



# MOMENTUM

NEWS FROM CJR PROPULSION

ISSUE 14

June 2019

[www.cjrprop.com](http://www.cjrprop.com)

## Destined for Mexico

Wight Shipyard Co. are ready to launch the two fast ferries featuring CJR's flow-aligned rudders

### Mainprize Offshore

Contract secured to develop a complete propulsion and sterngear package for the M05

### To the rescue

Two-week turnaround for replacement props

### Record-breaking

2018: CJR Propulsion's busiest year yet, delivering more products than ever before





# Welcome...

Another year has flown by since I last sat down to write this introduction to the Seawork edition of Momentum, marking the start of the show season and hopefully another long hot summer! Thankfully, despite the uncertainty that the ever-looming Brexit is causing, both sides of the CJR family have continued to grow: diversifying our operations, adding new clients, increasing our output and making further advancements in our design and manufacturing capabilities.



In this issue, we talk about how 2018 turned out to be CJR Propulsion's busiest year yet, delivering more products than ever before. This has been driven, in part, by the investments we made in design and manufacturing technology, enabling us to dramatically reduce the time it takes to get new props out the door, with our long-held ambition of offering customers a two-week turnaround for replacement props now a reality.

Other factors in our growth have included our work with production clients, who are increasingly leveraging the performance and ride comfort advantages that CJR's products provide with their customers. There is still work to do within the industry, with some yards continuing to opt for inefficient

props on luxury vessels but thankfully, that list is shrinking steadily.

We highlight several prominent projects that are fresh in the water or soon will be, including the latest launch from Mainprize Offshore, further enhancing its excellent reputation for support vessels. We also celebrate the launch of Wight Shipyard's latest deliveries – two fast ferries destined for Mexico's largest ferry operator, Ultramar, which both feature CJR's flow-aligned rudders. Wight is another UK business making waves (pun intended) with its modern, technology-focused approach, utilising the unique construction techniques to reduce weight and build times.

We discuss the changes taking place at CJR Fabrication, and how its business

is being recognised for its bespoke design and engineering capabilities, winning new contracts for complex one-off solutions and its first true production line contract – with none other than Sunseeker.

2019 is already shaping up to be another interesting year, filled with challenges and opportunities, and I hope this Seawork is a successful show for you all. So, from all of us at CJR, we hope you enjoy our latest news and we look forward to chatting to you at the show or in the coming weeks.

Many thanks

Mark Russell

# CJR PROPULSION EXTENDS ITS RELATIONSHIP WITH Mainprize Offshore

After successfully replacing the propellers on Mainprize Offshore's M01 support vessel, CJR Propulsion has extended its relationship with the Yorkshire-based vessel operator, securing the contract to develop a complete propulsion and sterngear package for its latest project, the M05.

In 2018, CJR was tasked with addressing issues related to fuel

efficiency and vibration for the existing M01 vessel. At the time, the vessel was fitted with propellers that were causing excessive vibration under load and were not efficient – resulting in the engines burning too much fuel.

In response, CJR Propulsion designed a bespoke set of propellers, using its in-house Computational Fluid Dynamic (CFD) department to define the optimal set-up for this specific vessel's hull form. Once the data was input into the software, the resulting simulations were tested, using over 20 million data points to understand the uneven flow of water around the propeller and sterngear. The setup's pressure variations were also analysed to accurately predict and reduce cavitation and provide a realistic indication of the minimised noise and vibration levels Mainprize could expect.

After accepting CJR's recommendations, the resulting propellers were manufactured within CJR's Southampton manufacturing complex, certified to Class S, and installed on the vessel. On-the-water trials were then performed; the results

showed a significant reduction in fuel burn for the same speed – equating to approximately 8–10% of annual usage.

