



TPIL Sales Presentation

A World Leading Supplier of Propellers and Stern gear



Presentation to CMN April 2010

An overview of Teignbridge Propellers International Ltd

Its ownership, its competencies and experience

Its claim to be the best option as a propeller and sterngear supplier to CMN

To differentiate TPIL from other propeller manufacturers.

Our aim is to demonstrate the capabilities, innovations and achievements of the group companies.

A World Leading Supplier of Propellers and Sterngear



Who are the owners of Teignbridge Propellers Int. Ltd?

Teignbridge is owned by David Duncan and David Hunt who are the shareholders of Duncan Propellers Holdings Ltd

Both are engineers and have been in the propeller industry and sterngear industry since Teignbridge was originally formed in 1974.

David Duncan was one of the original founders and a previous Chairman of the company.

David Hunt was the Managing Director of the company up until year 2000.



The Structure of Duncan Propellers Holdings Ltd



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Duncan Propellers Ltd

- Set up in 2005 and is based in Newton Abbot, Devon
- 75% of customers are commercial marine sector
- Manufacture of propellers up to 2.65 metres diameter
- Has purpose-built manufacturing facility
- Its own foundry
- 35 employees
- Turnover in 2008 > £3M

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Teignbridge Propellers Dubai

- Founded in 1988, based in Jebel Ali, UAE
- Sales of propellers and sterngear
- Sales of jet drives, bow thrusters and steering gears
- Markets are Middle East, Africa, Indian Sub-Continent
- Warehouse in Jebel Ali Free Zone
- Offices in Dubai City at Al Jadaf
- 10 employees
- Turnover in 2008 > £6M

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Teignbridge Gulf LLC

- Formed in 2000, based in Dubai, UAE
- 3 employees
- Propeller repair and service centre
- Service and installation of jet drives and thrusters
- Has purpose-built manufacturing facility
- Turnover 2008 circa £1M

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Teignbridge Propellers International Ltd

- Originally established in 1974
- Based in Newton Abbot, Devon
- 90% of customers are leisure marine sector
- Manufacture propellers up to 2.65 metres diameter
- Has purpose-built manufacturing facility
- Its own foundry
- 80 employees
- Turnover in 2008 £6M

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Compared to other propeller manufacturers, we believe we offer:

- A stronger background of knowhow and experience
- More technically advanced manufacturing facilities
- Unrivalled manufacturing processes
- A superior knowledge of propeller design
- A larger range of sizes and styles
- The ability to innovate rather than just copy

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We believe that we offer our customers:

- A superior design and application engineering service
- A rapid, low-cost pattern and mould-making process
- Shorter manufacturing lead times
- An extensive and rapid aftersales service
- Improved performance with faster, smoother-running propellers
- Excellent quality
- A dedicated Quality Assurance Engineer
- Competitive prices

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Background, Knowhow and Experience

- Teignbridge Propellers was involved at the very beginning of the growth of the UK production motor yacht building industry in 1974.
- At that time there were just a few propeller companies producing propellers to out-dated designs, not suited to fast boats.
- Teignbridge introduced new innovations into the propeller field which improved boat performance and soon became the supplier of choice.
- Teignbridge supplied designs for the first shaft-driven boats produced by Princess, Sunseeker, Fairline and Sealine and a whole host of overseas production boat builders.
- Under our management Teignbridge grew to employ 240 people in 8 UK and overseas companies supplying both leisure and commercial market sectors.

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More Advanced Manufacturing Facilities



View from the north side of the Teignbridge factory with a total floor space of 6000 sq metres on 3.5 acre site

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TEIGNBRIDGE PROPELLERS

The Driving Force in Marine Propulsion

Sales, Engineering and Design Office



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The Pattern Store



There is a complete range of standard propeller patterns.

Additionally, there are thousands of propeller and sterngear patterns for a multitude of boat models.

The Teignbridge Foundry



A view of the mid-range propeller-moulding line.

The Teignbridge Foundry



The carousel where moulding of sterngear components and production propellers takes place.

The carousel enables high-speed moulding of components. After moulds have been made they are fed onto a roller system ready for casting in separate area of the foundry.



Propeller Shaft and P-Bracket Manufacturing Section



Shafts, P-brackets, rudders and propellers are manufactured in machining cells.

