

# MARINE PROPELLER PERFORMANCE ANALYSIS

**Expert application of computational tools can offer industry unparalleled flexibility in product design and performance assessment.**

Workflows ranging from a stand-alone performance comparison between differing designs right through to full design optimisation can be performed to not only inform but drive the design process.

DesignFlow was commissioned by Teignbridge Propellers, a leading manufacturer of high performance propellers, to perform a comparison of output thrust and operating efficiency between an industry standard and proprietary design of propeller in order to identify where, how and why performance differed.

Validation is crucial in developing a suitable simulative method so initial work focussed on replicating known experimental performance results for an example of the industry standard design. In order to allow flexibility in the propeller geometry used, a fully parametric propeller geometry generation tool was developed.

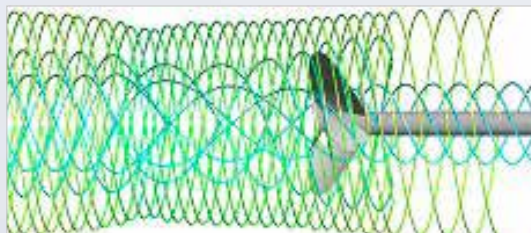
Once validation was completed, the geometry definition tool was used to develop a propeller of the same pitch, diameter and blade area ratio as the proprietary design.

Results of the comparative computational work did indeed indicate that the proprietary design offered significant performance improvement over the standard design.

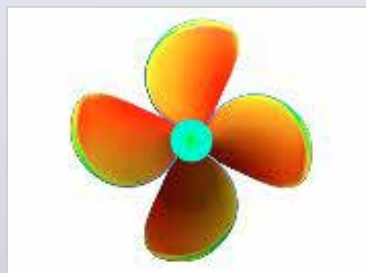
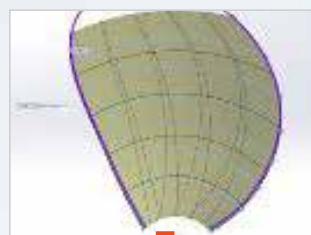
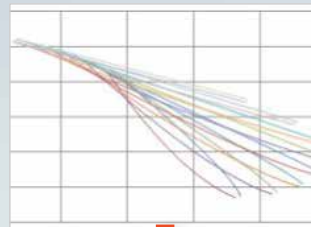
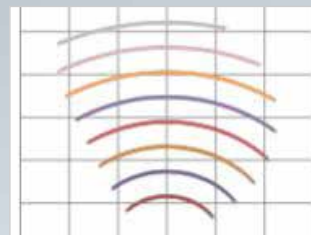
Moreover, the extensive interrogation of results possible using CFD software showed where and how this improvement was achieved.

This has not only equipped Teignbridge Propellers with a fundamental understanding of how blade geometry affects performance but also offers a reliable computational method which can be used to look at the effects of proposed design changes before any expensive prototyping and testing is performed.

Industry standard propeller simulation result images.  
(For commercial reasons, proprietary propeller images cannot be shown)



Standard geometry evolution



Working with DesignFlow has not only given us a deeper understanding of why and how our blade form affects performance but, crucially, demonstrates to our clients our key commitment to using cutting edge research and development tools to continuously improve our products."

**David Duncan, CEO Teignbridge Propellers, UK**



**UNIVERSITY OF  
PLYMOUTH**

DesignFlow is a specialist consultancy and research group operating within Plymouth University. We offer a range of CFD, engineering analysis and product development services to industrial clients and research partners.

**DesignFlow**  
Reynolds Building  
Drake Circus  
Plymouth PL4 8AA  
**Tel:** 01752 586116  
**email:** designflow@plymouth.ac.uk