professional opinion an acceptable safety factor would be no less than 2. On both calculations it is substantially lower than that too.

In summary the experts seem to me to vary very little. Whilst I did not have the benefit of Mr. Lyons in the witness box, he seems to be saying that some impact by the keel either at the time or shortly before has caused the keel to separate from the vessel.

Mr. Dovell, on the other hand, is very clear in his evidence and that is to the effect that such an impact would not have been necessary.

That, frankly is in keeping with the evidence and the weight of evidence – to the balance of probabilities, at least.

I am satisfied with the opinion of Mr. Dovell as to why the Rising Farrster lost its keel.

On this issue I generally accept the submissions of Mr. Cox which were very well expressed.

Whilst, clearly it can be seen that I do not agree with aspects of Mr. Morris' analysis of the evidence, in general terms I do agree with Submission 4.3 of his submissions.

In relation to Submission 4.2 (Morris – external force operating on the keel), to which I have referred earlier, I can only say this. Certainly it is *possible* that an external force, unknown to anyone may have operated on the keel. I am satisfied, however, to the required standard, the balance of probabilities, that there was no such external force.

I have adequately addressed submission 4.1 elsewhere.

I must acknowledge the level of co-operation between Mr. Dovell and Mr. Lyons. Without that co-operation this difficult technical area would have been far more difficult to comprehend and resolve. Of course this inquest would have been greatly lengthened.

Issue of legislation.

Section 48, Commercial Vessels Act 1979 (NSW) provides an exemption for "sail training vessels" which must satisfy a number of criteria including being operated by a sailing school which holds a valid AYF training centre certificate.

A school which does not hold such a certificate, does not qualify for the exemption and is therefore subject to requirements of the Act, which includes vessels being in full commercial survey, and requirements for qualifications of crew members. Breach of these requirements can constitute an offence under the Act.

However, *Section 4A* of the Act also provides that the Act does not apply to a vessel proceeding on an ... interstate voyage. Interstate voyage is defined in *Section 5(1)* as meaning an interstate voyage within the meaning of the *Navigation Act 1912 (Cth)* as "a voyage in the course of which the ship travels between ... a port in a State and a port in another State".

Thus as the *Rising Farrster* commenced its (relevant) voyage in the State of Queensland, its destination a port in the State of New South Wales. It was proceeding on an interstate voyage and as a matter of statutory construction the *Commercial Vessels Act* does not apply.

Whether the *Navigation Act 1912 (Cth)* will then apply depends in part on whether the vessel falls within the definition of "pleasure craft" in *Section 6(1)* of the Commonwealth Act. I do not express a concluded view on this matter but I note that the Waterways Authority has taken the view that it does, and therefore is not covered by that Act either.

The result of this legislative lacuna is that there is no sanction for a vessel or a school which fails to comply with the requirements of the Memorandum of Understanding between the Yachting Association of NSW and Waterways, so long as that vessel sails to an interstate port in the course of its journey. Had the *Rising Farrster* had its tragic accident at Evans Head in the course of a journey between Sydney and Tweed Heads, in NSW, there would have been legal consequences for LMI in the form of potential prosecutions under the *Commercial Vessels Act*. To anyone but a constitutional lawyer, the difference between sailing to Tweed Heads and sailing to Southport cannot, as a practical matter, justify such a dramatically different legal result.

The Waterways Authority in its submission to me acknowledges that the present legislative position is inadequate and *"has taken steps to ensure that vessels such as the "Rising Farrster" are covered by the new Marine Safety Legislation which will be introduced once the Regulations are completed"*.

The *Marine Safety Act 1998* repeals the *Commercial Vessels Act 1979* but has, in part, not yet commenced. The definition Section of that Act makes it clear that it has a much broader application than the current legislation. For example it applies to a vessel in NSW waters even if that vessel is on an interstate voyage. It is not known when that Act will commence as the complex Regulations to the Act have not yet been finally drafted. It is therefore appropriate to make a Recommendation.

Submissions by the families and friend of the deceased.

Many of the points made by Mr. Manion have been covered elsewhere in this judgment. Nevertheless it is appropriate to deal separately with some of his submissions.

- 1) I note the submissions in relation to the advertising brochure used by Flying Fish LMI and in relation to Charlotte being accepted on the voyage despite her relative inexperience and youth. As coroner I have to inquire into the manner and cause of death of each and to my mind these concerns do not go to those issues. It is worth noting that Linda Yarr, at 35 years of age was a mature, experienced and level headed woman, described as having excellent survival skills. I believe that were it possible for anyone to have got out of that yacht, she would have. The fact that she did not leads me to the conclusion that Charlotte's inexperience was not relevant to her death. Rather, her position in the boat in terms of it inverting as it did meant that she could not get herself clear. I am satisfied that both women died very quickly after the vessel capsized.