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A Superior Propeller Design – The C-FOIL

Four years ago, Duncan Propellers introduced a new propeller design into the industry. The new design has been extensively tested. In every comparative test, it outperformed all competitors' propellers with increased speed and better fuel economy.

C-FOIL propellers have been adopted by every boatbuilder that has tried them. The design uses a new propeller blade section shape gives an improvement in thrust. It also reduces the possibility of generating cavitation.



Latest design innovation now undergoing sea trials

Seven-bladed highly-skewed propellers

- With the need for smoother, anti-vibration performance, we have introduced a new range of seven-bladed propellers.
- There are various causes of vibrations. Even a CNC-manufactured propeller with perfect geometry will have some vibration.
- Waterflows of different directions and intensities, depending on the distance of the flow from the hull and disturbances from appendages will cause vibration.
- The most pronounced effect comes from a propeller on an inclined shaft. The blade pitch angle on one side will increase and on the other side it will decrease. This causes the pitch to become heavy and then light, as the propeller rotates.
- More blades will reduce vibration.

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Seven-bladed Propellers

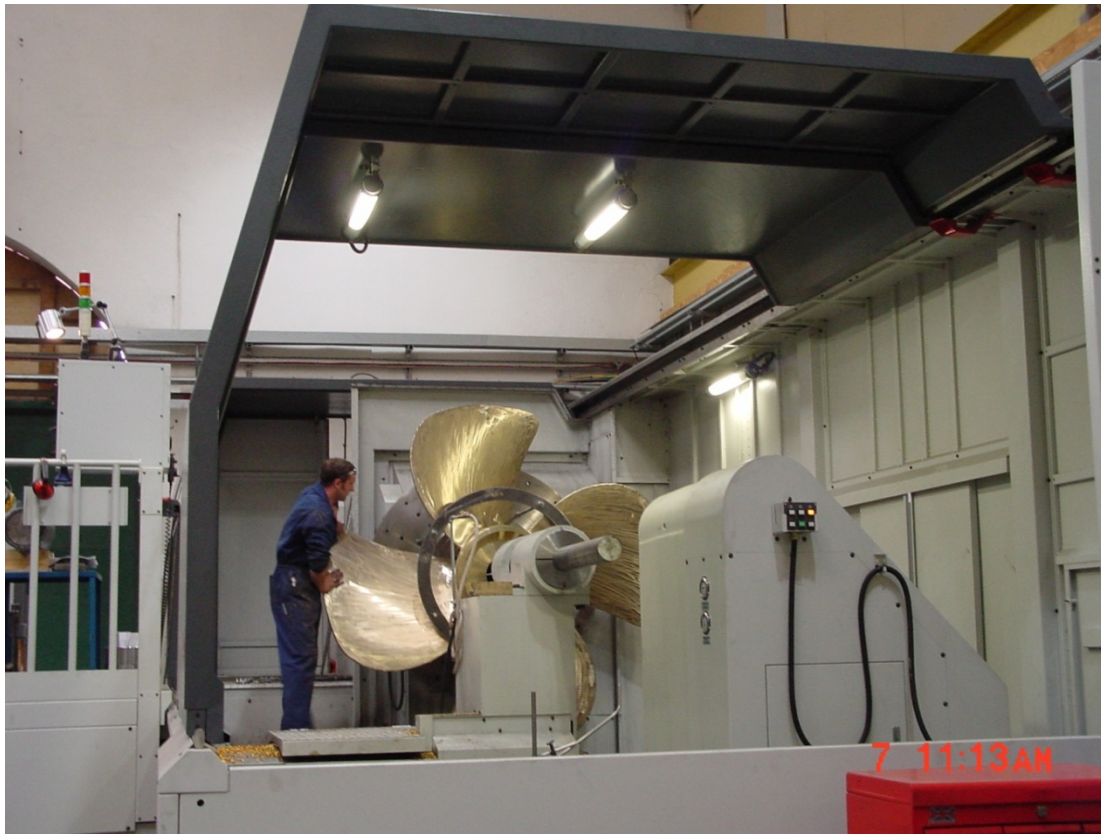


In recent tests, compared with five-bladed propellers, the seven-bladed propeller has proved to be much smoother. A small improvement in speed and fuel economy has been gained.