The new M05, which has just been launched, represents the latest in support vessel design, and is set to offer notable benefits for its operators, as Bob Mainprize explains:

"Following almost five years of research and development, many changes and fine tuning, extensive tanks testing, the highly anticipated M05 will be launched in Europe in August. Fitted with the most up-to-date equipment and expected to outperform any of the current 26-metre vessels in terms of comfort, transit and transfer height, we hope the vessel will become the new standard of offshore support vessels. Due to the proven quality and professionalism they have already displayed, Walker Marine Design and CJR Propulsion worked very closely to ensure the propulsion and stern gear system was developed to operate at maximum efficiency in many operating conditions, and we have total confidence it will again exceed our expectations."





# CJR to the rescue

## WITH TWO-WEEK TURNAROUND FOR REPLACEMENT PROPS



When a prop gets damaged, getting a replacement designed, manufactured and installed is a long and often stressful process, typically taking 2-3 months. This timeframe can be extended even further if the vessel features a complex or bespoke propulsion setup. For most owners and operators, the realisation that their boat is going to be out of action for eight weeks or more is devastating.

For charter boat operators, a loss of a vessel at the start of season could have a notable impact on the business' annual profitability, with bookings needing to be cancelled or alternative vessels secured at an additional cost. Equally, for a commercial operator, two months with a vessel on the dockside could significantly curtail the business' operations and risk both financial and reputational damage.

One option to speed up the process is to opt for a standard, off-the-shelf

propeller design and replace both props, doubling the cost and likely resulting in a less efficient and poorer performing system being fitted – potentially creating issues relating to engine wear, fuel consumption, vibration and cavitation further down the road.

**However, a far better and potentially even quicker solution is available – an approach where a truly identical replacement prop can be designed and manufactured or where a new set of props, designed for the specific vessel in question, and fully optimised for peak performance and longevity, can be produced in as little as two weeks.**

By combining mobile 3D scanning, CJR's in-house computational fluid dynamics and lifting surface theory design capabilities, fully-automated robotic mould-making, and CNC machining and finishing technology,

six weeks or more can be saved and a superior product installed.

Mark Russell, CJR Propulsion and CJR Fabrication managing director explains:

"The benefit of our 3D scanners is that they are hand-held and totally mobile, so we can put you in touch with one of our global partners or send a specialist anywhere in the world to scan the undamaged prop in minutes, with 100% accuracy. With that information we can effectively reverse engineer an identical prop to replace the one that's been damaged. That is only possible if you aren't relying on hand-drawn designs and manual finishing. Alternatively, we can design a bespoke set of propellers to match the boat by using key vessel and engine data. We've had customers gain an extra two knots just by replacing the original props with ours and that can be directly converted into reducing fuel consumption and engine wear."

"If you think a 30m vessel can charter for up to €90k a week, eight weeks could cost you nearly €750k during peak season. With CJR, you could be back on the water six weeks earlier, potentially saving you half a million Euros. We think that's a pretty powerful message. Add to that the performance improvements you could achieve with a replacement set of props and you could negate the entire cost of the replacements within a very short timeframe."

If you damage your props, give us a call to find out how CJR can help.

---

"The benefit of our 3D scanners is that they are hand-held and totally mobile, so we can put you in touch with one of our global partners or send a specialist anywhere in the world to scan the undamaged prop in minutes, with 100% accuracy."

---








Copyright Jake Sugden Photography



# Wight Shipyard Co: Ready for launch

In an update to last year's Momentum article on the project, two fast ferries destined for Mexico's largest ferry operator, Ultramar, are getting ready for launch at Wight Shipyard Co's Isle of Wight facility.



Designed by Incat Crowther, both the 37-metre ferries feature fully CFD-optimised propellers, with a diameter in excess of 1.2 metres, and are amongst the first commercial vessels of their type to benefit from flow-aligned rudders, which reduces rudder resistance by being adapted to the propulsion systems lift, drag and torque. Through their innovative design, which is perfectly aligned with the ferries' propeller flow angles, premature cavitation and vibration are reduced by lowering the suction pressure peak that can form on or near the leading edge of the rudder.

