



LARGE METAL CAST PATTERNS

PRODUCED 33% FASTER

HOW TEIGNBRIDGE OPTIMIZED ITS PROPELLER-
MAKING PROCESS USING THE BIGREP ONE

HIGH-PERFORMANCE ENGINEERED COMPONENTS

Teignbridge Propellers International is a high-performance, marine engineering components company. Over 40 years old, Teignbridge produces its signature custom-designed and produced propellers, for tugs, luxury yachts, fishing trawlers and ferries.

PRODUCTION OF CUSTOM-DESIGNED PROPELLERS INVOLVES FIVE TRIED-AND-TESTED STAGES.



Although the overall technique is well-established, companies in the industry must compete to preserve their reputation and further their position in the market. Teignbridge does this through delivering top-notch workmanship for a high-quality product, and by constantly innovating and investing in both an improved product and in more efficient production processes.

This combination of unquestionable quality with an innovative streak has made the company a world-leading supplier of propellers and stern gear.



“WE PRODUCE HIGH-QUALITY ENGINEERED COMPONENTS. WE HAVE TO CONSTANTLY INNOVATE TO RETAIN OUR POSITION AS A LEADING FIRM IN OUR SECTOR.”

Ian Moss
CEO, Teignbridge

BigRep's experts are waiting to sink their teeth into your unique and challenging use case.

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LARGE, COMPLEX METAL CASTING PATTERNS PRINTED FAST ON A BIGREP ONE

In 2017, Teignbridge invested in a BigRep ONE large-scale industrial 3D printer for use in propeller production. The BigRep ONE workhorse 3D printer is used in the second stage of the process, to 3D print a full-size replica of the designed propeller to be the positive pattern for the cast mold.

PATTERNS ARE PRODUCED IN THREE STEPS:

1

Engineers make a CAD model of the part, convert this to a G-code file, and load the file onto the BigRep ONE.

2

The BigRep ONE prints the pattern. The pattern-maker facilitates this by ensuring the machine has the correct BigRep 3D printer filament loaded.

3

The pattern is then post-processed with the removal of the support structure, followed by the application of filler and a coat of mold release paint.

The process is straightforward. A typical pattern fits into a volume of 500 mm x 500 mm x 750 mm, meaning the BigRep ONE can comfortably print it in one go. Such patterns of around 4 kg take 40 hours to print, thus can be fully produced, including post-production, within just 48 hours. Short print times come in part from the BigRep ONE's ability to print structurally sound patterns with hollow interior sections, which brings the added benefit of minimal material use.

“IN PRODUCING OUR PROPELLER PATTERNS, CYCLE TIME IS NOW AROUND 33% LESS. TRADITIONALLY IT WOULD TAKE US OVER 3 DAYS TO PRODUCE A PATTERN. NOW IT TAKES LESS THAN 2 WORKING DAYS.”

Ian Moss
CEO, Teignbridge



“THE SIZE OF THE MACHINE WAS A CRITICAL FACTOR IN SELECTING BIGREP AS OUR 3D PRINTING PARTNER. THE FILAMENT MATERIAL IS CHEAPER, FASTER AND MORE PRACTICAL THAN MATERIALS FOUND ON ALTERNATIVES SUCH AS RESIN 3D PRINTERS.”

Ian Moss
CEO, Teignbridge

THREE KEY BENEFITS

Teignbridge’s early adoption of BigRep’s 3D printing technology brings three key benefits, which together add up to a transformed pattern-making process.

<p>1</p>	<p>REDUCED CYCLE TIME</p> <p>Teignbridge now achieves 33% shorter pattern production times. The 3D-printed approach takes just 48 hours, including post-processing. This compares to the three days Teignbridge used to spend producing patterns in wood or polystyrene with a milling machine. Some metal casting firms use traditional hand-production methods which take even longer.</p>	<p>FASTER DELIVERY TO CUSTOMERS</p>
<p>2</p>	<p>COST SAVINGS</p> <p>Major resource savings come from a 90% reduction in pattern maker labor required. The milling technique required 20 hours of skilled labor in CNC machine operation, section assembly, and post-processing. The 3D-printed method requires a maximum of two hours post-processing labor. The new approach also saves engineer time as one G-code file is required, rather than several.</p>	<p>INCREASED COST-COMPETITIVENESS</p>
<p>3</p>	<p>REDUCED LABOR RELIANCE</p> <p>The reduced need for pattern maker labor insures Teignbridge against two kinds of risk. It brings reduced risk of being undercut by low-wage competitors. And, as skilled pattern-makers become scarce in traditional locations, it brings reduced risk of labor shortages which could make project completions impossible.</p>	<p>INSURANCE AGAINST RISING WAGES & SKILLED LABOR SHORTAGES</p>

It is worth highlighting three key features of the BigRep ONE which enable Teignbridge to get maximum benefit from its switch in production technique. The large format of the ONE delivers maximum time-savings by allowing pattern production in a single print; the low per-kilogram cost of BigRep’s PLA filament contributes significant cost savings; being able to print sound, hollow patterns allows further time and materials costs savings.



A STUDY OF EARLY ADOPTION IN INDUSTRY

Teignbridge has been proactive in introducing BigRep's large-scale, fast, precise 3D printing technology to its industrial processes. It has done this because it can benefit from faster cycle times and lower costs in its metal casting of large, complex performance components for its customers. A key factor in deciding which 3D printer to purchase was the large-format factor, as well as BigRep's range of print materials.

Teignbridge's proactivity reflects the company's general approach to maintaining its competitive position, by seeking and embracing opportunities to invest in value-adding technologies. And it reflects its trust in BigRep's printer technology to reliably provide the kind of precision and performance required by the industry. Given the ingenious heritage, vital function, and exacting standards of the marine industry, this is a strong vote of confidence in BigRep technology.

“ OUR TYPICAL PROPELLER PATTERN IS 500 X 500 X 750 mm. FOR THAT REASON, THE SIZE OF THE MACHINE WAS A CRITICAL FACTOR IN SELECTING BIGREP AS OUR 3D PRINTING PARTNER AS IT MEANS WE CAN PRODUCE PATTERNS WITH ONE QUICK AND SIMPLE PRINT.”

Ian Moss
CEO, Teignbridge

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“ANOTHER PROBLEM THE BIGREP ONE SOLVED WAS THE LACK OF AVAILABLE SKILLED PATTERN MAKERS. THE 3D PRINTING SOLUTION ALSO PROTECTS US AGAINST OVERSEAS COMPETITION FROM LOW-COST ECONOMIES.”

Ian Moss
CEO, Teignbridge

