



New Zealand Naval Architect

The newsletter of the New Zealand Division of the Royal Institution of Naval Architects

Issue 28 • May 2007

Novel Hydrofoil Application for Wakeboarding

by

Sarah Holdem and Jason Herrold



A typical aerial stunt by a wakeboarder

The question of how to maximise the wake size that comes from a speedboat is one that has long plagued wakeboarders. Jason Herrold, a part four mechanical engineering student from Auckland, thought up an idea that presents a possible solution to the problem.

Traditionally, ballast weight has

been positioned inside the bow of the boat to lower the hull in the water and create a larger wake that enables wakeboarders to perform more elaborate aerial stunts. The ballast is usually made up of tanks filled with water.

Although this extra weight is not a challenge for large, modern speedboats, the typical fourteen-

foot Fireball from the 1970s will struggle to reach a planing condition with the added weight in the hull, because the extra weight results in a larger wetted area and consequently increased drag. Herrold and his project partner, Sarah Holdem, realised that a hydrofoil could be a more efficient way to increase the wake size.

Herrold and Holdem, the winners of the Student Naval Architecture Prize in 2006, undertook research into a hydrofoil that would be able to create a larger wake on a

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A Word from the President



I believe that it's been an eventful year. The New Zealand Division organised evening technical meetings for members and gave their time supporting Massey University degree program and BITO.

The Marine Design Course at Massey is accredited by the RINA and enables corporate Membership of the Institution for students successfully completing the course and after appropriate work experience. The Division is in consultation with Massey and has proposed two Members to sit on the Academic Board. The course does not have its full

complement of professional teaching staff at this time and this unlikely to be resolved until the end of 2007 when the new Dean of the faculty is appointed. Until then further appointments are on hold. Bruce Woods is still committed but has signalled the importance of the further staff member. It is important that Massey retains its accreditation.

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The Division has found it more difficult to arrange industrial visits for our Members because of the pressure of work and commitments on the industry but a plea is made to the Industry to recognize the importance of this function.

Vosper Thornycroft/Babcock has maintained its support for the student awards at Auckland University which has been run successfully again in 2006 and now the NZ Division Council has developed a post graduate student award at Auckland University funded by the High Performance Yacht Design Conference. The RINA Division Council is also expanding the student award scheme to other institutions with significant input from Formulation and Alloy Yachts as industrial sponsors.

The well developed and extensive marine library that had

been kept and maintained at IRL is installed at the Maritime Museum and while there is free access to this library to RINA Members, members of the public and MIA may browse this resource on entry to the Museum.

Attendance at the annual Xmas Dinner at the RNZ Yacht Squadron is expanding in numbers each year and was, once again, a great success.

Many of the more senior Members of Council reached the limit of their Council service in 2006, including Vice President Helen Quekett. Of note was the addition to Council of five Student Members from Massey University and there is a healthy sprinkling of active boat designers and Naval Architects on the current Council. It has been a difficult year for our Council Members to have enough time to contribute their time and on behalf of the Division it is timely that I

express my thanks.

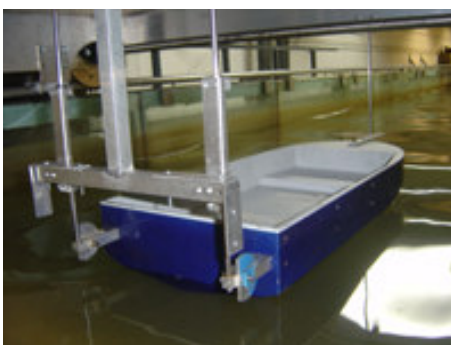
As a professional Institution we need to be aware of the progress being made through MIA of possible construction facilities at Hobsonville backed up with refitting berths at Westhaven. I have, as a member of the MIA Executive, been supporting this initiative and can only say that the future of these projects is promising.

My objective as President is to focus on the activity and support of practicing boat designers and Naval Architects as I believe that we can build a really successful Marine Industry based on the remarkable talent of our current Kiwi based designers. The 2007 AGM gave some of these designers the opportunity to describe their talents and air their views on what it is like to practice in NZ.

John Harray

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wakeboarding boat. The hydrofoil acts in a manner opposite to a typical hydrofoil by creating a down force that pulls the boat into the water. This creates a similar effect to the ballast, but, as Herrold points out; "The real advantage of the hydrofoil would lie in its convenience and the ability to adjust the magnitude of the down force during different parts of the boat's transition from



The model-scale boat

displacement to planing, thus still giving the boat the ability to reach planing". It also means that the wake size and shape can be altered to cater for wakeboarders of various levels of experience.

