CJR PROPULSION

MOMENTUM

NEWS FROM CJR PROPULSION

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Introduction

Welcome to the 2012 Seawork issue of the CJR newsletter, Momentum.

Despite the turbulent trading conditions, 2011 proved to be another buoyant year for CJR Propulsion and our Australian partners, VEEM. We benefitted from sustained growth within the commercial/work boat market – where yards and specifiers have increasingly chosen CJR based on our performance credentials and advanced CFD program, which continues to feature in the press on a regular basis. In addition, significant gains have also been made within the superyacht and leisure marine sectors, as owners begin to consider fuel efficiency as a more important factor when purchasing a propulsion package.

In this issue, we're talking about projects which have benefitted from CJR and VEEM's advanced design and engineering prowess and how performance and efficiency has been improved through a more scientific approach to propeller and sterngear design and production. We also talk about CJR being recognised for its commitment to safety and compliance and our appointment as UK distributor for CIP Marine.

With that in mind, we invite you to take a look at what we've been up to and, if you attending the show, we hope to see you on the stand for a chat about CJR's comprehensive design and manufacturing solutions or simply to discuss how we can make a positive difference to your next project.

Many thanks

Mark Russell
Managing Director

> "We have been working with some of the best superyacht builders in the business..."

CJR approved by the big six!

Approved by all six of the marine industry's biggest classification societies, CJR can now pitch for the very best projects around the world

CJR is now approved by all six of the marine industry's biggest classification societies and, in addition, is recognised as the only UK manufacturer certified to build P-brackets to Lloyd's Register standards. The company's recent approval by ABS can now be added to its existing awards from Germanischer Lloyd, DNV, Lloyd's Register, BV and RINA and makes CJR one of the only global propeller manufacturers to be recognised by all six bodies.

CJR's head of design, Marek Skrzynski, commented on the news: "The classification process is an area in which we continue to invest and reflects our continued commitment to safety and compliance. Our objective has always been to exceed the highest industry standards wherever possible, not least as it's in the interest of both CJR and our customers for us to do so. Being recognised in this way means we are also able to quote for projects many of our competitors cannot legally fulfil and that puts us at an obvious commercial advantage.

"Getting to the stage where we are approved by all the major classification societies has actually required very few changes to our existing systems and procedures, which makes it a fairly trouble free and rapid process. We are now one of the only propeller and sterngear manufacturers which is able to boast all six and this enables us to pitch for the very best projects around the world."

Mark Russell added: "It has taken a real team effort to get to this point and meet all the individual requirements for each society. Each department within CJR had its own role to play and I am thrilled that we have achieved this level of recognition in such a short space of time. For our customers, it demonstrates that they are working with an organisation that understands the importance of regulation and compliance and one which is truly committed to quality and exacting standards."

Going green

CJR lays out plan to help builders achieve RINA Green Plus Notation

CJR Propulsion has today released details of how it can assist organisations looking to achieve RINA's notation on environmental sustainability. First launched back in 2008, the 'Green Plus' notation has recently started to gain traction and several builders, including key CJR customers Princess and Sunseeker, have both now been awarded the Green Plus and Green Plus Yacht Gold awards respectively.

The voluntary notation allows builders to choose whether they wish to construct their yacht according to the notation. However, the advantages of doing so make it difficult to imagine why any builder wouldn't place a greater emphasis on environmental responsibility with this in mind. Any company opting for Green Plus will not only get global recognition but also help distinguish itself from the competition in what has become a increasingly competitive market.

This industry wide transition to becoming more environmentally aware has led CJR to demonstrate where its propulsion systems and design services can be of benefit to an organisation looking to achieve this standard. Alternatively, for those which have already achieved a lower level of the notation, CJR has identified where it can assist its clients in reaching the highest level, Green Plus Yacht Platinum.

> "Any company opting for Green Plus will not only get global recognition but also help distinguish itself from the competition."

