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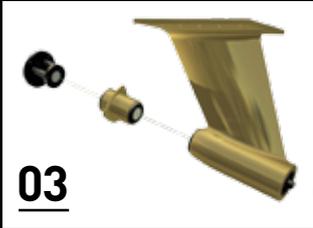
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Welcome to the second issue  
of the CJR Seawork newsletter.

What a year it has been! Back in 2010 we introduced you to our computational fluid dynamics (CFD) program, and discussed the incredible results CJR were achieving – using this advanced technology to optimise propeller and sterngear performance. Fast-forward twelve months and things have moved on a lot. Today, we're working with some of the best workboat builders in the business and have been delivering fully optimised propeller and sterngear packages to the likes of Alnmaritec, Holyhead, Seaward and Mustang Marine.

In this issue, we're talking about a number of workboat projects which have benefitted from CJR'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. CJR's acceptance in this market has been remarkable and is due, in no small part, to the emphasis we place on providing products which exceed the expectations of both the builder and the buyer.

With that in mind, we invite you to take a look at some of the work we've completed recently and, if you attending the show, we hope to see you on stand A179 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**

**02**  
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# Five down... one to go for CJR

CJR is now approved by five 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 Lloyd's Register and BV, can now be added to its existing awards from Germanischer Lloyd, DNV and RINA – and leaves only ABS to complete the 'big six'.

CJR's head of design, Marek Skrzynski, commented on the news: "The Lloyds and BV 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. Our clients demand the highest standards in all areas. 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.

"So far, getting to this stage has required very few changes to our existing systems and procedures, which makes it a fairly trouble free and rapid process. Our last remaining classification society is ABS and we are confident we are already in compliance with their regulations and it's more a matter of finding the right project to demonstrate our capabilities. When that happens we will be one of the only sterngear manufacturers which is able to boast all six societies and will enable 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."

About The Lloyds Register Group: Founded in 1760, the organisation provides independent assurance to companies operating high-risk, capital-intensive assets, working in a wide variety of industries, including the marine sector. The Lloyd's Register Group is one of the world leaders in assessing business processes and products to internationally recognised standards. The standards are either those of major independent bodies or that it has developed itself. From design and new build, to in-service operations and decommissioning, Lloyd's Register aims to deliver complete lifecycle and risk



management solutions to help ensure the safety, integrity and operational performance of assets and systems.

About BV: Created in 1828, Bureau Veritas is a world leader in conformity assessment and certification services. BV helps its clients improve their performance by offering services and innovative solutions in order to ensure that their products, infrastructure and processes meet the required standards and regulations in terms of quality, health and safety, environmental protection and social responsibility. Bureau Veritas is recognised and accredited by major national and international organisations.

## Building the ultimate, the right way

Following the success of the Sunseeker 40 metre, Tanvas, the CJR team was chosen to manufacturer a sterngear package for yet another high-profile superyacht manufacturer.

Again measuring 40 metres, the long range, tri-deck cruising yacht, called for a P-bracket built to RINA charter class specification and which weighed in at a colossal 750 kg. The project, which is due to be launched later this year, also required the use of CJR's bespoke laser alignment system, modified exclusively for the project, to ensure vibration across the vessel's nine metre shaft was minimised.

CJR engineering manager, Darren Marsh commented: "Unlike many of our other customers, the client was able to provide us with a finished design of the required P-bracket, so our job was simply to manufacturer to their specification. However, before that can happen we run a series of detailed tests to confirm the parameters, ascertain the finished weight and create a model of the P-bracket that we can use for tooling. >>



» Any product of this size comes with certain challenges but we have a well established relationship with the client, and working together we were able to deliver the finished product ahead of schedule.