When the idea was first visualised, Herrold and Holdem realised that to test the ability of such a device, full or model-scale testing would need to be carried out. For that reason, model-scale testing was performed in the Civil Engineering flume on a one-eighth-scale model crafted from balsa wood and fibreglass. A six-component force balance was used to measure the drag force acting on the 'hull', while the wake size and attitude of the hull were measured using video cameras to compare the hydrofoil and the ballast weight.

The results obtained by Herrold

and Holdem show that the hydrofoil yields a comparable performance to the ballast weight in terms of wake size for a given drag force. The two were very pleased with the results, and believe that this offers the wakeboarding fraternity with a cost-effective alternative to ballast weight.

Herrold and Holdem received the 2006 RINA-Babcock prize. The prize is awarded to student members in their final year of a Bachelor of Engineering at the University of Auckland.

Do you think you can write an article like this?

If you can, contact the editor.

hquekett@xtra.co.nz

Catamarans, an Underrated Offshore Solution

By

John Harrhy

Catamarans need to be seriously considered for offshore operations as they will provide more working deck space, greater deck loads, more accommodation and superior habitability than a mono-hull and for less cost. They have proved that they can launch and recover underwater vehicles in significantly higher sea states than mono hulls. Comparably, to provide the same deck space, same deck capacity and accommodation as a mono hull, the capital cost of the catamaran will be 2/3rds that of the equivalent mono hull and fuel consumption on station will be half.

The drawing in figure 1 shows a 50m option designed as an offshore support vessel. The important features developed for the catamaran concept is 425m² (4570ft²) of useable deck area, 300 tonne deck capacity with practically no restrictions on placement of load, and accommodation for 53 in secure comfortable cabins. The average fuel consumption, including provision for 8 days transit is approximately 5 tonnes/day.

Capability operating ROVs and Diving Bells

A startling lesson that was learnt with the DP catamaran, SeaWorker, was that, despite its relatively small size, a working class ROV could be launched and recovered in the Cook Strait, in a sea state higher than any mono hull had been able to achieve. This was because a mono hull tends to launch and recover either through a moon pool which experiences pistoning of the sea within the pool or over the side with problems arising from roll and wave action. Vehicles launched from A frames at the transom of mono hulls experience high pitch accelerations because of the large distance from the centre of gravity.

The moon pool provided for SeaWorker through the tunnel structure is on the centreline aft of amidships and does not suffer from pistoning nor is it influenced by rolling or pitching motion. Further lessons learnt through the use of SeaWorker were the facts that height of deck load was immaterial, ie the load could have been placed on the flight deck, and that high lift cranes could be

distributed anywhere around the periphery of the working deck increasing the versatility of its layout.

Experience has shown that modest sized catamarans can continue to operate in seas up to sea state 6.

Hull form

The hulls being long and slender are suitable for efficient propulsion at speeds up to 20 knots. The hulls must be designed to minimise lateral as well as fore and aft resistance whilst hovered on station which results in specific solutions.

Bow and transom shapes are designed not only to reduce ahead resistance but must also be designed to reduce rotational resistance, ie yaw, to permit the vessel to rotate a full 360 degrees in under 200 seconds. This rotational speed is also a function of thruster capacity, but minimising the resistance minimises the sizes of the thrusters and reduces on-station and capital costs. These features, if designed correctly, will increase pitch damping and reduce pitch

Figure 1—50m Catamaran



LOA 50.5m
Beam 16.6m
Depth 6.0m
Draught Range 2.8m to 3.6m
Deck Area 425m²
Accommodation for 53 Air conditioned

Deck Capacity 300 Tonnes
Cruise Speed 11 Knots
Max Speed 13.5 Knots
Endurance 8 days transit
40 days station
Hover in seastate 6

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Catamaran—Seaworker

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amplitude.

Habitability and Overall hull form

To be successful in habitability terms it is important that beam is moderated otherwise unacceptably high roll accelerations are introduced. A moderate beam together with fine hulls leads to reduced pitching motion and acceptable rolling motion and our experience, which is now more than 10 years, is that this combination has proven to be highly successful. JHCL developed a motion prediction program, QSDM, for predicting catamaran motions which has been verified with physical tests and has shown that catamarans can meet the habitability standards of OHSAS 18001. Their research has shown that catamarans can provide a hovered platform where the crew

will experience less overall motion than a mono hull.

