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School of Engineering

FASTBLADE

Structural Composites Research Facility

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School of Engineering
University of Edinburgh



EPSRC

Engineering and Physical Sciences
Research Council

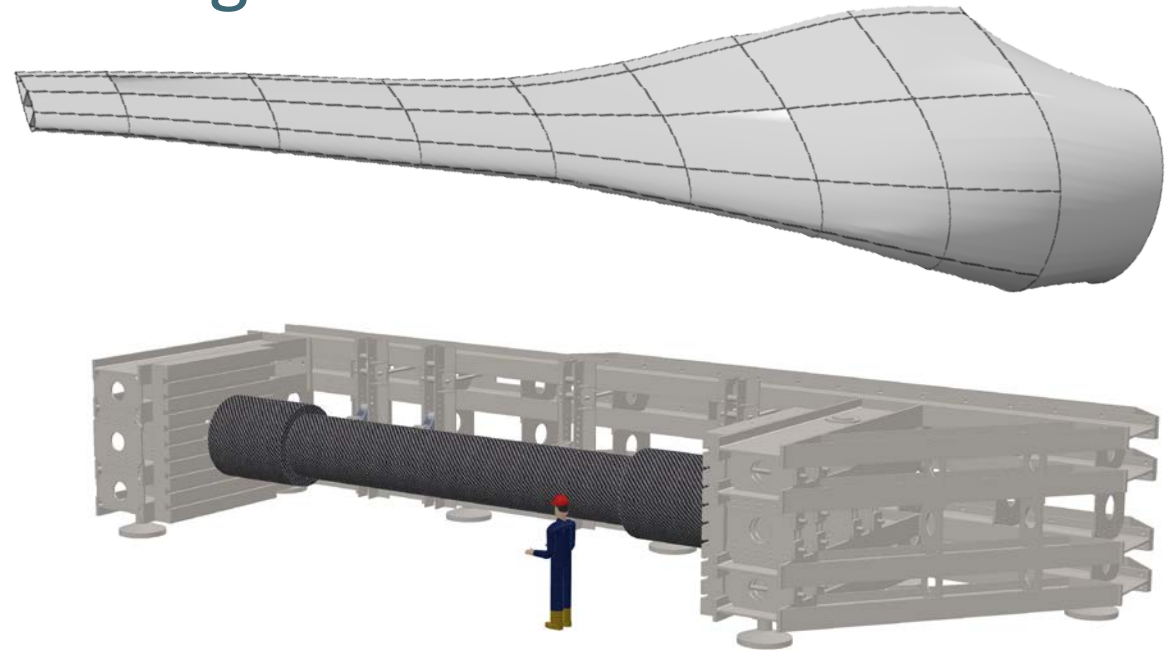
WHAT IS FASTBLADE?



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An innovative structural composites test facility funded by the EPSRC for **FULL** scale fatigue testing of:

- Tidal Blades
- Composite Bridge Sections
- Aircraft wing boxes
- Anything stiff and slender
 - 12m cantilevered
 - 10m simply supported



SMALL RESEARCH FACILITY (SRF)
EPSRC STRATEGIC EQUIPMENT GRANT: EP/P029922/1

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WHO IS FASTBLADE?



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SCHOOL OF ENGINEERING, UNIVERSITY OF EDINBURGH

ACADEMICS

- Prof. Conchúr Ó Brádaigh
- Dr. Edward McCarthy
- Dr. Tim Stratford
- Prof. Win Rampen
- Prof. Luke Bisby
- Prof. Spyros Karamanos

PROJECT PARTNERS

- ÉireComposites Teo
- Scotrenewables Tidal Power Ltd
- DNV GL (UK)
- Suzlon Energy Ltd



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WHY FASTBLADE?



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10x

Faster Fatigue

85%

Reduction in
Energy Input

The Ultra-Efficient Hydraulic Actuation System:

1. enables faster impact-led academic research into fundamental engineering options for new materials technology
2. reduces design risk by providing the opportunity for more and better data sets due to reduced product testing time
3. accelerated evaluation of tidal turbine blades leading to more rapid certification and deployment to market
4. significantly reduces fatigue testing costs