- 2) In relation to the submission about a “culture of drinking” I can only say that I have no evidence that excessive alcohol was consumed at Southport. The only evidence I have is that there was no alcohol on board.
 - 3) Hunt and Fairclough readily agreed that social activities are an integral part of the experience and it would be unnatural for the crew not to socialise whilst ashore. Again there appears to be no nexus between this socialising and the ultimate incident.
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- 1) I note Mr. Manion’s submissions in relation to the “hairline crack” and the tube worm. Crosky's evidence and that of Dovell is to the effect that there was some failure in the bolts over time before the ultimate loss of the keel. Crosky spoke of “10,000 load cycles”. When asked in cross examination to put a time figure on this in the context of a yacht, Mr. Dovell could only give a very rough estimate of 27 sailing hours. How this relates to crack or cracks observed simply cannot be interpreted. Mr. Dovell explained that the mode of failure being interlaminar shear, may never have displayed external cracking of the type Mr. Brooker observed in an unrelated vessel. Dovell said it was quite likely that there would be no visible evidence of the keel problems and draws no conclusion from the evidence about the crack. On the other hand Schofield, Brooker and Mr. Baker all said that a hairline crack in that position was unremarkable. I cannot say from the evidence whether the crack which Mr. Hunt observed was the same crack, nor whether it was indicative of the keel problem.
 - 2) I note the submissions about hydrostatic, personal and life-raft EPIRBS. I dealt with the issue of EPIRBS in great detail in my inquest into the six deaths during the 1998 Sydney – Hobart Yacht Race (12th December 2000). I do not believe that I have heard sufficient evidence in relation to this type of sailing to make recommendations. I will be referring this decision to the AYF and YA (NSW) in another context and ask those organisations to consider the issue of EPIRBS on sail training vessels.

- 3) I note submission 20 in relation to the designer, ABS and the builder. I have already dealt with the builder. It would be inappropriate to be critical of either ABS or Farr on the evidence before me, and without those entities being invited to appear as an interested party. The expert evidence is, however, that there was a combination of design, build and ABS requirements that resulted in the hull shell being inadequate for this type of keel. This is of concern to me, assuming that there are other yachts constructed and designed similarly. Accordingly I propose to make a **Recommendation pursuant to Section 22A, Coroners Act 1980.**

Finally.

The families of the deceased have sat patiently through this inquest. Ideally I would not have given judgment today. I have done my best to examine the relevant issues in relation to the capsizing of the Rising Farrster. I hope that my concluding of the inquest today will assist them to continue through the long process of grieving.

I would particularly like to thank Ms. Helen Roberts as Counsel Assisting. With Ms. Lazzarini they have come to grips with what has turned out to be one of the most complex inquests I have dealt with. Ms. Roberts has been invaluable to me.

It is also appropriate to commend Detective Senior Constable Labeeb Saad and Sergeant David Upston, who compiled a complex brief and attended to ongoing issues appropriately.

Lynne Challinor of the NSW Police Computer Training Unit placed the brief of evidence onto CD-Rom, a task which took much of her time.

Finding.

That Linda Elizabeth Yarr died on 1st April 2001, in the Tasman Sea, off Evans Head, by drowning, when the keel of the vessel on which she was a sail trainee, (Rising Farrster), separated from the hull causing the vessel to capsize.

Charlotte Ophelia Lenas died on 1st April 2001, in the Tasman Sea, off Evans Head, by drowning, when the keel of the vessel on which she was a sail trainee, (Rising Farrster), separated from the hull, causing the vessel to capsize.

Recommendation.

- 1) That the Waterways Authority of New South Wales seeks amendment to the *Commercial Vessels Act 1979 (NSW)* and/or other relevant legislation to enable regulation by that Authority of sail training vessels regardless of whether they are on an interstate voyage within the current meaning of that term.
- 2) That the Australian Yachting Federation, in conjunction with the Yachting Association of NSW, and yacht clubs endeavour to contact owners of light displacement yachts fitted with fin keels built subject to pre 1994 ABS approval, to provide them with a précis of my summing up, findings and recommendations at inquest in order that appropriate decisions can be made by owners as to checking and/or modification of yachts.
- 3) That the Waterways Authority of New South Wales as soon as possible amends the 1998 Exemption Order so that all offshore training vessels be required to comply with the *Commercial Vessels Act 1979* in relation to construction and survey.

(John Abernethy)
NSW State Coroner,
Glebe. NSW.
31st October 2003.