Accelerations, giving rise to nausea, are a function of the distance of the observer from the centre of gravity of the vessel. In general the height of catamarans is less than mono hulls, length is comparable, but beam will be greater. Accelerations arising from pitch and heave can be shown to be less because of the finer hulls and lower water plane area.

Yaw accelerations are controllable and are not a significant factor but the control of yaw does have a significant impact on rolling motion.

Rolling of catamarans can be reduced by specifically designed dynamic positioning systems that reduce motion arising from oblique waves which result in

roll reduction by reducing the RMS yaw amplitude. The catamaran plan form with large transverse distances between thrusters is particularly effective at controlling yaw, but the dynamic positioning software must be a generic catamaran solution such as SeaTamer® and not one adapted from a mono-hull solution.

The layout of a modern DP catamaran permits accommodation closer to the centre of gravity (the centre of motion) both vertically and longitudinally. The lower positioning of accommodation and working spaces possible with the catamaran reduces the transverse component of roll acceleration. This leaves the vertical component which reduces to the heave amplitude of an individual hull arising from an oblique wave system. However this can be largely eliminated with a DP system that can adequately control yaw

Propulsion systems

Plant rooms can be located at working deck level in the superstructure away from accommodation and control spaces. The sites of plant rooms permit the optional use of air cooled engines which in turn eliminates the installation of a raw water cooling system.

Retractable azimuth bow thrusters do have some drawbacks. However to meet high thrust demands at the bow to control yaw retractable tunnel thrusters are essential, as their greater immersion permits greater thrusts and careful relative angling between the port and starboard tunnels overcomes interference problems. A further advantage of the tunnel thruster solution is the fact that thruster

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noise is screened from the vessels underwater transducers.

Non retractable azimuth stern thrusters are used to exploit the remarkable facility of a DP catamaran to hold station. Two azimuth stern thrusters operating alone can maintain the position and heading of a catamaran because of the transverse separation between them which provides a rotational component as well as a vectored component. Bow thrusters increase performance capability and

introduce a high degree of redundancy as the catamaran can fall back onto just two of any thruster combination as long as one of these is an azimuth thruster.

The diverse prospect of catamarans in the offshore role will result in them becoming dominant for offshore support operations, surveying and inspection whether by divers or ROVs.

John Harry is the director of JHCL and president of the NZ Division of RINA.

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The Opening of the Auckland Traditional Boatbuilding School



AUCKLAND TRADITIONAL BOATBUILDING SCHOOL

Classic Yacht Association Chairman, Tony Blake, formally declared the Auckland Traditional Boat Building School open in a brief, informal ceremony at the School's premises at the marine industry precinct at Hobsonville on 31st March. Tony expressed great pleasure that the CYA's initiative, in promoting the establishment of the School, had borne fruit so rapidly and so effectively. ATBS Chairman Ron Jamieson praised the efforts of ATBS Trustee Robert Brooke who established the technical aspects of the curriculum. John Street of the Classic Yacht Charitable Trust spoke warmly of the School's aims and successes to date.

There was a very large crowd with many of the most respected designers and constructors in attendance alongside a large CYA contingent. All were delighted that a further major advance is being made in ensuring that the unique traditional Kiwi wooden boatbuilding skills are not lost, but are passed on to upcoming generations.

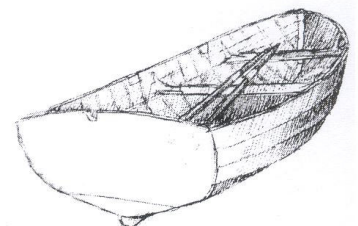
The School was open for inspection and seemed to create great interest with its classrooms, lofting room, workshop, library and display of early centreboarders.

The ATBS aspires to:

- The teaching of boatbuilding skills through workshop and classroom activities contributing to the maintenance of the great traditions of New Zealand boatbuilding.
- Establishing and maintaining a library and research facilities for assisting in the education of boatbuilding and allied trades.
- Reaching out to all members of the maritime community and general public to take an interest in ATBS activities.

The ABTS commenced classes in February, these included apprentice off-job training with Alloy yacht Ltd apprentices. Other courses include hobby boatbuilding and an introduction to Boatbuilding Apprenticeships for school leavers.

