TEIGNBRIDGE

SUPERYACHT

LEISURE

COMMERCIAL

MILITARY

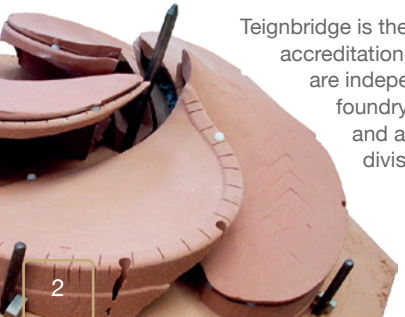
The Largest Manufacturer of Quality Propellers and Stern Gear in Europe

TEIGNBRIDGE PROPELLERS

WORLD LEADERS

Teignbridge Propellers Int Ltd is a world leading designer and manufacturer of high performance and high quality propellers and sterngear. Founded in 1974 Teignbridge has innovation in it's DNA and has brought a number of new products into the marine market place, many of which are now considered as industry standards.

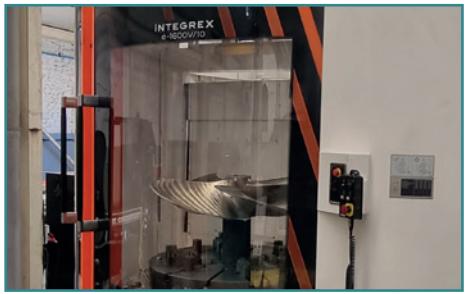
Teignbridge continues to innovate through research and development, enabling the Company to remain at the cutting edge of marine engineering innovation. This means employing highly qualified, experienced and talented engineers and investing in the best design software available. To support these designs the factory is equipped with modern robotic and CNC machinery to ensure that designs are faithfully and accurately replicated in the parts manufactured.



Teignbridge is the only UK foundry and factory to have ISO9001:2015 accreditation giving customers the confidence that our quality systems are independently validated. Teignbridge UK is supported by a foundry and factory in India, a workshop and warehouse in Dubai and an office in Malaysia. Each location having it's own sales division.

Latest Manufacturing Techniques

Teignbridge employs the latest manufacturing techniques throughout the Group.The patterns are manufactured as appropriate using either a 5-axis pattern mill or 3D printers or we use robotic sand milling to ensure mould accuracy. Both the UK and TP India foundry have a melting capacity in excess of 3 tonnes and use recyclable sand to minimise our impact on the environment.



Production Accuracy

Teignbridge has an on-going program of continual investment in all our Group facilities that ensures our products are machined to the highest degree of accuracy.

Our CNC Mazak mill can fully CNC propeller blades to within the thickness of a hair and deliver better than S Class propellers up to 2.2m in diameter. We have a number of modern CNC lathes to turn shafts, rudders and brackets. In addition we have a Hurco CNC mill for accurately machining CPP blades. This ensures that our world leading designs are matched by production accuracy to deliver world leading propulsion products.

Our experienced Quality Control team ensure that all products are carefully inspected for compliance with drawing accuracy and tolerances, to give our customers the reassurance that wherever they are in the world, our products will assemble correctly and perform as promised.

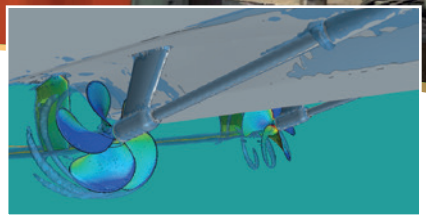
Quality Materials

Our fully equipped laboratory provides the tools to test and validate the quality of the materials used in our products.

Industry Developments

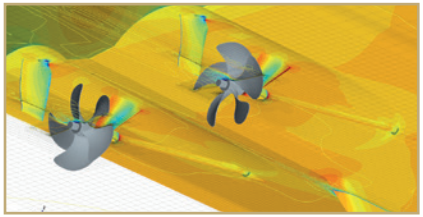
- The Teignbridge Group is committed to staying abreast of industry developments by adapting our approach and anticipating our customers' needs.