CJR's head of design, Marek Skrzynski, shares his thoughts: "After researching the criteria RINA uses to assess a builder or vessel, and understanding the products and services we supply, it was clear CJR could make a significant contribution to achieving RINA Green Plus. This is largely accomplished by supplying products and services of the highest quality and fulfilling RINA requirements expressed in the RINA rules for pleasure and commercial yachts." Skrzynski continued: "Looking at a propulsion system, the fuel consumption and emissions can be minimised in two ways. Firstly, by implementing highly efficient propellers; and secondly, by applying low drag passive parts of propulsion systems and appendages of the hull, such as shaft brackets, shaft fairings, propeller tunnels and rudders."

To achieve these objectives, CJR requires an understanding of the characteristics of the flow around the hull, including the working propeller. In order to obtain that information CJR has developed a procedure of flow analyses, combining CFD with vortex lattice lifting surface methods, which allows analysis of the hull behaviour in either a full planing or displacement conditions.

"Every boat aspiring to achieve the Green Plus notation should be fully analysed to enable optimisation of her appendage and propeller tunnel shape design. At CJR we use our own advanced computational fluid dynamics department but there are other methods which can produce similar, if less detailed, results. Without a comprehensive knowledge of the propeller wake, you simply can't design the most efficient propeller. In addition, with CFD you are able to analysis the rudders. With their section aligned with the flow, you can further reduce drag and improve efficiency. This is just a few of the areas where our design services can help and we are obviously more than happy to provide the finished products as well, making it even easier for a builder to choose CJR over the competition," Skrzynski concluded.

→ CASE STUDY

BOAT: Sunseeker 73 Manhattan with MAN 1550hp

Since the introduction of 70 Manhattan in 2007, CJR has analysed and developed sterngear and propellers across the range of engine options. The result of that development was implemented to the new 73 Manhattan, based on slightly modified 70 Manhattan hull. The boat was equipped with low drag P-brackets, highly efficient propellers, and rudders aligned with the flow of propeller race. Significant improvements were recorded over the initial speed estimation, which was 33.5kn. In reality, the boat achieved 36.2kn on a recent trial. Additionally separate trials were carried out to record the impact of new flow aligned rudders. The new rudders added an additional half knot to the top speed and a gain of up to two knots was observed in the cruising speed range.

The results of trials such as this clearly demonstrate the potential for significant performance and efficiency improvements, which could easily and cost effectively be implemented other almost any other unique, semi or production vessel.

Preferred supplier:

CJR continues to grow relationship with key builders

Since the introduction of its bespoke computational fluid dynamics (CFD) department in 2010, CJR has witnessed a 40 per cent increase in commercial projects year-on-year. What's more, the Southampton-based manufacturer has repeatedly been chosen by the most respected builders in the industry, as Marek Skrzynski, CJR's head designer explains.

Following similarly successful projects over the past 24 months, 2012 has already seen CJR deliver bespoke propulsion packages to some of the commercial's sector's most advanced and highest-quality builders, including Holyhead, Seaward Marine, Goodchild Marine and Pembrokeshire based Mustang Marine.

So far this year, CJR has produced full stern gear systems for three new Mustang projects. This included a 22 metre pilot boat named Nahodha II – which was commissioned by the Kenya Ports Authority (KPA) – and two 18 metre, Incat Crowther designed, all aluminium survey catamarans.

Nahodhall

Operating in the busy and testing waters around the Port of Mombasa, Nahodha II, which is based on an original hull from Camarc Design, came with a challenging brief that focused on quality, speed and ease of manoeuvrability. Responsible for the safe transportation of pilots to and from ships, as well as the escorting of cargo and significant vessels into the port, the multi-million pound build needed to be capable of operating in monsoon conditions; handling waves up to five metre and wind speeds of up to 40 knots. The fast pilot cutter also required the ability to assist in search and rescue situations, should the need arise.

Due to its demanding operational requirements, which include being on the water up to 3000 hours per annum, Nahodha II meets Lloyds Register 'Special Service Craft' standards and is powered by twin Caterpillar C32 ACERT engines, with an output of 970bkW at 2100 rpm each, and displacing over 65 tons. With engines of this magnitude, CJR designed a set of five blade, bronze fixed pitched propellers, connecting to Twin Disc MGX6620SC 'QuickShift' gearboxes. The complete stern gear installation, which was designed to achieve maximum thrust at full engine speed and full ahead motion, also benefitted from a complete CFD analysis including the shafts, stern tubes, P-brackets and rudders – to provide optimum performance and longevity.