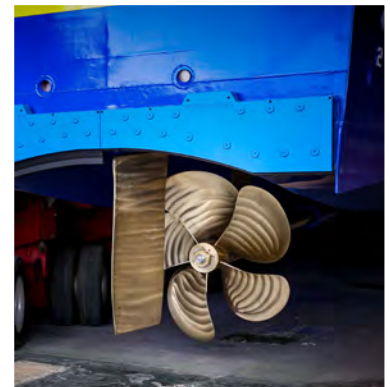
James Day, Naval Architect for Wight Shipyard, commented on the project and the experience of working with CJR's team:

"We know that by working with CJR, the end result is going to perform exactly as we expect and, with reputations on the line, that peace of mind means a great deal to us and our

customer. Cancun (Mexico) has few ship maintenance facilities, so a poor performing propulsion system would not only cost more money to operate day to day but could mean the boats are out of the water more often and for longer. CJR's scientifically-driven approach to design and manufacture reduces the risk of vibration and premature cavitation, so the ferries will operate for longer without issue. Also, the fuel efficiency and performance benefits that CFD design and CNC manufacture provide are now well understood. On commercial vessels that are in operation all day, every day, that optimisation adds up to very real cost savings.

Beyond the delivered product, boatbuilders also need to know that the experience of working with a propulsion specialist is going to be a collaborative and pleasant experience. And that was precisely the case, as Ollie Gove, Engineering Manager for Wight Shipyard explains:

"From initial contact to delivery and install, CJR's team are just easy to work with. We expect a quality product, but it still needs to work from a financial perspective – we can't go back to a client and tell them the price has changed simply because a partner misunderstood or miscalculated the complexity. Thankfully, through open communication, asking the right questions, and CJR's experience of this type of project, there were no issues on these fronts."



# Turn to CJR Fabrication for design engineering

**CJR Fabrication's design and engineering capabilities have been drawing the attention of a number of boatbuilders, with recent projects highlighting that there is a lot more to the Dorset-based marine specialist than handrails and staircases.**



Reflecting on the nature of its current order book, CJR Fabrication's general manager, Michelle Davies, explains why it is becoming the supplier of choice for commercial, recreational and superyacht brands in need of innovative solutions.

"In the past five years, CJR Fabrication has changed a lot. We have always been known for our ability to turn projects around quickly, supporting clients with a flexible and personal service, but in recent years the percentage of our work that requires bespoke 3D design and advanced engineering has grown significantly.

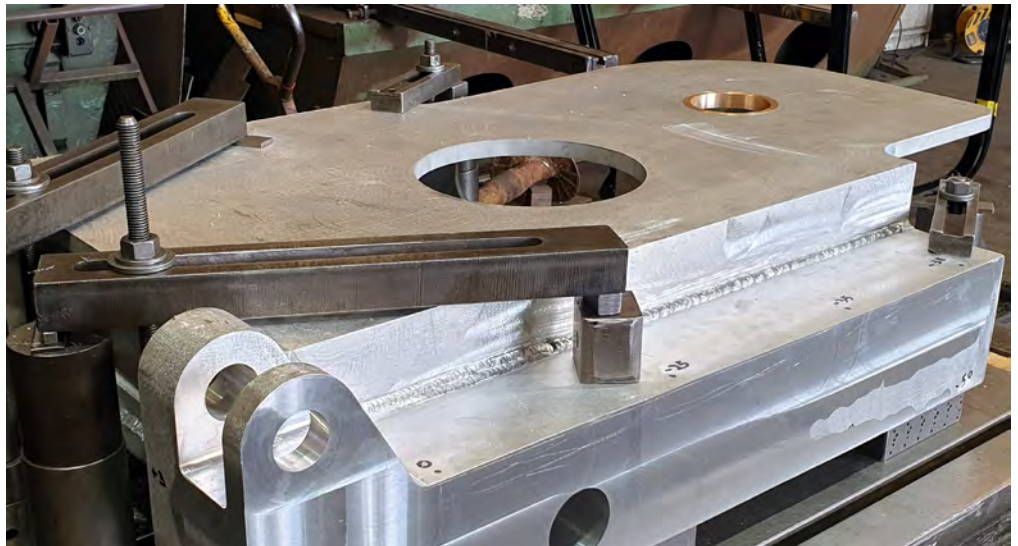
Even a few years ago, our production facilities were dominated by repeat orders for the forming and casting of