TECHNICAL CAPABILITIES



STATE OF THE ART TECHNOLOGY

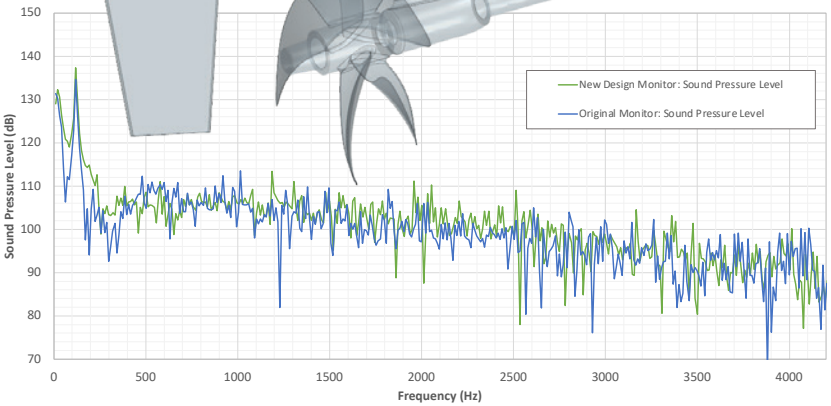
Teignbridge stays at the forefront of propeller design and manufacturing, through continued investment in state of the art technologies and processes. This approach along with the experience gained from 50 years in the industry, allows us to constantly develop, improve and perfect our products and the services we offer.



Numerical Ship Simulation

Developed in house, our MATLAB + Simulink ship simulator predicts fuel consumption and evaluates fuel efficiency of energy saving technologies based on hull resistance, engine simulation, propeller simulation and vessel control. Using real life ship mission profiles and weather profile data, high efficiency propeller designs can be optimised for real world vessel usage. Our industry leading Star CCM+ CFD software and computational hardware, alongside our traditional calculation methods, allows us to accurately predict the performance of propellers and stern gear over a full range of operating conditions, and to see the consequences of any design changes on the performance of our products.

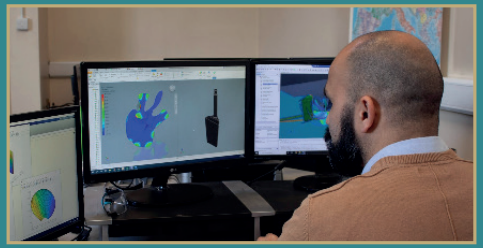
Full propeller hull interaction modelling including wake adapted design, will enable us to design propellers specifically optimised for the individual application.



Note: reference pressure in water 1 µPa

3D modelling

All new propeller designs are modelled in our 3D CAD package. These models can then be used in our CFD and FEA programs and geometry alterations can be made quickly during the design process. Once compete, a design can be sent to our 3D printer, CNC pattern mills or robotic sand mill.



Finite Element Analysis (FEA)

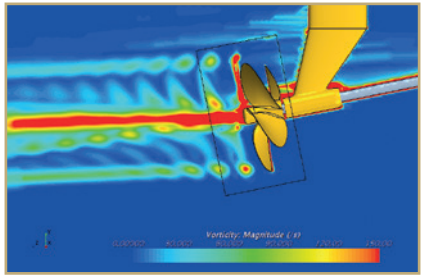
Working hand in hand with our CFD software, FEA allows us to optimise the geometry of our propellers and stern gear for strength and weight in combination with hydrodynamic performance

IMPROVING PROPULSION PERFORMANCE

AN INTEGRATED DESIGN APPROACH

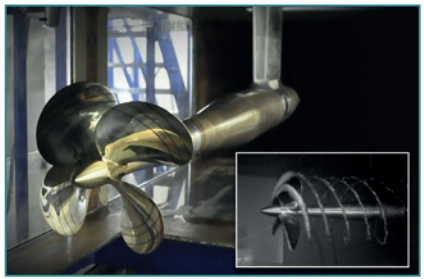
Propeller geometry is necessarily complex with inter-related parametric definitions of pitch, skew, rake, blade section and more. Navigating the available design space to drive performance in a particular direction whilst operating in the complex wake of a boat is not a simple or a quick task, but getting it right pays dividends in fuel reduction, noise and vibration, as well as cavitation reduction and overall performance of the system.