Tests are continuing and seven bladed propellers are expected to become standard equipment on motoryachts of the future.

We are working to keep prices at the same level as for five-bladed propellers.

A Larger Range of Sizes and Styles



Teignbridge now have a melting capacity of 3 tons. Propellers of up to 2.65 metres in diameter are produced and shafts up to 250mm diameter.

A recent major investment in an outsized CNC lathe has improved productivity for boring larger propellers up to 2.6 metres. The lathe weighs in at a massive 38 tonnes.



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Quality and Quality Assurance

Teignbridge holds ISO 9001 – 2000 Quality Assurance Accreditation



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Quality and Quality Assurance

In addition to ISO 9001, Teignbridge holds approvals from the following Classification Societies:

- Lloyds Register of Shipping
- Det Norske Veritas
- Bureau Veritas
- American Bureau of Shipping
- RINA
- Germanischer Lloyd
- Russian Register of Shipping

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Quality and Quality Assurance

Teignbridge employs a full-time Quality Assurance Engineer whose role is to ensure that all products are manufactured to the highest standards. This helps to eliminate possible manufacturing errors before the goods reach the customer.

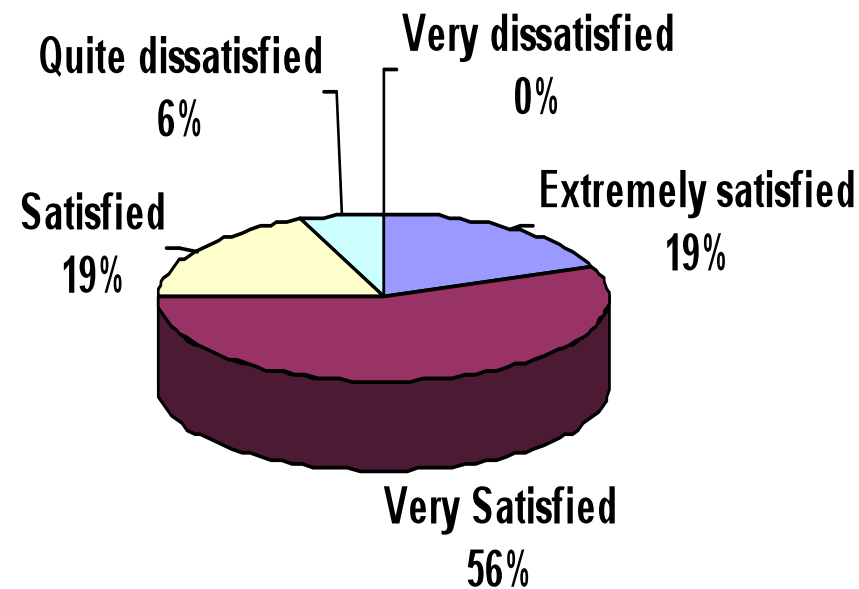
Customers have the benefit of a dedicated person with excellent product and process knowledge to liaise with in the event of a non-conformity

Quality and Quality Assurance

In line with the requirements of ISO 9001, a customer survey was recently carried out to all customers asking them to rate the performance of Teignbridge in the following areas:

- Quotations
- On time delivery
- Product quality
- Customer service
- Recommendations
- Overall satisfaction

The results are shown in the pie chart opposite





Shorter Manufacturing Lead Times

Teignbridge currently operate night shift working.

This is part of our three-shift system to give 24-hour working

In addition, Saturday and Sunday working is being introduced into the pattern making section and in the foundry also.

This enables the company to offer shorter manufacturing lead times and an excellent after sales service for spares.



Unique, rapid and low-cost pattern and mould making process

The company has developed a unique computer software program to generate propeller shape and geometry

The program is menu-driven for ease of loading propeller details. The program quickly generates a propeller shape in the computer. Code is then downloaded to a 5-axis CNC milling machine which machines the pattern and mould parts.

Sand parts are then made and assembled to make the propeller mould. This is a very quick process and produces very accurate castings.

Therefore, a design can be started at the beginning of a working day with a casting produced by the end of that same day. This process gives Teignbridge customers unbeatable service for spare or prototype propellers. The enquiry to delivery time can be reduced to as little as three days.