stainless-steel tubes; whereas, today, this represents a much smaller part of the business. We will always bring our quality-centric approach to these types of projects but, just like our sister company, CJR Propulsion, we recognise that there is an opportunity for companies, which invest in the right infrastructure and resources, and are willing to take on complex engineering challenges. By leveraging the capabilities of our growing team and utilising the latest software and manufacturing tools, we're seeing new and existing clients increasingly look to us to identify unique solutions to satisfy ambitious requirements.

A great example is a recent project for an automated passerelle on a large luxury yacht. At over three metres in

length, supported by a single anchor point and with limited space for the assembly, the level of engineering complexity was huge. With only eight weeks to deliver this project, a close-working relationship with the client was required. Our in-house team designed an elegant solution that involved the seamless movement of just four core components, all of which were manufactured and post-machined in-house – including cutting 200 mm solid blocks of aluminium with the latest in waterjet technology. The end result, which was delivered on time and budget, marries superyacht aesthetics with commercial grade quality – and the client couldn't be happier.

The success of this project, and others that have included everything from



retractable anchor systems, to restricted height tender launchers, is testament to the capability and experience of the team we have built across the business. Case in point is one of our latest additions. Tobias Kretzschmar has joined us from Rolls Royce and brought with him exceptional design engineering skills, and a critical ability to work collaboratively with clients. His logical, detail-oriented approach to solving multifaceted problems means he is able to rapidly identify the optimal solution, and design the product in a way that can be constructed cost-effectively. His arrival, along with new and existing members of the CJR family, means we are able to challenge for ever larger projects, whilst maintaining our focus on customer service and rapid turnaround.





# CJR FABRICATION ENTERS THE WORLD OF PRODUCTION LINES WITH Sunseeker contract

CJR Fabrication is celebrating winning the exclusive contract to design and manufacture the wet exhausts systems for Sunseeker's new project.



As part of the agreement, following Sunseeker supplying the engine room configuration and specification for each vessel, CJR Fabrication will be responsible for the complete wet exhaust system design, including calculating the correct system requirements for engine back pressure, noise minimisation and effective cooling.

Additionally, using a growing library of CAD designs, specific to the new project, CJR will provide recommendations for the optimised route for the exhaust's emissions to exit the boat, incorporating any modifications to the standard vessel layout.

Following in-house manufacture of all fabricated components, including the option for bespoke jackets, supports and anti-vibration mounts, CJR's long-term partner, Centek Marine, will supply the required GRP components ready for assembly. The complete system is then certified in line with all relevant regulations, including the Recreational Craft Directive.

Mark Patterson, design manager for CJR Fabrication, explains what it took to secure the company's first production line contract: "Exhaust systems may not be the most visible part of the boat, nor something its customers are likely to actively consider – but that does

not reduce their significance or the importance of quality and repeatability. For a company like Sunseeker, quality is central to every aspect of its operations and it understandably chooses its suppliers carefully, with strict criteria that must be met and every process well-documented. Thankfully, we have worked with its team for several years, supplying a variety of fabricated products, and building an excellent relationship.

"Our commitment to effective communication, combined with our flexibility and track record of delivering quality products on time and at the right price, played a big part of the



negotiations; however, we still had to demonstrate that our design and manufacturing process met its requirements. Like Sunseeker, we use the latest Siemens NX design software, which makes sharing technical drawings and related information much easier – further enhancing communication between the two organisations.

“Likewise, our relationship with Centek Marine means Sunseeker know that every aspect of the exhaust system is of the highest quality.”

