New Zealand Naval Architect

The New Zealand Division of the Royal Institution of Naval Architects Issue 34 July 2009

Attending the 19th Chesapeake Sailing Yacht Symposium

By

By Frederik Gerhardt

St. John's College, Annapolis MD.

In December 2008 I was awarded a RINA (NZ)-HYPD travel grant to present a paper at the 19th Chesapeake Sailing Yacht Symposium (CSYS). One day in March I left sunny Auckland and travelled to cold, pre-spring Annapolis on the east coast of the U.S.

The small town of Annapolis is the capital of the U.S. state of Maryland and is situated on the Chesapeake Bay about 50km east of Washington D.C. Annapolis was the temporary capital of the United States in 1783–1784 and is home to the United States Naval Academy (USNA) and St. John's College. The symposium considers itself the "world's premier technical forum dedicated to advancing the study of the art and science of sailing yacht design technology."

This year researchers from eight different countries around the world presented 14 papers on topics ranging from designing C-Class catamarans to assessing the wind-heel angle relationship of square-rigged ships.

Professor Miller (USNA), David Pedrick (Pedrick Yacht Designs) and Gram Schweikert (Pedrick Yacht Designs) gave a very interesting paper on the development of the new Navy 44 sail training craft. The current Navy 44 Sloop was designed by McCurdy & Rhodes in the early-80's as a replacement for a fleet of mahogany and later fibreglass yawls designed by Bill Luders. The Navy 44 sloop has proven to be very successful, being seaworthy, strong, and stable in the worst weather; fast and comfortable and with the rig and interior arrangement planned to meet the objective of midshipmen training.

In 2001 Pedrick Yacht Designs was asked to develop the next

Note from the Editor.

Welcome to our July issue of the New Zealand Naval Architect. We have had an influx of new council members. Find out more about them on page 6. Ian MacLeod has taken on the vacant role of President. We welcome them all, and you will be hearing from Ian, when "The President's Column" returns in the November issue.

We have been looking at the way we distribute the NZ Naval Architect. On the back page we outline how the magazine is currently distributed and how we might distribute it in the future. We are always looking for ways to best serve you, our members, so please take a few minutes to look at the options and email us if you wish to receive the NZNA electronically.

Helen Quekett

Inside this Issue

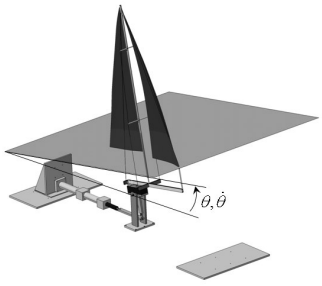
(Continued from page 1)

generation of the training craft. The paper presented at the CSYS highlighted some of the peculiarities of having the Navy i.e. the government as a client as well as the fact that the

The new Navy 44.
Courtesy of Jim Mumper.

Navy does not consider the 44s as yachts but rather as work boats outfitted to an industrial level to fulfil their role as training vessels. The current Navy 44s are used on 250 days/year and have several major collisions per month (on average that is...). Consequently the factor that determined the dimensions of the topsides GRP-laminate was impact strength. Or, to be more precise, the ability to withstand being hit by the bow of another Navy 44 sailing at 6 knots!

The emphasis of the conferences however seemed to be on Computational Fluid Dynamics and on performance prediction of yachts, especially in the context of dynamic effects. Professor Fossati (Politecnico di Milano, Italy) gave a truly interesting paper on the unsteady aerodynamics of a yacht that pitches in waves. He used a rigid model of a Mainsail-Genoa combination and oscillated this rig in the wind tunnel measuring the aerodynamic forces at the same time. For realistic pitching amplitudes his results show that the lift and drag polars of the steady case distort into symmetric hysteresis loops.