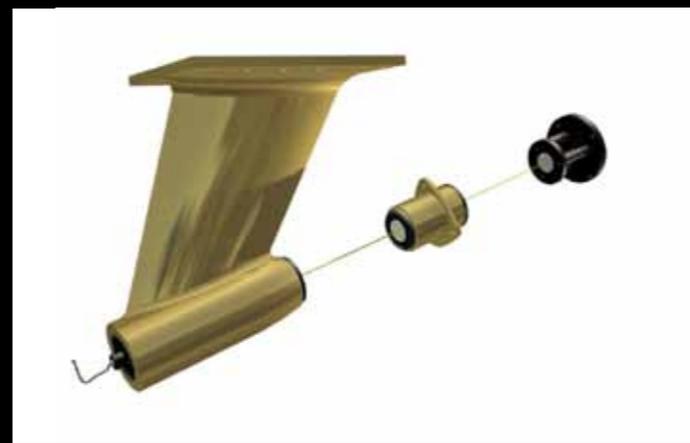
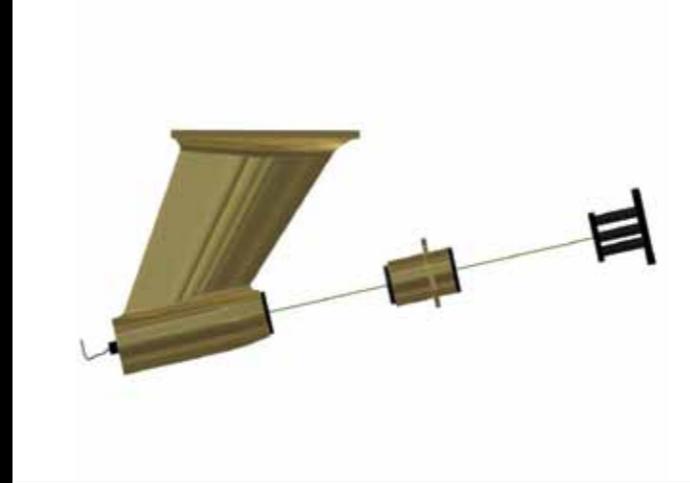
"Our work doesn't stop at delivery though and we are always on hand throughout the build process to ensure installation is as seamless as construction. One of the key areas we are able to assist with is in shaft alignment. Marine craft are not rigid structures, and unlike land based vehicles, are subject to twisting forces as a result of environment and load – all of which will affect the mounting of the propeller and sterngear."

During installation, the alignment of the engines and propeller shafts is critical on any vessel, but when it's a 131 foot superyacht – it becomes even more vital. Any discrepancy in the nine metre shaft could likely result in severe vibration. This could not only lead to breakdowns in the engine's shaft assembly itself, but can also cause rapid bearing wear, bent or broken shafts, damage to struts and hulls and can eventually lead to leaking and in the worst case scenario, sinking.

The age-old method relied on strings or wires suspended tightly across the boat, with measurements taken from these wires at key points. Today, CJR, like

many good propeller manufacturers, use their own bespoke laser alignment equipment, based on technology originally developed for land surveying, which shoots a thin beam of light at precision adjustable horizontal and vertical angles.

CJR sends the laser beam from its housing within the P-bracket, which has been developed specifically for the client in question, through any shaft supports and finishing at the shaft log, where a target plate, placed on the transmission's shaft coupling, shows discrepancies between the current location and the required position. Each laser is set up on four-plane



micrometers, which can then be adjusted up and down or side-to-side and measurable in thousandths of an inch. "When that laser beam shoots up to a target plate on the transmission's coupling and it hits the bull's eye, we know we've got it right." Marsh added.