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Unique, rapid and low-cost pattern and mould making process

Row	Column	Field Name	Value	Units/Notes
2	B	Pattern No	PP3019	
3	B	Pair / RH Only / LH Only	RH Only	
6	B	Blade Style	Kaplan	(Kat2 & Kaplan Platform)
7	B	Diameter	1950	mm
8	B	Pitch	1425	mm
9	B	Skew	0	degrees
10	B	Rake	2.17	
11	B	Material	HTB1	
12	B	DAR	60	
13	B	No of Blades	4	
14	B	Hub/Boss Length	340	mm
15	B	Boss OD in inches	10.230	
19	B	Step Size Radial	0.09	mm
20	B	Step Size Circular	0.09	mm
21	B	Shrinkage	YES	
22	B	Tool Diameter	25	mm
23	B	Double Shrinkage		
24	B	M/C Allowance	0.135	mm
25	B	Stress Factor	1.5	
26	B	Edge Thickness	0.334	mm
29	B	Power	938	hp
30	B	Engine Revs	1800	rpm
31	B	Reduction Ratio	5.421	
32	B	Shaft Revs	332.0	rpm
33	B	Dishing	No	
34	B	Wedging	No	
35	B	Vessel Speed		knots
36	B	Z-adjust	0	mm
38	B	Total Block Height	365	mm
39	B	Bottom Block Height	0	mm
40	B	Standard Z at top of block	198.0	mm
41	B	Standard Z at bottom of block	-157	mm
45	B	Backface Rotation Angle	0	degrees
46	B	Blade Rotation Angle	0	degrees
47	B	Jointface Length	25	mm

The program is menu-driven for ease of loading propeller details. The program quickly generates a propeller shape.

The software can also be used to reverse-engineer any type or style of propeller. This is useful when supplying propellers to builders who no longer use a propeller supplier but need to maintain a supply of spares to their boat-owning customers.

Once a generic style has been input into the program it can be scaled up or down in diameter and pitch.

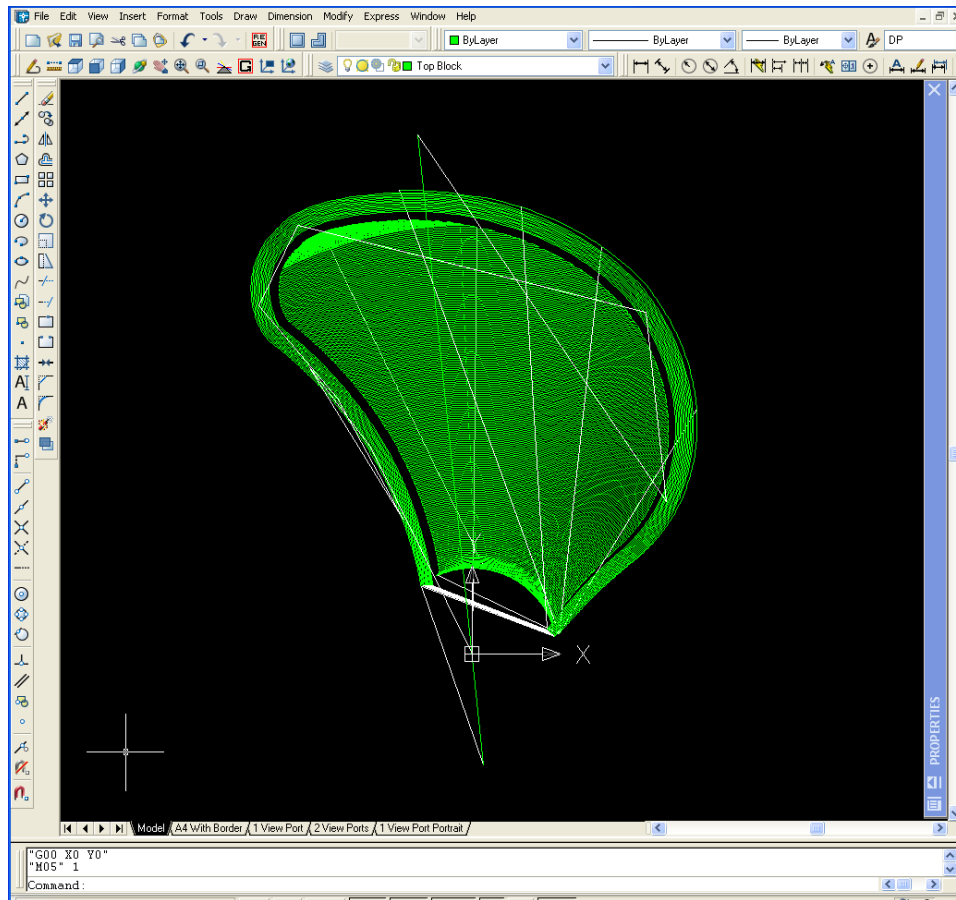
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The software quickly generates the required blade shape, skew, DAR, rake and blade section thickness for any given design.