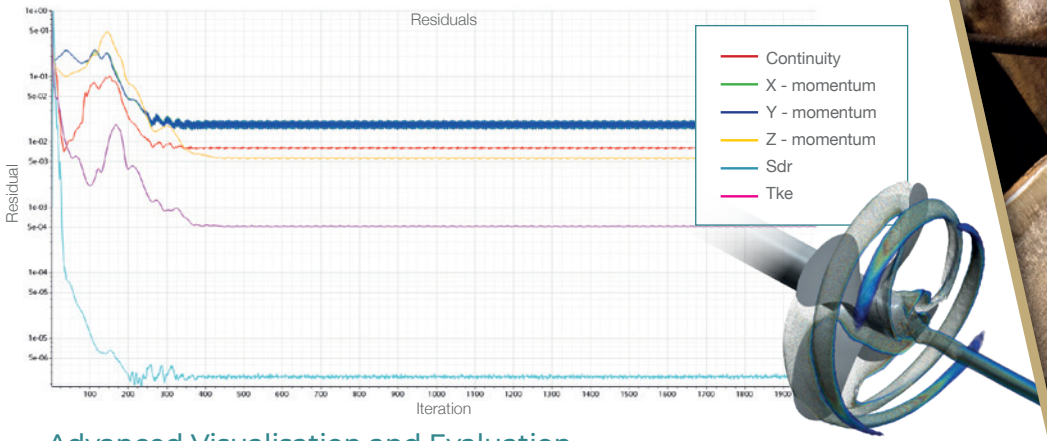
An integrated design approach, based on Teignbridge years of proven experience and utilising the most advanced and state-of-the-art technologies, ensures the highest possible levels of performance and efficiency. In an integrated design approach, the propeller performance is analysed in conjunction with the hull and its appendages, hence the interaction between the propulsion system and vessel is fully determined.



Computational Fluid Dynamics

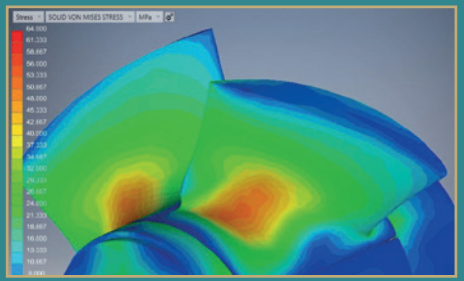
Using Computational Fluid Dynamics (CFD) offers a huge advantage comparting to model scale towing or cavitation tank testing by allowing the designers to evaluate their design at full-scale. When testing at model scale, despite the similarity of the Reynolds number (Re) and the Cavitation number (σ) between the model scale and the full scale, the flow regime and its transitional behaviour is often different, affecting the reliability of the performance predictions.





Advanced Visualisation and Evaluation

The flow around a vessel, its propulsion unit and appendages is quite complex and CFD technology allows for advanced visualisation and evaluation of the flow around the most complex parts of the geometry. In a CFD simulation the designed parts can be simply modified and evaluated without the need for building a new model which helps reducing the time spent in analysing different features of a vessel. In addition, with parametrising the design and taking advantage of optimisation algorithms, one could arrive at the best solution in a few hours. Teignbridge uses CFD for design and performance evaluation of variety of vessel types, propulsion units and Energy Saving Devices (ESDs).



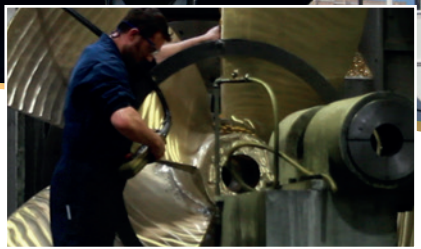
R&D projects

In addition to the CFD services we provide for our customers, we utilise CFD simulations in our various R&D projects to develop new products.

The areas where we can offer our help:

- Hull and appendages performance evaluation and optimisation
- Propulsion unit design with an integrated approach
- Propeller noise and vibration analysis (including propeller singing)
- Self-propulsion simulation for estimating the vessel speed
- Cavitation behaviour analysis of propellers and appendages
- Fluid Structure Interaction (FSI) simulations
- Performance prediction of high-speed and special purpose vessels
- Performance evaluation of hydrofoils

PROPELLER RANGE



50 YEARS EXPERIENCE

With 50 years of experience, Teignbridge have designed and manufactured propellers for almost every craft imaginable, from leisure, superyachts, lifeboats, crew boats, pilot boats, WFSV's, OPV's OSV's, tankers, bulk carriers, solar powered, autonomous, foiling, fishing boats and survey vessels to warships. We design the bespoke propellers using CFD and propeller design optimisation software to suit any of these applications and new designs of vessels as they emerge. Whether it's a high bollard pull for a nozzle propeller or a high speed patrol boat or a smooth vibration free superyacht, we have the range of designs that suit each application and the technology to customise the design to suit your application and criteria.