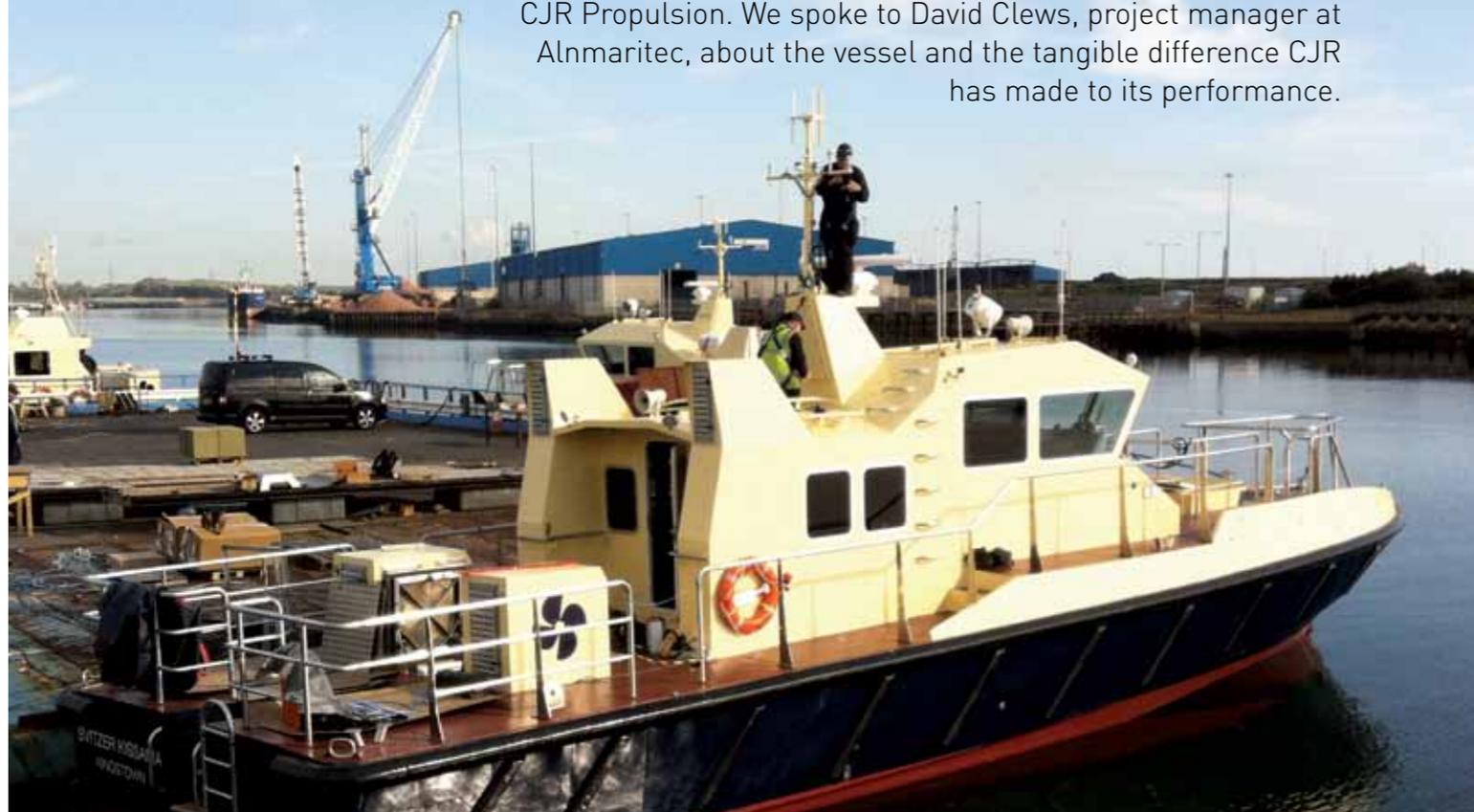
Rather than moving each strut, CJR looks for at least two points that are aligned within tolerances, and moves other components to match, reducing the time required. As the shaft and P-bracket are aligned, the engine is also brought into precise alignment with the shaft. All too frequently CJR find that the front end of the engine is about a quarter – to a half-inch low.

The yacht builder's own engineers prevent this with the same laser system, raising or lowering each of the four corners of an engine until the transmission's output shaft is exactly parallel to and centred with the propeller shaft. A laser reflected off the coupling verifies the angle, and shooting it into a precisely centred target ensures vertical and horizontal alignment.