The toolpath of the cutter can also be checked prior to machining.

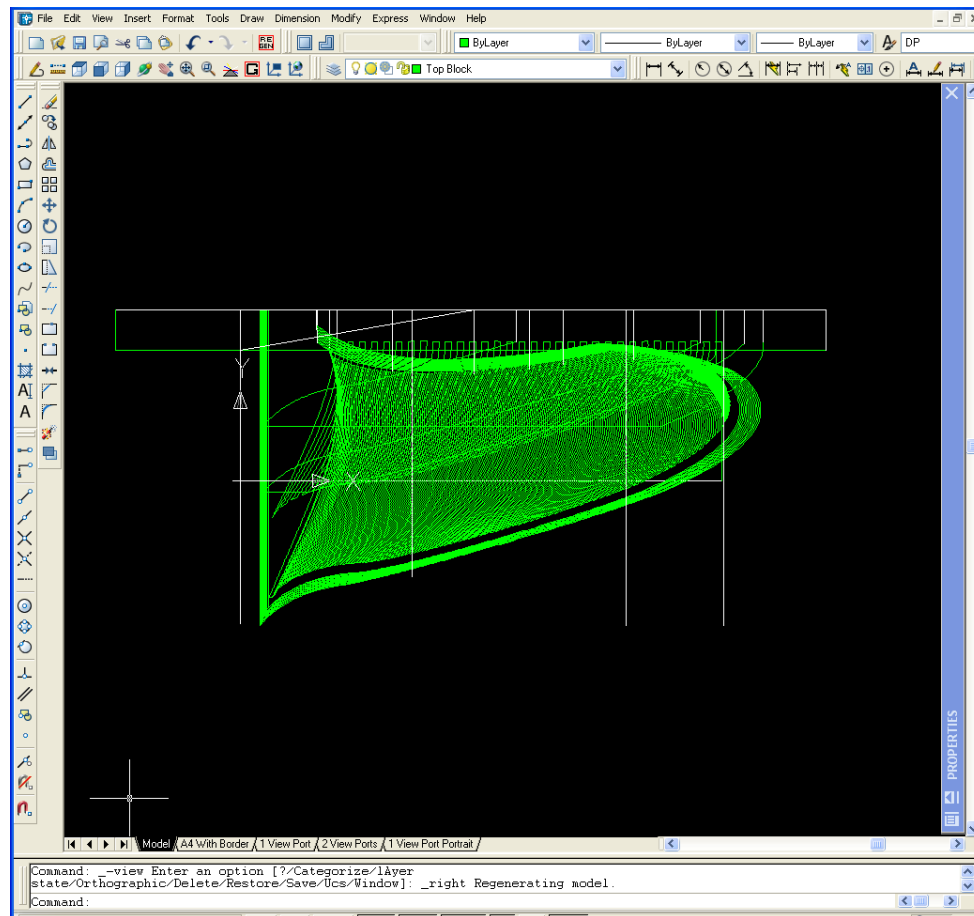
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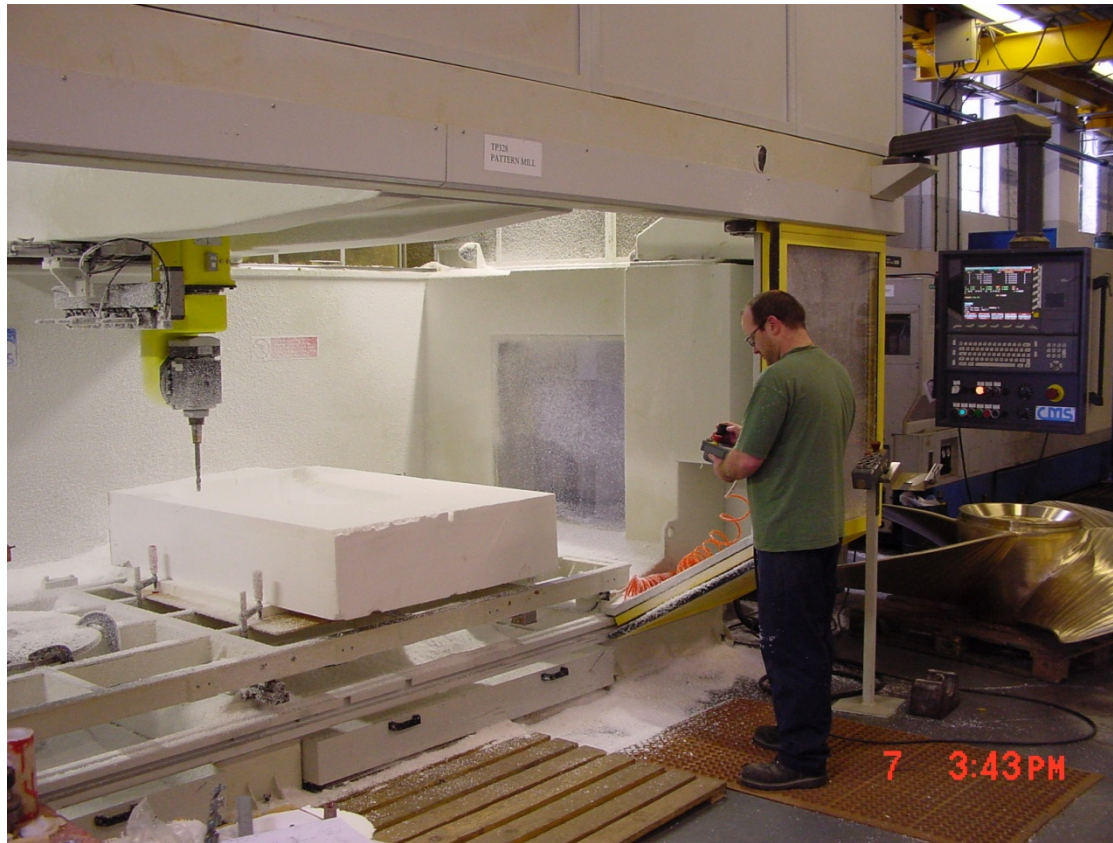