Discussing the project, Ian Strugnell, director for Mustang Marine commented: "We managed to achieve a maximum speed higher than the design target of 22 knots – with the extra performance being delivered through a combination of a well-developed hull form from Camarc, attention to hull fairness during fabrication and the fully optimised stern gear from CJR."

Throughout the process, representatives for the Kenya Ports Authority repeatedly remarked on how the vessel's performance exceeded their expectations. They were also particularly impressed with the stability of the boat, especially when coming alongside ships in rough water.

Survey Vessels – Mersey Guardian & Humber Guardian

As mentioned, CJR has also delivered full stern gear packages for two new Mustang manufactured aluminium catamarans, utilising hull forms developed by Incat Crowther. Designed for efficiency and minimal wake and wash, the sea kindly craft represent the first and second of an eventual three coastal survey vessels commissioned by Briggs Marine Ltd, for operation as part of its marine services contract with the Environment Agency.

These new catamarans, featuring detailed production design and bespoke elements provided in-house by Mustang Marine, are being built to comply with the MCA Small Vessel Code, Category 2, and are welded in aluminium, in accordance with the Lloyds Register 'Special Service Craft' Rules and Regulations.

With their primary role as coastal survey vessels in mind, each was designed to include a large main aft working deck, with superstructure forward and an elevated wheelhouse. This arrangement provides more than sufficient space for wet and dry laboratories for scientific work and a galley and mess area, as well as room to store a five metre RIB if required.

The catamarans are powered by two Volvo D9-MH diesel engines, rated 261bkW at 2200rpm, close-coupled to Twin Disc MGX-5075 integral Vee-drive gearboxes driving CFD optimised CJR propellers and related stern gear, as Mark Russell CJR's managing director elaborates: "These survey boats are another example of our precision design and manufacturing capabilities being fully utilised for efficiency and longevity rather than increase top speed. Our CFD optimisation process is able to significantly reduce the potential for cavitation, by enabling a greater technical understanding of the input flow regime, which also helps minimise vibration – both characteristics which are vital for projects such as this."

Goodchild Marine - Estuary Elan and Estuary Elite

When Goodchild Marine Services Ltd, of Norfolk, England, won a £1.7m contract with Estuary Services Ltd to build two ORC 171.P 17m pilot launches, they turned to CJR for an advanced propulsion and stern gear system – to provide the fast and efficient running they required, across the speed envelope.

To be named Estuary Elan and Estuary Elite, these modern craft are based on a well-proven hull design by French naval architects Pantocarene. Already used by over 50 boats, built in a wide range of different configurations, these new-builds are the first of this design to be built by a British builder and to be destined for UK operation.

The hull design has a double chine with a forward 'beak' that gives exceptional performance in head seas, reducing slamming and vertical accelerations. Set to replace existing vessels currently

> "CJR Propulsion offers a very efficient range of propellers so were immediately able to satisfy our brief. The company also has a hands-on approach to customer support which is important to both ourselves and our customer."

in operation, the new craft offer a greater range and will be significantly faster in order to handle the extended pilotage area, which now includes the Thanet Offshore Wind Farm.

Both vessels feature identical dimensions, with a 17.58m LOA, a 5.39m beam and 1.44m draft. Each craft will displace 24.5 tons and have the capacity to carry over 2,000 litres of fuel to supply the twin 600 hp Scania engines, which will drive five bladed, bronze CJR propellers through Twin Disc QuickShift gearboxes. This combination will give a speed of 26 knots fully loaded with 27.6kn achieved at trials. The hull shape, combined with the CFD optimised propellers and stern gear, is designed to be very economical at cruising speeds – an essential element of the original scoping document, due to an expectation that the vessel will be in operation up to 3000 hours per year.

"Crew comfort and fuel efficiency has been a priority throughout the design of the ORC series and in-line with this modern innovative design we wanted to install propellers that complement this priority," comments Alan Goodchild, Director, Goodchild Marine.