Marsh concluded: "Precision engineering is what CJR stand for and it doesn't get much more precise than this. In comparison to the old way of doing things, these tools are a must. I just couldn't imagine handling this

problem any other way, especially for a boat of this size, where a bad vibration could cause a lot of irritation, not to mention longer term damage. We are certainly not the only manufacturer using something similar but where we stand out is how we develop a solution specifically to match the project in hand. We do not use one solution for all our projects, mainly because each has very specific requirements and a generic product just wouldn't be as good."

Next month sees the launch of Alnmaritec's latest pilot boat, fitted with a complete propeller and sterngear package from CJR Propulsion. We spoke to David Clews, project manager at Alnmaritec, about the vessel and the tangible difference CJR has made to its performance.



## Exceeding expectations through engineering

Based in Northumberland, Alnmaritec has more than 20 years experience in the design and fabrication of aluminium alloy workboats for commercial use. Its boats are built to a range of new and proven Alnmaritec proprietary designs,

many of which have become industry standards in their field and operate in some of the toughest conditions worldwide. The company has expanded rapidly in recent times, increasing its workforce by over 400 percent in the last 18 months alone.

Alnmaritec also supports a sizable in-house technical team capable of tailoring each boat to suit the individual requirements of its customers.

Alnmaritec's latest project has been no exception. The 16 metre pilot boat, designed by Camarc, exclusively for Alnmaritec, called for a range of specific requirements, combining excellent sea-keeping and manoeuvrability – both at slow speed for harbour operation and at service speeds for pilot boarding operation. The vessel also features an advanced double chine, plaining propulsion and sterngear system – to provide fast and efficient running across the speed envelope.

Clews commented on the project and his ongoing relationship with CJR: "I have worked with the CJR team at previous organisations and have built an excellent relationship with Mark and the guys. This meant when I joined Alnmaritec I had no reservations in turning to them for a raft of upcoming projects where performance was a key deliverable. My opinion hasn't changed and CJR has been able to meet and exceed our expectations every step of the way – ensuring the finished product was something we are all very proud of. We are already working on several other projects with CJR, again where performance is a key consideration.

"We completed initial sea trials of the first two CJR equipped boats last week and we're delighted with the results. We went into the day obviously looking to surpass the required contracted speed, but in reality, we were able to comfortably exceed it in both cases – and that was in a heavy sea and before adjustments have been made to their trim. Both the pilot and patrol boats performed well in trials, with the new pilot boat reaching 27.7 knots, which

was nearly three knots faster than expected. The 19 metre patrol boat, which was contracted to reach 36 knots, managed 37.6 and I think there is still more to come with the final setup. In my opinion, CJR is responsible for a significant proportion of that increase. That's the difference its products make."

CJR's managing director, Mark Russell, explains how: "We came to Seawork last year, talking about how our experience across a range of markets meant we were well placed to deliver performance products to the work boat industry. Today our message is a far simpler one; look at what we are achieving in this market and the people we are working with. I think it clearly shows we are doing things differently to our competitors and the right manufacturers are already taking notice – recognising that top performance, matched with the highest quality standards is possible at a fair and competitive price. The results from last week's sea trials perfectly demonstrate that performance gains and efficiency savings can be made, simply by selecting the right propulsion partner.

"Working in the superyacht arena especially, you have to optimise every element of your product – squeezing the last drop of efficiency, performance and durability out of it, and it is this mentality which constantly pushes us to achieve more, regardless of who the client is. We use our bespoke computational fluid dynamics (CFD) capability to realise this, something none of our competitors are doing. We use CFD to understand how our products are interacting under the waterline, which translates to a greater understanding of how they will perform. Any manufacturer can talk-the-talk or design a propeller which looks the part but it's only when you get on the water that you get a true indication of its performance.