The side view of the propeller can be viewed to ensure it has sufficient clearance with rudder blade and P bracket strut.

So far the process has taken less than one hour.

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Unique, rapid and low-cost pattern and mould making process



Details of the propeller are downloaded into the 5-axis CNC milling machine which very quickly cuts the blade shape into a high-density polystyrene block. Two blocks are required for each propeller, one for pitch face and one for suction face.

Once the machining is complete the block can go to the foundry for sand moulds to be made. So far the complete process has taken less than three hours.



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Unique, rapid and low-cost pattern and mould making process



The blocks are filled with sand. Each block makes one half of a blade mould.

This process can be carried out by an operative in a matter of a few minutes. This reduces time and costs, compared to traditional methods.

This process takes just a few minutes for each blade.

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Unique, rapid and low-cost pattern and mould making process



The individual blade moulds are fitted together and the propeller is assembled using a specially adapted base where each blade is slid into place using key ways.

This method produces propeller castings with highly accurate blade spacing and tracking, which helps to eliminate the two main causes of propeller induced vibration.

Once the propeller is assembled, it is enclosed in a box and filled with sand to support it, ready for pouring the molten bronze.

At this stage the process has taken about 6 hours.



Unique, rapid and low-cost pattern and mould making process



115' Blue Star Princess, built by Baglietto, damaged a propeller shortly before it was due to be chartered.

Duncan Propellers responded to their SOS.

A new 1200mm diameter propeller, a copy of the Port propeller, was produced in a matter of a few days and shipped to the South of France. We hit the performance requirement first time on trials.

The charter took place saving the boat owner 90,000 Euros.

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- Pendennis Shipyard – UK – Replacement propellers for ‘Va Bene’ superyacht to LRS rules. Carried out a vibration appraisal prior to designing new propellers. Fitted propellers to the boat. New shafts and refurbished existing propellers for superyacht to DNV class.





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