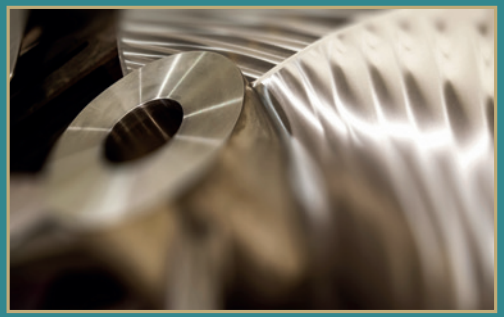
Custom Designed Propellers

Premium performance, fuel efficiency, durability and safety are the characteristics of a Teignbridge custom designed propeller. We are continuously driven to enhance our designs by developing innovative software solutions that enhance the Teignbridge range of propellers for all the applications our customers need. Teignbridge is the largest producer of custom designed propellers and stern-gear in Europe and an established brand that you can trust. Custom propellers are designed specifically for the individual vessel's needs, to provide optimum performance considering the hull shape, appendages, operating environment and customer's criteria. Our design team will work in partnership with you, to fully understand what your vessel needs to deliver and design the optimum propeller to meet your criteria. A Teignbridge custom designed propeller will be the perfect choice for your vessel.

The ‘Clamp on Blade’ propeller (CoB)

The ‘Clamp on Blade’ propeller (CoB) has been designed by Teignbridge for use on merchant, commercial, military and leisure applications. It is a completely new modular replaceable blade propeller system that allows propeller blades to be changed underwater on small boats or alongside or at anchor on larger vessels.

The ‘Clamp on Blade’ propeller significantly reduces downtime on charter, as many vessels are able to carry spare blades and replace damaged blades without having to use a slip or dry dock. The CoB propeller also provides an economical and flexible option for smaller vessels and superyachts.



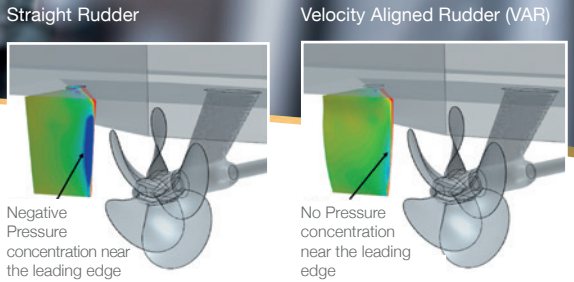
CoB system patent

Teignbridge CoB system patent references the use of clamping rings to attach each blade to the central hub, compared to most other detachable blade concepts on the market which rely on a bolted connection and have an associated flow disruption in this area of the propeller.

Unique design software

- Our company’s design office use unique software to produce the perfect propeller shape for your vessel without compromising the design to suit a standard collection of existing patterns.
- We also work in collaboration with Universities and technical institutions to access the latest tools and test equipment to advance and validate our designs.

RUDDERS



A RANGE OF DESIGNS

Teignbridge produce a wide range of rudders for all types of boats for leisure, commercial and military vessels. Working in close partnership with naval architects, boat designers and builders we produce the best solution for the individual application. Using advanced CADCAM solid 3d modelling design system, computational fluid dynamics (CFD) our rudders will provide the optimum performance according to the design criteria provided. Manufacturing via modern a five axis CNC milling machine guarantees that we faithfully replicate the design tolerances and shape.

Teignbridge produces several types of rudder to suit numerous applications: Stainless steel fabricated, bronze cast, modular and composite moulded. A range of designs are available such as NACA foil sections, wedge shaped sections and flat plate sections, bolt-on-blades, cast-in stainless stocks with cast AB2 blades. We can advise on how to avoid stalling and ventilating. We have also designed many rudders with anti-cavitation plates.