For more information about ATBS contact Robert Brooke, info@atbs.co.nz



Copyright Amendment Bill 2006

By

James Carnie and Terence Lau

The Copyright (New Technologies and Performer's Rights) Amendment Bill was introduced into Parliament on 8 December 2006. The Bill aims to clarify the application of existing copyright rights in the digital environment and take account of international developments. It also seeks to make the Copyright Act more technology-neutral.

Some of the key amendments made by the Bill include limitation of liability of internet service providers (ISPs) for copyright infringement in certain circumstances; protection for technological protection mechanisms (TPMs) but also safeguards for the exercise of permitted acts where TPMs have been used; and protection for copyright management information (CMI).

Limitation of ISP liability for copyright infringement

The Copyright Act gives copyright owners exclusive rights that allow them to control the exploitation of works. If an ISP, in the course of providing internet services, does any of those acts without permission of the copyright owner, it is committing a primary copyright infringement. Secondary copyright infringement occurs when an ISP does not itself do any of the restricted acts, but possesses or distributes an infringing copy of a work or sends it through a telecommunications system.

Consistent with changes to equivalent legislation in other countries, the Bill limits the potential liability of ISPs for both primary and secondary copyright infringement in certain circumstances. In respect of primary liability, the Bill provides that an ISP is not liable where it merely

provides the physical facilities to enable communication to take place. An ISP will not be secondarily liable for copyright infringement in cases where it caches and stores infringing material if it does not know or have reason to believe that the material is infringing and acts within a reasonable time to delete it or prevent access to it upon obtaining such knowledge.

Increased protection for TPMs

TPMs are hardware or software used to prevent the unauthorised access, reproduction and distribution of electronic works.

The Copyright Act currently prohibits creating and dealing in de-

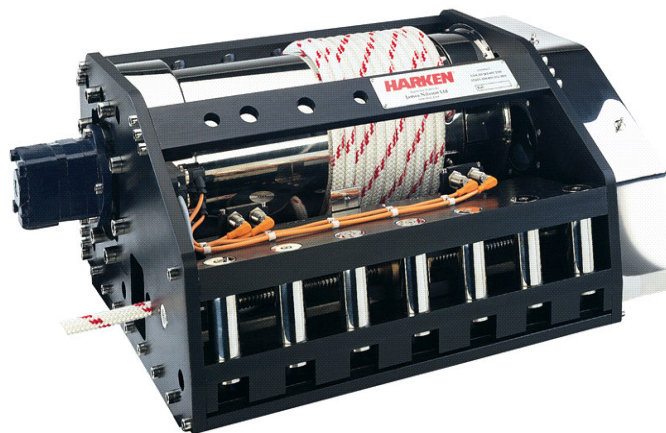
vices, means or information designed to circumvent TPMs if it is known that circumvention would lead to the making of infringing copies. However, while actual circumvention of TPMs is not prohibited, unauthorised use of the material that is facilitated by circumvention is.

The Bill expands the current provisions by protecting all rights provided to copyright owners, including communication, not just copying. The Bill also introduces an offence for commercial dealing in devices, services or information designed to circumvent TPMs. If convicted the offender could face a maximum fine of \$150,000 or 5 years' imprisonment or both. Importantly, how-

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ever, the Bill enables the actual exercise of permitted acts where TPMs have been applied.

By way of comparison, the US equivalent legislation (the Digital Millennium Copyright Act or DMCA) also makes circumvention of TPMs an offence. The DMCA has been criticised by some as having a severely restrictive effect on research and innovation, despite the various statutory exemptions from this offence, including fair use of copyright works, reverse engineering and encryption research.

It should be noted, however, that the New Zealand Bill contains much weaker prohibitions on circumvention of TPMs. Firstly, actual circumvention of TPMs is not prohibited but only the creation and dealing in information, means or devices designed to circumvent. Secondly, the Bill continues to link circumvention to infringement, and it is only an offence if a person knows that circumvention will or is likely to

lead to copyright infringement.

Protection of ERMI

CMI is information associated with digital works that identifies content protected by copyright and the terms and conditions of use of such content. The Bill introduces protection against the intentional removal or alteration of CMI. However, this protection does not extend to the functions of CMI that tracks the use of copyright material.

The Bill also introduces an offence provision for commercial dealing in works where the ERMI has been removed or altered. If convicted, the offender could face a maximum fine of \$150,000 or 5 years' imprisonment or both.