The structure of Alnmaritec's pilot boat is designed and built to drawings in-line with the MCA small workboat code rules. The propeller and sterngear have both been manufactured using the latest 5 axis CNC machinery for precision accuracy and noise and vibration reduction, with finishing conducted by CJR's latest robotic tools. "At CJR, our manufacturing and procedural systems ensure that the geometry of our finished castings perfectly replicate the design of the 3D models, as well as complying with all relevant standards, this is the first step to a perfect prop." Russell added.

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By using the latest technology to automate much of the design, manufacture and finishing processes, CJR is able to offer repeatable performance, with little need for extensive finishing. This saves valuable time but also significantly reduces design and production costs, which is why it is able to offer such an engineered product at a price which is within industry expectations.

"We are very happy with the results from the sea trials and look forward to working with Alnmaritec to supply CJR propellers and sterngear for the next generation of high-performance workboats. It is a partnership which is achieving great results – exactly what we expect with all our customers – a positive outcome for all parties." Russell concluded.

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# Supported worldwide

CJR and Veem products are now supported in locations around the globe. Launched last year, the CJR Propulsion dealer and service support network has gone from strength-to-strength and recent months have seen the addition of several new centres – where either VEEM, CJR or products from either manufacturer can be serviced, repaired or replaced.

The global partnerships, established with some of the most professional service organisations in the industry, guarantees any work on existing equipment is completed to the standards set out by CJR and VEEM, regardless of

where in the world you are. The network also ensures any new or replacement props are fitted to the correct specification and optimised for efficiency and performance, in-line with design and engineering procedures.

“Our customers want to know their props are in safe hands and that they are being looked after by someone who knows us and how we work. It also means any repair work is not based on ‘an idea’ of the propeller but real technical information, provided by us or VEEM.”

**Mark Russell**  
CJR Managing Director

# Flavour of the month? Not a chance.

The past twelve months has seen CJR rapidly become the preferred choice for precision, high performance propulsion packages within the workboat market. Since exhibiting at last year's Seawork exhibition, CJR has secured orders worth in excess of two million Euros – following successful partnerships with several leading workboat manufacturers. Organisations such as Mustang Marine, Seaward Marine, Goodchild Marine Services, Holyhead Marine and Almaritec have all selected CJR for several recently completed and ongoing projects.

One of the first to choose CJR, and to profit from the performance benefits available through CFD, was Holyhead and its client, Harwich Haven Authority (HHA). Bevan Thomas, technical consultant for HHA, discussed the impact CJR had on efficiency following initial boat trials: "Based upon 2,500 hrs of operation per year, HHA is expecting to make an annual saving on fuel of £48,500! Add to that the reduced strain on the engine and gearbox, and opting for CJR is an obvious choice."

That sentiment is echoed by Mustang Marine (Wales) Ltd, which has chosen CJR Propulsion to supply the sterngear requirements for a significant proportion of its current contracts – including a 22 metre Pilot boat destined for Kenya and three 18 metre Catamaran Environmental Survey Boats. Also, earlier this year, CJR provided sterngear for Mustang's

new Nelson 48/50 Pilot Boat, 'Humber Mercury', delivered to Associated British Ports – Humber Estuary Services. The company added: "CJR Propulsion was chosen as the preferred supplier of propellers, shafts, couplings, P-brackets, and rudders for their quality, experience in high-speed vessels and progressive propeller design capability."

The heavier hull construction necessary to comply with current Lloyds SSC rules, along with the additional sound insulation and equipment carried these days by the operators, has resulted in an increase in the displacement of some commercial craft. This has led proactive builders to look for new ways to offset any potential performance shortfall, without impacting on engine size or efficiency. One such manufacturer is Seaward Marine, whose managing director,

Barry Kimber, turned to CJR to ensure he was able to meet his customers' expectations, adding: "We've had a lot of success switching to CJR's 5-blade propellers. Several projects have reported significant performance benefits against expectations, or on existing vessels, against established performance.