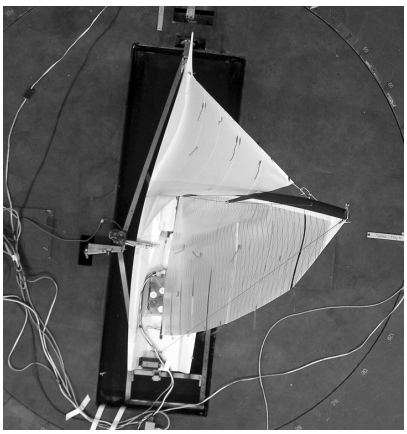


Oscillating rig used in the Milano wind tunnel. Courtesy of F. Fosssati, Politecnico di Milano.

Bill Beaver (USNA) and John Zseleczky (USNA) talked about full scale force measurements on a hydrofoil International Moth.

The International Moth class has experienced a resurgence of interest and publicity associated with the adoption of hydrofoils and the performance improvements these foils have brought. The presented paper documented a series of full scale tests intended to characterise some of the major parameters impacting the performance of a foiling Moth. The lift and drag of various home built and commercial foil configurations was determined from towing tank experiments. Furthermore the hydrodynamic drag of a hull was measured at various displacements, and the aerodynamic forces were measured for a hull and racks.

In my own paper I looked at sail forces during tacking manoeuvres. Over the last decade interest in dynamic sailing simulations has grown significantly. One reason for this is that match races are usually won or lost on the upwind legs. A tacking duel in an America's Cup race can include more than 30 tacks per leg. Consequently a yacht that has been optimised to lose as little speed as possible during a tack has a huge advantage over its competitor.



Measuring forces on flogging (top) and backed (bottom) sails in the University of Auckland's wind tunnel

With this in mind a number of Dynamic Velocity Prediction Programs (DVPPs), which allow studying the behaviour of a yacht while tacking, have been developed. The aerodynamic models used in all of today's DVPPs suffer from a lack of available data on the behaviour of the sail forces at very low apparent wind angles where the sails are flogging. The University of Auckland's Yacht Research Unit therefore carried out a series of quasi-steady tests in the Twisted Flow Wind

Tunnel. In those tests we measured aerodynamic force and moment coefficients for apparent wind angles between +30° and -30° and also investigated different ways of handling the headsail during tacking (e.g. Genoa flogging or backed).

One of the findings is, that a backed headsail does not necessarily produce more drag than a flogging headsail but increases the beneficial yawing moment pushing the yacht through the tack significantly.

The main goal of the tests was however to acquire a more or less generic set of force and moment coefficients that can be used in a DVPP-analysis of different tacking scenarios. A table containing such coefficients can be found in the conference proceedings.

The quasi-steady approach used in the wind tunnel tests (i.e. changing the apparent wind angle in discrete steps) does not account for unsteady effects like the aerodynamic inertia in roll due to the "added mass" of the sails. Added mass or virtual mass is the inertia added to a system because an accelerating body must "push aside" and hence accelerate some volume of surrounding fluid as it moves through it.

In the second part of my paper I estimated the added mass moment of inertia of a mainsail using two-dimensional "strip theory". It was found that the added inertia is of the same order of magnitude as the inertia of the keel bulb and will therefore considerably influence the tacking behaviour of the yacht. To further quantify the added inertia experiments with a mainsail model were carried out. Results from those tests were presented at the end of the paper and indicate that the added inertia is about 76 % of what the two-dimensional strip theory predicts. Qualitatively and quantitatively this reduction agrees well with what analytical, three-dimensional theories from the literature predict.

It follows that the difference between predictions based on strip theory (2D) and measured (3D) values of the added inertia in roll is probably too large to be neglected when analysing the tacking performance of yachts and that one should improve the way that added inertia is currently calculated in DVPPs.

Many more papers were given at the symposium and can be found in the conference proceedings available from www.csysonline.com.

Frederik is a Postgraduate Student, Yacht Research Unit, The University of Auckland.

He says" I would like to thank RINA NZ for the generous grant that made it possible for me to attend the conference."

CPD – Discounted Project Management Courses for RINA Members

RINA NZ have managed to negotiate discounted training courses for our members with internationally recognised Project Management training company Project Plus. Training courses are offered in Auckland, Wellington and now Dunedin and range from project management fundamentals through to certification courses.