Christopher Jones, Sunseeker category buyer, added: “Providing value to clients

– whilst maintaining quality, reliability and compliance – is key at Sunseeker, and we are delighted that CJR have chosen to partner with Centek Marine, the premier designer and manufacturer of marine exhaust systems. The relationship provides a much needed addition to the UK Marine Exhaust category. I have met with CJR a number of times to discuss our criteria and expectations, and their knowledge and enthusiasm is refreshing. CJR share Sunseeker’s commitment to quality and reliability, as evidenced over our long history, giving us confidence that the product we receive will be suitable for the Sunseeker brand.”

---

“For a company like Sunseeker, quality is central to every aspect of its operations and it understandably chooses its suppliers carefully, with strict criteria that must be met and every process well-documented.”

---

# ANOTHER BUSY 12 MONTHS SEES CJR BREAK ITS OWN RECORD FOR Completed projects



Propeller in the process of being CNC machined in CJR's new manufacturing facility

As awareness of the benefits of its unique design and manufacturing capability proliferates through the marine industry, an increasing number of boatbuilders, refit yards and owners are looking to CJR to help solve complex propulsion-related challenges or commission performance-oriented, highly-efficient propulsion packages.

In the last year, 50 vessels commissioned bespoke flow-aligned rudders, which reduce drag and improve efficiency through a twisted profile that's aligned with a propeller's flow angles along its entire span. Equally, over 500 projects have benefited from CJR's computational fluid dynamics and lifting surface theory, to capabilities to design and build optimised propellers and propulsion packages that maximise performance, efficiency and longevity.

"To be blunt, better is better and quality always shines through. We can demonstrate that we have the capability to produce better quality products than most propulsion specialists, and certainly higher quality and higher performing than any other UK manufacturer. With rising operating costs always on the horizon, customers can't afford to install inefficient products, and more and more boatbuilders are promoting optimised propulsion systems as a specific customer benefit. Our customer base and the complexity of our output is growing because of these factors, demonstrating that the marine industry is becoming more aware of the available opportunities but also the risks that can be easily avoided," commented Alex Stevens, Technical Sales Manager for CJR Propulsion and CJR Fabrication.



“We can demonstrate that we have the capability to produce better quality products than most propulsion specialists, and certainly higher quality and higher performing than any other UK manufacturer.”

#### → Project recap

- › 50 pairs of CJR flow-aligned rudders for resistance minimisation and optimum performance
- › 500 pairs of propellers for production boatbuilders
- › 500 complete shaftlines/brackets and rudders to production motoryacht builders
- › Two complete sterngear packages to >100ft cClassic yacht refit projects
- › Five sets of sterngear–shallow draft hi-speed vessels operating in rivers
- › Ten lateral vibration and alignment calculations
- › Five noise and vibration studies on superyacht projects
- › 100 full computation fluid dynamics studies
- › 20 finite element analysis projects
- › Five complete sterngear packages to vessels with hybrid electric propulsion
- › 25 fast ferry sterngear packages
- › Two complete sterngear packages for 40m patrol boats
- › Two complete sterngear packages to windfarm support vessels
- › 50 complete sterngear packages to pilot boats



“Despite the uncertainty that the ever-looming Brexit is causing, both sides of the CJR family have continued to grow: diversifying our operations, adding new clients, increasing our output and making further advancements in our design and manufacturing capabilities.”



CJR Propulsion Ltd, 70–72 Quayside Road, Bitterne Manor, Southampton SO18 1AD United Kingdom  
Tel: +44 (0)23 8022 2032 Fax: +44 (0)23 8021 1832 [info@cjrrprop.com](mailto:info@cjrrprop.com) [www.cjrprop.com](http://www.cjrprop.com)

CJR Fabrication, The Fulcrum, Vantage Way, Mannings Heath Road, Poole BH12 2NU United Kingdom  
Tel: +44 (0)12 0274 9907 Fax: +44 (0)12 0274 8471 [info@cjrfab.com](mailto:info@cjrfab.com) [www.cjrfab.com](http://www.cjrfab.com)