Velocity Aligned Rudders (VAR) & Brackets VAB)

The first “twisted rudder” design was introduced nearly three decades ago to delay the onset of cavitation erosion damage on the U.S. Navy DDG 51 Class vessels. This new ‘twisted’ rudder design also showed improvements in the noise signature of the vessels.

Rudders behind a propeller experience an incoming flow that not only varies in angle of incidence, but also varies in the magnitude from top to bottom, due to the hull boundary layer presence. Hence, we prefer to use the term 'Velocity Aligned Rudder' (VAR) to describe the concept of a "twisted rudder", since velocity is a vector quantity.

A 'velocity aligned rudder' takes advantage of cross-flow velocity components in the propeller wake by careful design of blade sections to distribute the pressure more evenly on the surface of the rudder and reduce the impact of the negative pressure concentration found near the leading edge of a conventional straight rudder.

With the aid of computational fluid dynamic (CFD) modelling of flow around a propeller, it takes a few iterations to align the rudder sections with the propeller downstream velocity components and predict the overall performance of the propulsion unit.

Sea trials of our velocity aligned rudder (VAR) show an average increase in speed of about 1.0 knot at maximum engine speed. At the same time, the VAR does not negatively affect the manoeuvrability of the vessel. The increased efficiency delivered by a VAR will also result in increased fuel efficiency, an important consideration for vessel operators.

Because the pressure is more evenly spread across the rudder blade, the VAR rudder will significantly reduce cavitation, noise and vibration. As a result delivering a smoother ride. We are currently developing an acoustic methodology to predict the underwater radiated noise from the propeller and stern gear of fast speed boats, which will be validated against the sea trials.

VAR Rudder
installed for sea trials

Virtual Twin Model

Types of rudder we produce

- Stainless steel fabricated
- Bronze cast monobloc
- Bonze blade with cast-in stainless steel stock
- Bronze cast blade with stainless steel bolt-on stock
- Composite designs available

Increase speed & fuel efficiency

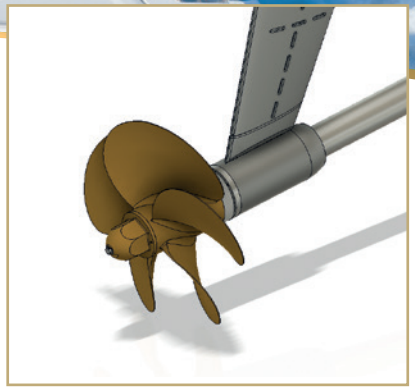
- To further enhance the efficient water flow into the propeller the shaft bracket can also be velocity aligned.
- In order to achieve the maximum benefit the bracket, rudder and propeller must be designed together.
- An integrated designed set of brackets, rudders and propellers will deliver significant increases in speed and fuel efficiency that will quickly repay the additional bespoke CFD design costs and will give your vessel a USP.
- Teignbridge offer this design and manufacturing service for existing and new build vessels alike.

SHAFT BRACKETS

CUSTOM DESIGNED BRACKETS

Teignbridge produce a wide range of P-brackets and A-brackets for all types of vessels including leisure, commercial and military vessels. We are probably the world's largest producers of custom designed brackets with an extensive range of different designs of brackets produced during the past decades.

Our Design Engineers work closely with naval architects, designers and builders to produce the optimum solution for each application. Any appendage forward of the propeller has the potential to have a positive or negative impact on the water flow into the propeller. This can directly influence the performance of the vessel and poorly designed brackets can directly result in cavitation on the bracket itself and/or the propeller and rudder.

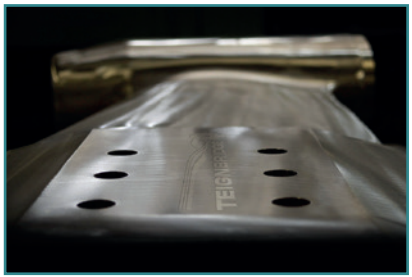


Advanced 3D Modelling

We use an advanced CADCAM solid 3d modelling design system and computational fluid dynamics (CFD) to ensure that our designs contribute positively towards the performance of the vessel and avoid cavitation issues. Our five axis CNC milling machines are employed to replicate the required design profiles.

Our Manufacturing Facility

Teignbridge has a complete design and manufacturing facility that can produce any type of bracket to suit your needs, fabricated (aluminium, mild steel or stainless steel), cast aluminium bronze and composite moulded.