Other changes

The Bill provides a limited exception to the reproduction right of transient copying undertaken by computers or communication networks as a result of an automatic or inevitable technical process. It also introduces new

exceptions for format-shifting of sound recordings for private and domestic use, and for decompilation and error correction of software.

The Associate Commerce Minister Judith Tizard has commented that the Bill is supposed to provide more clarity and transparency on how the Copyright Act works. She hopes that the Bill will increase incentives for investment in creative industries, information communication technology development and new business models for the delivery of copyright works.

The Associate Minister is encouraging all interested parties to make a submission on the Bill when called for by the Select Committee.

James Carnie is a Partner, and Terence Lau is a Solicitor at Clendon Feeney. Clendon Feeney is an Auckland based law firm, specialising in copyright and intellectual property issues. The firm is a sponsor of RINA(NZ).

NZ Division Library

The library has moved to the National Maritime Museum.

To access the library members do not need to pay the museum entrance fee. At the entrance show any form of ID and you will be directed to the library.



A full list of books will be available on the RINA NZ website.

AGM 2007

The 2007 AGM was held at the MIA offices in Westhaven and was attended by over 30 members and guests. Reports from the Treasurer and President were presented and the new council determined. Graeme Finch stood down from the council after completing his term and Daniel Upperton has resigned having taken up a position in Nelson. John thanked them for the time that they have given to the Division. Susan Lake, Roger Hill, Nic de Waal, John Harrhy, Dima Ivanov, Jarrad Hale, Philip Maxwell, and Chris Moors will continue their term on the council and will be joined by Brett Bakewell-White. Helen Quekett gave a brief summary of the results from the survey carried out at the end of last year.

In his president's report, John Harrhy announced that an HPYD/RINA award is being created for a post graduate scholarship at Auckland University, it will be available in the near future. This award has come about due to the success of the previous HPYD conferences and the Division's desire to support students pursuing a career in Naval Architecture.

The AGM was followed by a presentation of their work by designers and naval architects. The panel included Angelo Lavranos, Nic de Waal, Brett Bakewell-White, Richard McBride, Roger Hill and Ted Ewbank, and was chaired by John Harrhy. It was followed by a vigorous discussion on how the Division could best support NZ designers and Naval Architects.

Division Survey Results

Thank-you to the people who responded to the survey. We had 63 responses from our 160 members so the results cannot be conclusive but have given us an indication of how our members feel the Division is performing.

The majority of members use RINA to maintain contact with people with similar interests in the Marine Design and Naval Architect fields. Most people were aware of the benefits provided by the Division, however about a third did not know about the free Terms of Trade and Contracts downloads available from the Clendon Feeney website, discounted legal advice and discounted fees for the HYPD conference.

Overall the members were satisfied with the benefits received from the Division but 20% felt that it was not providing an important key area - CPD courses. The council will try and address this over the coming months. If any members know of, or are an expert in any field that may be suitable for a CPD course please contact one of the council members for further discussion.

The subjects that interested members the most were new technology, boatyard tours, construction and sailing yachts. Twenty-five percent (25%) of the members responded that they would be willing to "do a talk" or arrange a visit for a member's evening, so if you have a specialty in any of the areas stated I am sure that you would have a warm response from the rest of your fellow members. The council would be pleased to hear from you.

The most contentious question on the survey was that about promoting it's members abilities to the government and public. The majority (80%) of our members agreed or strongly agreed that the Division should be more active in this area. This question provoked further lively discussions at the AGM. The constitution does not allow for RINA to directly promote its members but it could support its members in the formation of a special interest group to promote New Zealand yacht/workboat designers.

Over the next few months the council will be addressing the issues raised in the survey and subsequently at the AGM.

Forthcoming events

There are no members meetings or CPD courses planned for the next month. Future meetings will be advertised in E-update and by post.

Draughtsperson required!

We are looking for a draughtsperson with experience in drawing aluminium boat structures. Experience in drawing interiors, systems, general arrangements, etc will also be of much benefit. Must be proficient in AutoCAD, and 3D drawing experience will come in handy. We would like an enthusiastic person to join our team in the design office on the North Shore, where we are designing vessels for construction in many parts of the world.

Please phone 09 482 3331 for further discussions

The New Zealand Naval Architect is published quarterly.

All correspondence and advertising should be sent to:

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