Project Plus is a Registered Education Provider (REP) with the Project Management Institute in the U.S (PMI) and registered with the New Zealand Qualifications Authority (NZQA). You can choose from a range of training courses to suit your requirements and create a modular project management programme suited to your sector and your organisation.

Courses are run by professionally qualified trainers with extensive New Zealand and international experience in project management. They give you access to current, world-class 'coal -face' experience.

For more information check out the Project Plus website www.projectplusgroup.co.nz and click on the training schedule to find out where and when projects are being run.

RINA members receive a 10% discount on the standard price (excluding certification programmes). Book your training online through the Project Plus website and use voucher code RINA001 to obtain your discounted rates.

s.y. *Fritha* – "A Touch of Majesty"
by
Mike Kay

Fritha under sail

Built in Auckland, New Zealand in 1983-84-85 by McMullen and Wing, ***Fritha*** is a Murray Peterson Brigantine. The Peterson hull was designed in 1937 and was able to take several rigs. The Brigantine rig was chosen for ***Fritha*** because of its challenge, majestic beauty, and the opportunity it presented for highly skilled riggers to express their artistry.

Fritha is built of only the finest materials. She is carveled planked with 1 ¾ inch Kauri planks over six inch square kauri double sawn futtock frames. Every piece of timber which was bent into place was first steamed and clamped into position until it was completely cooled. Additionally, her construction was ahead of her time with the use of laminated hull structures.

Prior to her coming to "the States" ***Fritha*** embarked on a 17,000 mile journey in 1989, sailing the Pacific with visits to Fiji, Guam, Japan, Alaska, west coast USA, Hawaii, Christmas Island, the Cook Islands, and a return to her (then) homeport of Auckland, New Zealand. (The first leg of the trip was the Inaugural Auckland – Fukuoka Yamaha Cup race.)

Acquired in 2006 by Northeast Maritime Institute, ***Fritha*** has undergone extensive preservation maintenance. Serving as a sail-training vessel for the Institute, bronze safety rails have been added around the entire vessel. The deck has been sanded and recaulked. New paint and bright work adorn her top sides. Masts and spars have been refinished. Below deck a complete replacement of bedding and carpeting has taken place.

Fritha's new life as the flagship of the Institute is full and vibrant. She has sailed the U.S. east coast with frequent visits from her homeport of Fairhaven, Massachusetts to Newport, Cape Cod, Martha's Vineyard and the Elizabeth Islands, and Nantucket. She has trained tugboat captains and crews in the art of sailing. She has journeyed to Bermuda where she helped in the training of young Bermudians in various aspects of formal maritime education.

Transom detail

And, most recently, she has been the basis of the educational platform for "The Fairhaven Project", an NMI and U.S. State Department effort designed to foster leadership development among young adults through maritime education and training programs that integrate traditional sea-going experiences with ocean science, technology, and media to augment conflict resolution and team-building exercises.

In the summer of 2008 three Palestinian and three Israeli youth called ***Fritha*** 'home' for three weeks as they learned about each other, their different cultures, politics and how to co-exist. The platform of the s/v ***Fritha*** served to show that by working together much can be accomplished.

The sea, salt water, and sail have magical powers and lure us all to a calm and tranquil place. So it is aboard ***Fritha.***

Photos kindly reproduced with permission from the Northeast Maritime Institute.

Contracting Out of the Commissioning Rule
By
Clendons, RINA (NZ) Honorary Solicitors.

With the possible repeal of the Copyright 'commissioning rule' uncertain, a case this last December illustrated the risk when a designer's terms of trade do not clearly raise the issue. It appears that actual practice can also override the terms as written, when they fail to contract out of the commissioning rule.

Pending the adoption of Copyright Amendment laws, the current 'commissioning rule' provides that copyright belongs *by default* to the commissioner of a boat/hull design, and not the architect (unless the parties specifically agree by contract that the commissioning rule does not apply).

Many architects/designers have been caught by the commissioning rule and unintentionally parted with ownership of copyright in their design. The proposed law change will – if enacted – eliminate the 'commissioning rule'. In the meantime, the importance of unambiguously contracting out of the commissioning rule was recently illustrated by *Maxim Group Ltd v Jones Publishing Ltd & Ors* (Auckland High Court, December 2008).

