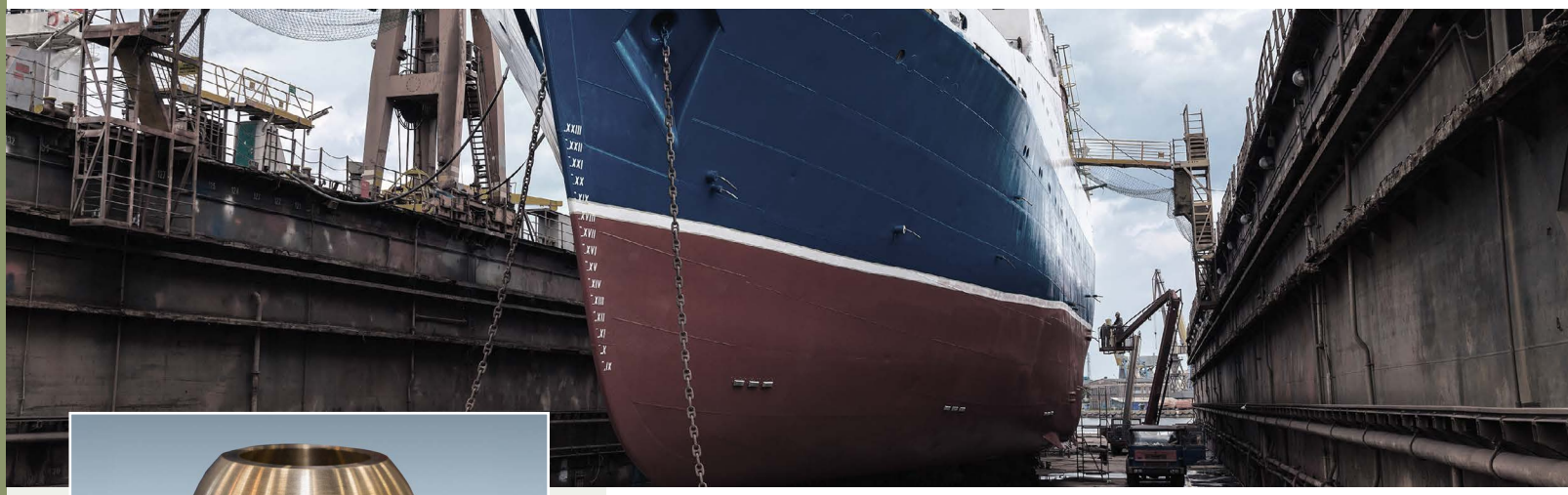


Variable Pitch Propeller Housing

Functional prototyping for optimized designs and increased efficiency.

Value Summary

The ability to quickly produce functional nickel aluminum bronze prototype housings for the variable pitch propeller design allows for faster iteration, reduced costs, and a shorter design cycle for bringing this innovative component to market.

Production Method	Production Time
Prototype Casting	4 weeks
SPEE3D CSAM	25.5 hours

Background
Traditional fixed blade propellers represent a compromise between low and high-speed characteristics (performance, economy, etc.) and are optimized for a single engine RPM and cruising speed of a vessel. A variable pitch propeller can be used to increase efficiency AND maneuverability over a range of operating speeds. Additionally, an adjustable pitch propeller can be used to achieve reverse thrust without the need for a gear box that allows the shaft to physically spin backwards creating reduced drive complexity and parts.

The Challenge
Producing prototypes for design iteration and functional testing is generally expensive and slow whether they are machined from billet or produced as prototype castings.

The Solution
SPEE3D's Cold Spray Additive Manufacturing (CSAM) technology was used to create functional prototypes for iterating and testing design for a variable pitch propeller housing.

The Value
Using CSAM for prototyping offers key advantages over traditional casting and machining, including design flexibility, faster iteration, reduced costs, and material efficiency.

Design to deployment in less than a day

Print: 4.5 hours

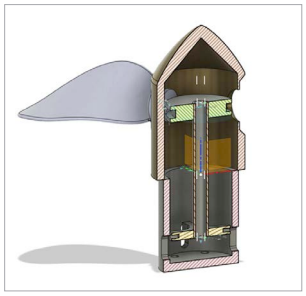
Aluminum 6061, 14.6kgs of material

Cook: 17 hours

Heat treated in a standard air furnace

Cut: 4 hours

Critical surfaces machined on CNC



About The Equipment

A variable-pitch marine propeller, also known as a controllable-pitch propeller (CPP), has blades that can be rotated around their long axis to change the blade pitch, allowing for optimized performance and efficiency under various conditions. They are efficient across a range of rotational speeds and load conditions, as the pitch can be adjusted to absorb the maximum power produced by the engine. When fully loaded, a vessel requires more propulsion power than when empty. By varying the propeller blades to the optimal pitch, higher efficiency is achieved, resulting in fuel savings.

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