Introducing the new compact TrialDAS

CJR launches its latest innovation with the TrialDAS (Trial Data Acquisition System)

Gathering accurate and detailed trial information is key to establishing the performance of the vessel and the propulsion system. In order to obtain required performance data during sea trials, a portable data acquisition system is required, one which allows data to be collected even in rough sea conditions, when reading on-board instruments proved to be difficult task. To solve the problem, CJR has taken a novel approach. Instead of using an existing system with limited functionality, CJR has adapted the same technology used to gather flight data from unmanned air vehicles (UAVs). The control of UAVs requires real-time accurate information about the aircraft attitude and GPS position and is, in many ways, similar to the information required during sea trials.

Over the past six months, CJR has been working in collaboration with a major autopilot system manufacturer to develop the TrialDAS– a data acquisition system specifically tailored to gathering useful and accurate statistics during sea trials. The new TrialDAS features a comprehensive onboard sensor suite (3-axis accelerometers, 3-axis gyroscopes, 3-axis magnetometers) and uses complex algorithms to combine the collated information to provide accurate trim, roll and heading information. It has a GPS receiver with an active antenna to provide ship position, ground speed and heading, and data is collected 10 times per second. The acquisition system also allows on-board vibration levels to be measured at a frequency of 1kHz, with data acquired 50 times a second. The system is expandable, and adaptable, with plans for a shaft RPM sensor, rudder angle and shaft torque sensors well underway.

"The TrialDAS is another example of CJR doing more to add value for our business partners and global customer base. We are committed to ongoing R&D and this is a great example of what is possible when you collaborate with specialists in other industries," commented Mark Russell, CJR's managing director.

The TrialDAS includes a real time monitoring program, and automated reporting so that reports can be generated at the touch of a button and before the yacht is even moored up back in the harbour. Trials relating to specific RPM ranges or particular conditions are also possible with the TrialDAS' easy to use start-stop functionality, meaning multiple reports can be generated from a single trial.

"The TrialDAS is another example of CJR doing more to add value for our business partners and global customer base."

CIP finds trusted partner in CJR

CJR Propulsion appointed distributor for Columbia Industrial Products (CIP)

CJR Propulsion today announced its appointment as UK and Ireland distributor for Columbia Industrial Products (CIP), in an agreement that covers the distribution of all CIP MarineTM self-lubricating composite rudder and stern tube bearings.

CIP MarineTM has a range of advanced laminated composite products which are environmentally sustainable and manufactured by impregnating textiles with thermo setting resins and solid lubricants. This highly specialised, extremely reliable, self-lubricated composite material is designed to eliminate complex lubrication systems; which can lead to undesired maintenance and increased dry docking time.

Mark Russell, CJR's managing director, commented on the appointment: "CIP has a reputation for producing products which utilise the very latest technological developments and are of the highest quality – reflecting CJR's own brand values and ethos and making the partnership a perfect fit. We have been working with CIP on many of our superyacht projects over the past twelve months and have found them to be unrivalled in terms of customer service, durability, functionality and design. We now look forward to collaborating to further develop the UK market for these exciting products."

With its self-lubricated rudder, stern tube and thruster bearings, CIP MarineTM offers the lowest friction coefficients, as well as minimal coefficient of thermal expansion, with negligible moisture absorption. The whole range is naturally corrosion resistant and lightweight, while having high load and high impact capabilities. The company's products also provide excellent dimensional stability in all environments, are easy to machine and can be press or freeze fitted, with the ability to machine in place, while still optimising the friction, wear and bearing functions.

Working with CJR, CIP's custom range will be designed to each customer's individual specifications for both below and above the water line, and are suitable for all applications from commercial vessels to superyachts. CJR will offer an extensive range of ID sizes up to 60" (1524mm) inner diameter and provide the options for raw tubes/ sheets or finished parts.

"We found CJR to be the upmost reputable company to partner with in the UK for the marine industry. CJR has the expertise and quality standards that we are proud to have representing CIP products and specifically CIP MarineTM. We believe that combining the CIP and CJR brand names is going to give both companies the long term competitive edge necessary to dominate the industry. We are excited to about this new relationship and the further development of CIP MarineTM to the UK," Stephen Phillips, president of CIP, concluded.

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CJR Propulsion Ltd, 70-72 Quayside Road, Bitterne Manor, Southampton S018 1AD United Kingdom
Tel: +44 (0)23 8022 2032 Fax: +44 (0)23 8021 1832 info@cjrprop.com **www.cjrprop.com**