Maxim created the *"look, feel and vibe, layout, imagery, typography, format, photography and production"* of a number of magazines for Jones Publishing, including Dish Magazine. Although Maxim may have contributed original photography and writing, or individual elements of graphic design, no evidence of this was submitted to the Court. Even if Maxim had done so, and these elements were considered original enough to attract copyright protection, then contracting out of the commissioning rule would have been essential to ensure Maxim's ownership of that copyright.

Maxim's terms of trade *did* stipulate that the client would be licensed to use the design only for the intended project, and only once payment had been received, with all creative work retained as Maxim's property. However, Maxim had permitted the Jones group to publish the magazines *before* payment had been received, and often before invoicing (an understandable occurrence when racing toward a project deadline). Maxim had effectively authorised the magazines' publication and could not now claim copyright infringement. Not only did this pattern of trading contradict Maxim's terms of trade, but there was no evidence that the Jones group had viewed or accepted these terms in any event.

The importance of clearly raising the issue of the statutory commissioning rule, and contracting on terms so that the architect/designer retains copyright, cannot be overstated. *Maxim v Jones* in particular, demonstrates the need to ensure that:

- Terms of trade are very clear about copyright ownership (exclude the commissioning rule and are not dependant on variables such as payment);
- Those terms are accepted by the client (indicated by a signed agreement); and
- The parties act consistently with those terms of trade.

Any departure from the written agreement should be clearly recorded and confined to a particular event, so as not to override the written terms of trade. Ultimately, these terms should minimise the risk of ambiguity by (where possible) contracting out of terms implied by statute.

CLENDONS
BARRISTERS & SOLICITORS

James Carnie (Principal) and Stuart Bradshaw (Solicitor) are specialists in intellectual property law at Clendons: See www.clendons.co.nz, or call (09) 306 8000.

Your New Council Members

Ian MacLeod

Ian was born in Inverness, Scotland. And graduated Strathclyde University, Glasgow 1995 with BEng (Hons) Naval Architecture & Small Craft Engineering.

He joined Lloyd's Register September 1995 as trainee surveyor where he had postings in Bahrain, Copenhagen and Glasgow before going to sea for a month on a small bulk carrier. His first long term posting in Piraeus, Greece for almost 5 years, moving to Dubai in 2001 and then to New Zealand in December 2003. Ian completed 5 more years with LR in Auckland looking after superyachts as well as the RNZN's new Inshore Patrol Vessels. Ian left LR in January 2009 to join VT Fitzroy as Engineering Consultancy Services Manager fulfilling the role of company Naval Architect while also establishing a Marine Engineering Consultancy company.

Ian is a Member of RINA, a Chartered Engineer and is also a Member of IPENZ, IMarEst and FEANI European Engineer (Eur Ing)

Ian lives on the North Shore with his wife and two sons and time allowing enjoys windsurfing, surfing, kayaking and competing in triathlons.

Mike Kay

After gaining academic, heavy engineering and sea-going experience culminating as a chief engineering officer on board British refrigerated cargo and passenger ships, Mike held senior marine technical management positions ashore, including a two-year contract as General Manager, Papua New Guinea Government Ships Authority. Upon returning to New Zealand, he entering into sole practice as a consulting marine engineer. The practice provided opportunities for extensive wide-spectrum experience, such as appointments to the principal classification societies as non-exclusive engineer and ship surveyor, accident investigation and international consulting assignments, including overseas aid projects. He currently acts as a nautical inspector/ISM/ISPS auditor for the maritime administrations of Liberia, the Marshall Islands and Vanuatu.

Mike is an Eur.Ing. (Ingénieur Européen (Fédération Européene d'Associations Nationales d'Ingénieurs, Brussels) [EU Professional Engineer Registration] and UK Chartered Engineer. As well as being a Fellow of this Institution, Mike is a Fellow of the Institute of Marine Engineering, Science & Technology. He is an alumnus of Auckland University graduating M.Mgt. and Dip.Prof.Ethics.