Flanges, Starter Struts and Bearings

We design and manufacture brackets with either with a flange to be bolted to the vessel's hull or brackets that are welded directly to the hull, or with starter struts or to be glassed in to a hull.

Our brackets can be designed with a wide range of bearings including rubber/ bronze Aqualube bearings, rubber/ phenolic Aqualube bearings, and a wide range of composite bearings shelled or flanged.

Nozzles to increase Thrust

- Standard design 19A
- Standard design 37
- VG40 High Speed Applications
- Optimised designs
- Steering nozzles

SHAFTS, STERN TUBES, BEARINGS & SEALS

WORLDWIDE INSTALLATION SUPPLIES

Teignbridge design and manufacture a comprehensive range of stern tubes for use in shaftline assemblies. In addition to a standard range of designs, Teignbridge custom design stern tubes to various customer specifications, in a variety of materials for a range of vessels. Thousands of installations have been supplied worldwide by Teignbridge over a 50 year period. Water lubricated bearings helps to cushion vibration loads and provides excellent bearing life.

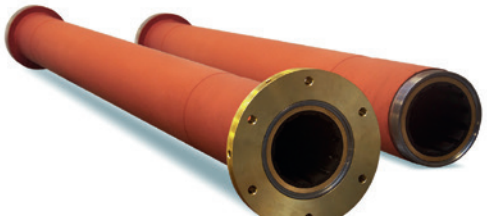
Aqualube Marine Rubber Bearings

Rubber and water make the perfect combination for a bearing material and a lubricant. The Aqualube range of rubber sleeved and flanged bearings is designed for both marine and industrial applications. The bearings feature a specially formulated rubber, moulded into various shell materials. The rubber is an extremely tough, chemical and oil resistant nitrile which offers outstanding resistance to abrasion and wear, even in the most adverse conditions.

Composite Bearings

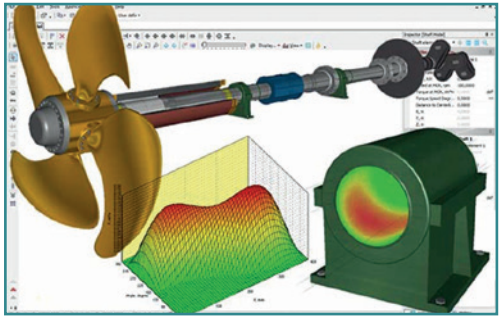
Composite bearings provide a low coefficient of friction minimising the start-up torque and both friction and wear, they also deliver a longer life cycle, which reduces docking intervals and therefore maintenance costs.

The designer can choose a composite material that suits a variable environment or one specifically designed for a river or sandy/silty environment and is compatible with the vessel's operating modes.



Temet 25 Shafts

Temet 25 is a special high strength duplex stainless steel alloy. It has an outstanding resistance to corrosion in seawater which makes it an ideal material for propeller shafts. Temet 25 was introduced to the marine market by Teignbridge in the late 1980s for the high horse-power diesels being fitted to motor yachts and workboats. Temet 25 has a combination of toughness, strength and resistance to corrosion, superior to other commonly used shaft material. Temet 25 is now the industry standard material used in place of Monel K500 and Aquamet 22 or 17. It is now used by all UK boat builders and extensively in the rest of the world. Temet 25 is suitable for any marine propeller shaft application and is the material of choice for leading shipyards and operators of all types of leisure, military and commercial vessels.



Teignbridge has invested in facilities, equipment and technology to improve shaft production. The entire south wing of the extensive Newton Abbot facility has been redesigned and refitted to accommodate demand for increasing capacity for shaft manufacture. In line with increased capacity, Teignbridge have also invested to improve the shaft design process with the acquisition of state-of-the-art ShaftDesigner software.

Stern Tubes

- Steel Water Lubricated (SWL)
- Bronze Water Lubricated (BWL)
- GRP Water Lubricated (GRPWL)
- Aluminium Water Lubricated (AWL)
- Oil Lubricated Systems

Shaft Seals

Teignbridge supply three different types of water lubricated seals. These are:

- Lip Seal
- Face Seals
- Gland Seal (or stuffing box)

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