"A good example is a recent Nelson 42 pilot boat. During trials we discovered she was performing at the lower end of our expectations so we took the opportunity to utilise a spare set of CJR propellers



belonging to her sister vessel. The effect of the replacement propeller was immediate and after everything had been properly tuned, we were recording an increase in speed of up to three knots. This immediately took her from the lower end of the speed envelope, to exceeding our expectations. Since then we have chosen CJR for replacement propeller systems on several projects and each time there has been a positive impact on performance."

Commenting on CJR's popularity, company director, Belinda Russell

discussed why CJR is making such a difference: "The propeller industry is a competitive environment so it is vital we are able to demonstrate a very real advantage over our rivals. We have an incredible design team and use the experience we have built up over the years, combined with the latest technical advances to ensure we only produce products which are truly the best out there.

"This commitment to technical development has led us to invest in our own 'supercomputer' to allow the CFD simulations to be

## RECENT AND CURRENT WORKBOAT PROJECTS FOR BOATBUILDERS:

### Almaritec:

- 1 x 16 metre aluminium pilot boat
- 2 x 19 metre aluminium patrol boat
- 1 x 19 metre aluminium wind farm support vessel

### Mustang Marine

- 1 X 14.6 metre GRP pilot boat
- 1 x 22 metre steel pilot boat (Lloyds)
- 3 x 18 metre steel survey boats

### Seaward Marine

- 1 x 45 foot GRP ambulance boat
- 1 x 35 foot GRP pilot boat

### Goodchild Marine Services

- 2 x 17 metre GRP pilot boats

### Holyhead Marine

- 1 x 16 metre GRP pilot boat

### Undisclosed overseas clients Middle East

- X 13M GRP survey vessel (GL)
- 12 X 10M aluminium mooring boat
- 3 X 15M aluminium pilot boat (Lloyds)
- 6 X 33M aluminium crew boats (BV)
- 1 X 23M aluminium crew boat (BV)
- 5 X 24M steel patrol boat (Lloyds)

### Europe

- 1 X 13M GRP pilot boat
- 1 X 14.5M GRP survey vessel
- 1 X 30M steel fast ferry

### Africa

- 2 X 38 metre aluminium patrol boat

carried out in-house – rather than utilising our partnership with the University of Southampton. Overall, the new system we've developed has 72 Gb of RAM, and is capable of running parallel CFD simulations with up to 16 processors. Having this technology in-house enables us to offer the service on a rapid turnaround and at a highly competitive price. I don't know any other sterngear manufacturer who is investing in the same way and I think the results speak for themselves – rapidly establishing CJR as a leader within the industry.

# CJR chosen for its consultancy services

Back in year 2008, White Horse Ferries, operators of Southampton's Hythe Ferry, approached CJR Propulsion to provide consultancy services relating to a recurring and expensive problem with its existing propellers. An issue with cavitation and erosion was so severe, the propellers had to be replaced on an annual basis – causing disruption to service, as well as significant replacement costs.

Marek Skrzynski, head of design for CJR, picks up the story: "White Horse came to us and asked if we would investigate why the cavitation was happening so rapidly, as well as asking us to provide a replacement set of props. We designed and manufactured the required products to a higher specification but while the boat was out of the water we also looked at the hull, trying to find out the route cause of the issue.

"We found that the ferry had double shaft and keel supports, placed very close to the propellers – which were a hangover from the boat's previous life. They were not needed for her current operation and were poorly positioned in terms of propeller operation, so after some initial testing, we made the decision they should be removed. A few weeks ago the boat was being serviced in Saxon Wharf and we had a chance

to have a look at the sterngear. There was not a single cavitation mark on propeller blades after three years in operation. A very positive result."

CJR is able to provide ad-hoc and long-term consultancy services relating to the longevity and performance of your boat hull and appendages. If you have any requirement, get in touch, we are here to help.



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