Professor Richard Flay

Richard has been an active club sailor in small centreboard yachts and later in small keel yachts. He studied Mechanical Engineering at the University of Canterbury graduating with a BE(Hons) and PhD in the 1970s. After that he took up a National Research Council Visiting Fellowship and carried out postdoctoral studies at the Atmospheric Environment Service in Toronto, Canada for 2 years. His research there was mainly focused on Wind Engineering, making extensive use of a large Boundary Layer Wind Tunnel. Richard Flay then joined DSMA as an Aerodynamic Design Engineer, and designed wind tunnels and aerodynamic test facilities. After 4 years at DSMA, he returned to NZ and joined the University of Auckland as a

Senior Lecturer in 1984. He is now Director of the Yacht Research Unit, and Deputy Head (Research) of the Department of Mechanical Engineering.

Anthony Stanton

Tony grew up in Auckland as part of a sailing family, and spent a fair proportion of his childhood in boats of some kind or another. After graduating from Auckland University's School of engineering, he deciding the heating and ventilation design was not for him and went out to find a job in the New Zealand Marine Industry designing boats. He was lucky enough to get a job with the late Malcolm Tennant designing multi-hulls for the next seven years. He worked on a wide range of projects from guys building sailing trimarans in the South American jungle to luxury powercats. In 2006 he moved to High Modulus, as a senior engineer he has been involved with getting new engineering projects through the door. When he is not working on boats he is at home working on boats. At present that means restoring a Smith 34' classic cruising yacht which is set to hit the water this summer after a long break on the hard stand.

Forthcoming events

Please watch your **Inbox** for the latest events listings. If you do not receive email please pass on your details to to the division and we will ensure you hear about our talks.

Site visit: ***Hall Spars***

Date: ***August 13th***

Time: ***TBA.***

Hall Spars & Rigging was founded by Eric Hall and Phil Garland in 1980 in the US. In December, 2007, Hall acquired the factory in Auckland. Hall spars have been used on many yachts including America's Cup yachts and the Volvo Ocean racing yachts.

RINA NZ Division Council News

The annual general meeting for the New Zealand Division of RINA was held on 30 April. Division Business included the election of three new council members, president's report, and treasurer's report.

The three council members elected at the AGM were Mike Kay, Tony Stanton and Ian MacLeod. Richard Flay was nominated at a later date. Ian MacLeod was elected as President at the next council meeting. You can read about your new council members in this issue.

We would like to pass on our best wishes to John Harrhy who stepped down from the council.

The AGM was followed by a talk by Tony Hambrook of Alloy Yachts. He gave a very interesting talk about how he got into yacht design and the influences that got him to be where he is now, the Managing Director of a successful company building world class superyachts.

Your Magazine

We are looking at the way we distribute the NZNA. At present we print out 650 copies of our magazine. 215 are sent by post to our members and the remaining are given to the MIA for posting out to their members. The MIA no longer wish to do so many mailouts and so we are looking at distributing the NZNA to their members as a link to the RINA NZ website or as an attached PDF. This would save both mailing and printing costs and a few trees!

Would this method suit you? Do you prefer a hard copy?

If you would prefer the next edition of the NZNA to be emailed to you, please email us at **secretary@rina.org.nz** with the following in the subject line.

Send me the NZNA electronically.

If we do not receive an email from you will continue to receive a hard copy in the post.

The Royal Institution of Naval Architects (New Zealand Division) would like to acknowledge the continuing support of Clendons as our Honorary Solicitors.

Go to *www.clendons.co.nz* for free of Terms of Trade and Contract downloads

The New Zealand Naval Architect is published three times a year.

All correspondence and advertising should be sent to:

The Editor
The New Zealand Naval Architect
C/o RINA New Zealand Division
PO Box 91395
Auckland Mail Service Centre
Auckland

Email: hquekett@xtra.co.nz

Opinions expressed in this newsletter are not necessarily those of the Institution.

Administration and Membership enquiries

Email: membership@rina.org.uk

Web Page: www.rina.org.nz

UPDATE: phillmaxwell@yahoo.co.nz

NZ Council: