



New Zealand Naval Architect

The New Zealand Division of the Royal Institution of Naval Architects

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Christmas Message from the President

As the end of another calendar year approaches, it is time for me to wish you all a very Merry Christmas and a Happy and Prosperous New Year.

The year that is now ending may not have been "prosperous" in a financial sense for many of us, myself included. It seems that ship and boatbuilding activity has been rather depressed. But in the biblical sense,

prosperity is synonymous with peace and goodwill, and that is what I wish for all of us in the coming year.

This last year has, nevertheless, been eventful. We have managed two CPD sessions at technician level (in my opinion, since it was I who presented them), several technical sessions, and most recently a very well presented talk by Mr James Carnie of the law firm Clendons'.

Our division Christmas Dinner this year again was part of the combined Maritime Societies Annual Dinner (MSAD), hosted by me at the Northern Club. Our guest of honour and guest speaker was to be the Deputy Chief of Navy, Commodore Dean MacDougall, but other duty prevented his attending. However, Captain Mark Worsfold, Captain of Fleet Personnel and Training, was deputized to attend in his place. Captain Worsfold was the most amiable of guests who treated us to an inspirational after-dinner speech relating to the address he was about give to a group of newly commissioned naval officers.

Also this year, we received the Institution's CEO, Mr Trevor Blakeley, on his visit to Australia and New Zealand. In similar vein, next year we can look forward to an historic visit from the President of the Institution, Mr Bruce Rosenblatt, at the end of February. This visit is historic, not only because it is the President who is visiting, but also because Mr Rosenblatt is the first American to head the Institution. Mr Rosenblatt heads the third generation of Rosenblatt Naval Architects, with offices

Call for Nominations

Due to the unexpected resignation of Ted from the position as President of the New Zealand Division, your Council invites expressions of interest/nominations for the position which becomes vacant 31 December 2014.

Corporate members who feel that they can make a difference and have the time and enthusiasm for this exalted position (ex-officio member of RINA HQ Council) are asked to contact Jason as soon as possible to take the matter further. He will happily answer any questions; yes, even across the holiday period!!

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Inside This Issue

Page 2

Division News

Presentation to RINA members by Clendons Solicitors

Babcock Prize winners

Page 3

Division News

Abstract and poster of the Babcock winning project

Page 4

Industry News

Noble Bob Douglas

Page 5

Industry News

HMNZS Resolution

Superyacht Refits

Page 6

Editorial

Committee & Contacts

on both coasts of the United States. I met the second generation, Lester Rosenblatt, at a SNAME conference in Pittsburgh in the 80's. He and Mrs. Rosenblatt were kind enough to spot Marie and me looking for a place to sit on a river dinner cruise hosted by SNAME, and were kind enough to offer us 2 seats with them. I remember him most for his sense of humour (or should I say "humor"). His firm's website is well worth a visit.

Also coming up, of course, is the now famous High Power Yacht Design conference, details to be advised in the very near future.

I can't go further into next year's programme, as I am standing down as president as of the 31st December 2014

And so, once again, have a very merry festive season, and happiness and prosperity for the year ahead.

Division News

RINA NZ Talk by James Carnie of Clendons Barristers and Solicitors

On Thursday 13 November, James Carnie (principal at Clendons, the Honorary Solicitors for RINA NZ) gave a presentation to members on key intellectual property and business laws affecting marine design businesses.

The presentation covered the following topics:

Copyright ownership in marine designs, and how to ensure that you identify and retain valuable intellectual property;

Getting Paid: Tips and techniques to make sure your client pays your fee; and

Keeping your shirt: Covering the main trading risks for marine designers, and steps/techniques to manage those risks.

A range of intellectual property issues were covered, including important copyright laws affecting marine designers and recent legal developments including the potential loss of copyright ownership if undertaking initial pitching and disclosure of concept designs. Key terms of trade and recent legal developments relating to guarantees and deposits from clients were discussed, and techniques for protecting personal assets and managing trading risks were also covered.



Above: James Carnie of Clendons Barristers



Ted Ewbank introducing James Carnie



There was time after the presentation for a drink and conversation

If members have any queries on these issues (or other legal issues), James can be contacted on 09 306 8002.

Babcock Prize Winners

Congratulations to Sarah Daniell & Kyle Yozin as winners of the BABCOCK-sponsored annual prize.

Over the page is the abstract and poster of the project - we will include more information in our next issue.

Division News

Babcock Prize Winners . . . continued

Feasibility Study of a Pico-hydrokinetic Linear River Turbine for Use in Developing Countries by S H Daniell

Abstract

There is a need for an inexpensive means of small scale power production for villages in developing countries. A concept and original design for a picohydrokinetic linear turbine suitable for use in such areas has been developed, and this project investigates the feasibility of this design.

There has been little development in the field of hydrokinetic linear turbines and their theoretical and actual performance. For this project four different models have been developed to predict the maximum theoretical power output of the turbine. The first was based on Service and Ishida's work, the second was developed using lift and drag forces, the third was modified from existing rotational turbine equations, and the fourth was based on the work of Housby et al. These models indicate an expected maximum theoretical power output in the range of 537 W to 1.6 kW

at a 1.2 m/s flow rate, for a device with an effective length of 1.3 m.

A full scale prototype of the turbine was designed and built based on Service's designs. The prototype was built mostly from low cost or second hand parts expected to be readily available in developing countries. Field testing of the prototype was carried out in the Orewa River. Measured power outputs ranged from 0.5 to 3.3 W in flow rates between 0.55 and 1.4 m/s.

It was concluded that the use of a pico-hydrokinetic linear turbine in developing countries is unfeasible due to both the mechanical complexity of building and maintaining the device, and the low predicted and measured power output.



23 October 2014

FEASIBILITY STUDY OF A PICO-HYDROKINETIC LINEAR RIVER TURBINE FOR USE IN DEVELOPING COUNTRIES

Sarah Daniell & Kyle Yozin

Supervisor: Prof. R. G. J. Flay



INTRODUCTION

Linear turbines offer advantages over typical axial turbines for use in rivers as they are able to operate in a low head environment, and negate the need for works which redirect the river flow. This project investigates the theoretical modelling and physical testing of a linear turbine for use in developing countries. The aim of the project is to determine if a linear turbine is a feasible option in such countries when compared with traditional turbines.

MODELLING

Four mathematical models were developed from existing theory to determine the expected power output for a linear turbine of given size in a given flow rate. The fundamental equation for each model is detailed below:

Wind Turbine Theory

$$P = \frac{1}{2} \rho A V^3 C_p$$
 Water density, Water velocity, Effective area, Power coefficient

Lift and Drag Theory

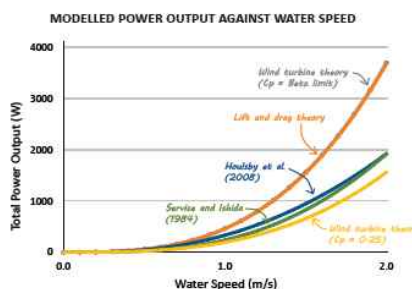
$$P = \frac{1}{2} N \rho V^3 A (C_l \cos \theta - C_d \sin \theta)$$
 Blade velocity, Lift coefficient, Blade angle, Number of blades, Relative water velocity, Drag coefficient

Service and Ishida (1984)

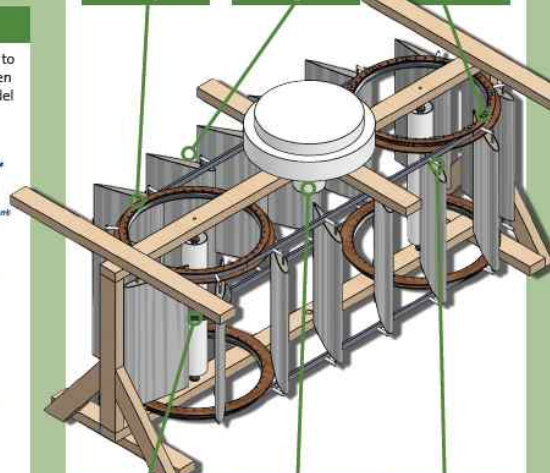
$$P = \rho g V_s (V_s \sin \theta_s - V_s \sin \theta_d)$$
 Flume width, Upstream velocity, Downstream angle, Downstream velocity

Housby et al. (2008)

$$P = \frac{1}{2} \rho V^3 B h C_p$$
 Channel width, Blade height, Blockage ratio



DESIGN FEATURES



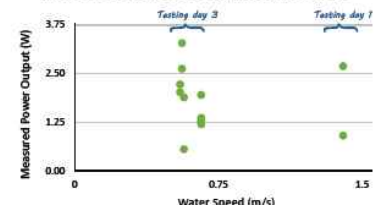
TESTING

Testing of the full scale model was conducted in the tidal river at Orewa. Measurements of flow speed and power output were recorded.



RESULTS

MEASURED POWER OUTPUT AGAINST WATER SPEED



CONCLUSIONS

- While the construction of a linear turbine is feasible, it may not be feasible in a developing country due to mechanical complexity.
- The measured power output of the linear turbine ranged from 0.5 to 3.3 W in flow rates between 0.55 and 1.4 m/s.
- The theoretical models suggest that useable power output will only be produced in flow rates above 1 m/s.
- Overall, the results suggest that the use of a pico-hydrokinetic linear turbine in a developing country is not feasible.

Industry News

Noble Bob Douglas

NOBLE BOB DOUGLAS spent a couple of months or so drilling exploratory wells in three different areas around the New Zealand coast earlier this year. The vessel was the first in a class of four such drill ships built for Noble Drilling LLC of Texas by Hyundai Heavy Industries for operation in the Gulf of Mexico.

The editor spent some time on board off Dunedin auditing the vessel for the initial issue of a harmonised Safety Management Certificate (SMC) and an International Ship Security Certificate (ISSC) required under SOLAS. All the officers, navigating and engineering, were US nationals apart from two additional New Zealand junior officers in each department, which made the systems auditing process proceed in a well-structured manner.

The professionalism on board was, to say the very least, impressive. Safety compliance with the mandated drills

was, as to be expected, foremost in everyone's mind. Equipment redundancy provision was extensive. It was even possible to navigate or hold on station the vessel from the engine room where control of the ship could be transferred in the unlikely event of equipment failure on the bridge.

On departure from Dunedin **NOBLE BOB DOUGLAS** departed for the Gulf of Mexico via Cape Horn, being too large to transit the Panama Canal.



Noble Bob Douglas

Noble Bob Douglas

Rig Type	Drillship
Rig Design	Gusto P10000
Builder	Hyundai Heavy Industries
Year Built/Upgraded	2013
Classification	DNV +1A1, Ship Shaped Drilling Unit, DYNPOS-AUTR, BIS, EO
Flag	Liberia
MODU Code	2009
Water Depth	10,000 ft
Drilling Depth	40,000 ft
Variable Deck Load	44,092 kips
Hook Load	2,500 kips on main hoist; 1,500 kips on auxiliary hoist
Setback Capacity	3,500 kips
Quarters Capacity	210
Draft (Operating/Transit)	36 ft / 36 ft
Moonpool	115 ft x 41 ft
Depth	61 ft
Length	752 ft
Breadth	118 ft



NBD bridge DP simulator



NBD one of two main engine rooms

Industry News

HMNZS Resolution



GEO RES name plates (RNZN & USNS)

After being laid up for three years, being surplus to Navy requirements, Auckland Shipbrokers Ltd eventually closed the sale of the vessel. Under a new name, GEO RESOLUTION and registered in the Marshall Islands, the ship will be operated by EGS Marine Corporation based in the Philippines.

During the layup period, Lloyd's Register classification was allowed to lapse. This put tremendous pressure on the local LR office to resurvey the vessel, in a short time,

for a single voyage to Singapore where drydocking and Class renewal was planned, together with a major refit before joining other survey vessels operated by this company.

Superyacht Refits

An article in the Summer 2015 edition of "NZ Marine News" notes that "our refit yards have also been powering ahead over winter completing high profile projects to a world leading standard and earning the country millions of dollars from foreign exchange earnings".

One such recent project was the major refit in Auckland of the 41 metre, twin screw motor yacht "Alchemy" where the major contractors were Titan Marine Engineering Ltd. and World Power Electrical.

Built by Feedship in 1970 to a design by De Voogt Naval Architects, with interior design by prepared by Robin Rose and Associates, the vessel has been lovingly restored by

the present owners.

Internally, the teak panelling lends itself well to enhancing the coziness of the accommodation - truly a gentleman's retreat from the maddening crowds. However, extensive radio communication systems are in place to ensure that the "maddening crowds" are readily contactible!



Photograph courtesy of Captain Paul Jeffrey, m.y. ALCHEMY

From the Editor

As 2014 draws to a close, I would like to thank all those who have contributed to the success of this Division.



The year to date has been fruitful, with continuing education programmes being presented, the visit of CEO Trevor Blakely, the presentation of prizes to the next generation of naval architects and, of course, the splendid dinner at the Northern Club hosted by Ted for the combined maritime professional organisations.

It is now time to celebrate Christmas once again. Christmas is celebrated in different ways and for different reasons. The cohesive element of these celebrations is that people celebrate together, whether in family groups, with friends or in the wider community, to give thanks for blessings received.

In the seemingly never-ending times of strife throughout the world, let everyone strive to ensure that this be a season of love, and of peace and of hope. May each day beyond Christmas provide opportunities for achievement and fulfilment of treasured dreams.

In closing, may I wish you all a very Merry Christmas and a Prosperous New Year and ask that amongst your New Year's resolutions, each and every one of you resolves to provide at least one article during the year for this newsletter!!

Mike Kay

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