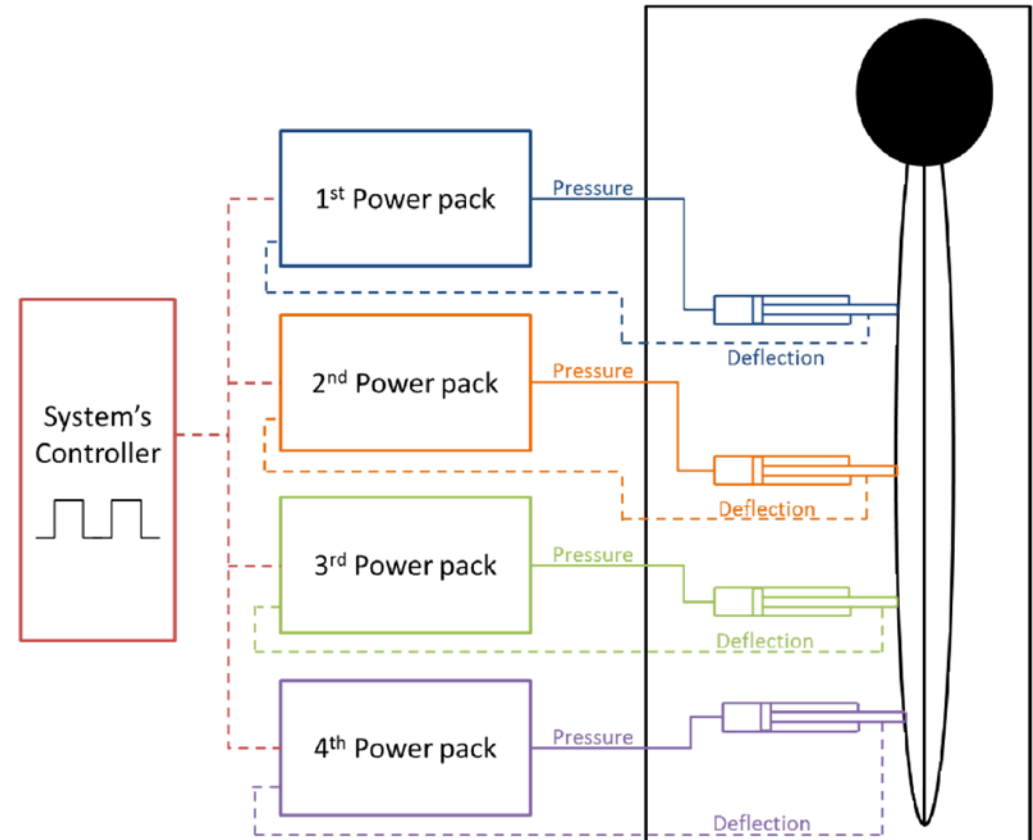
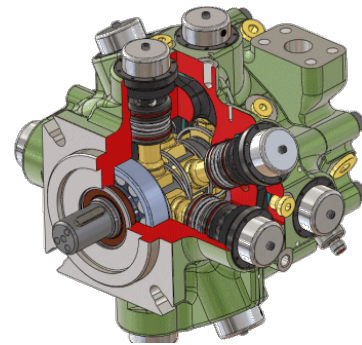


REGENERATIVE HYDRAULICS



The hydraulic actuation system recovers stored potential energy during the unloading cycle.

This transfer of energy reduces overall power demand from 70kW to 9kW.



FASTBLADE LOAD CAPABILITY



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1MN

Fatigue Load

3MN

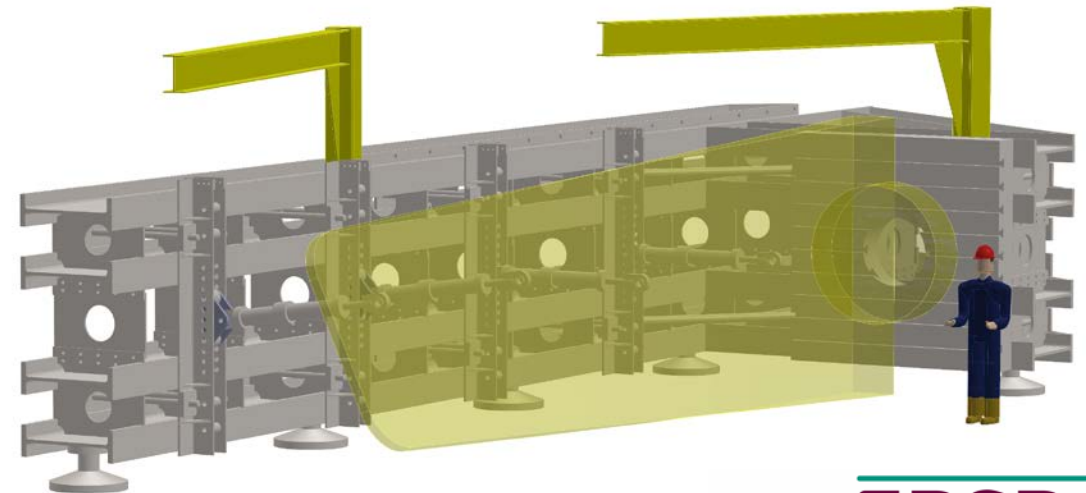
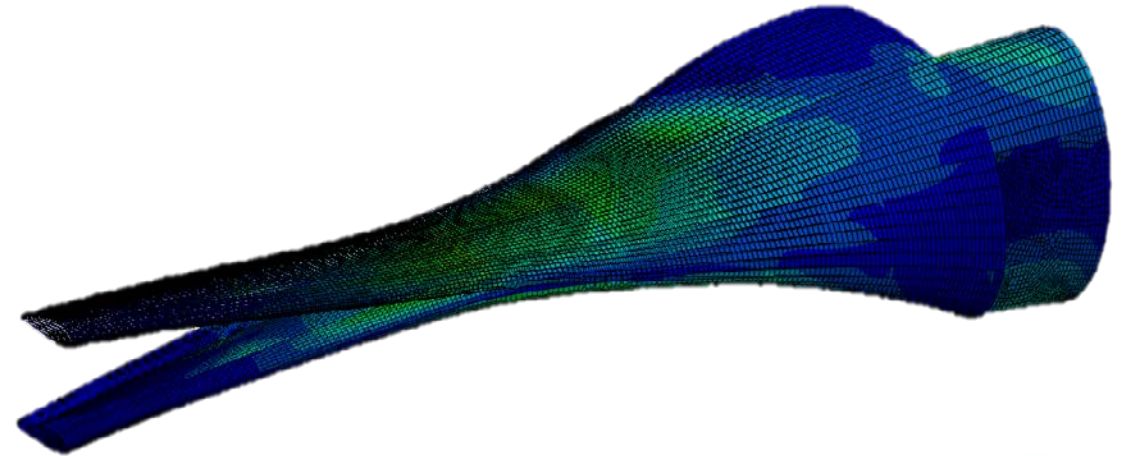
Static Load

5MNm

Fatigue Moment

15MNm

Static Moment



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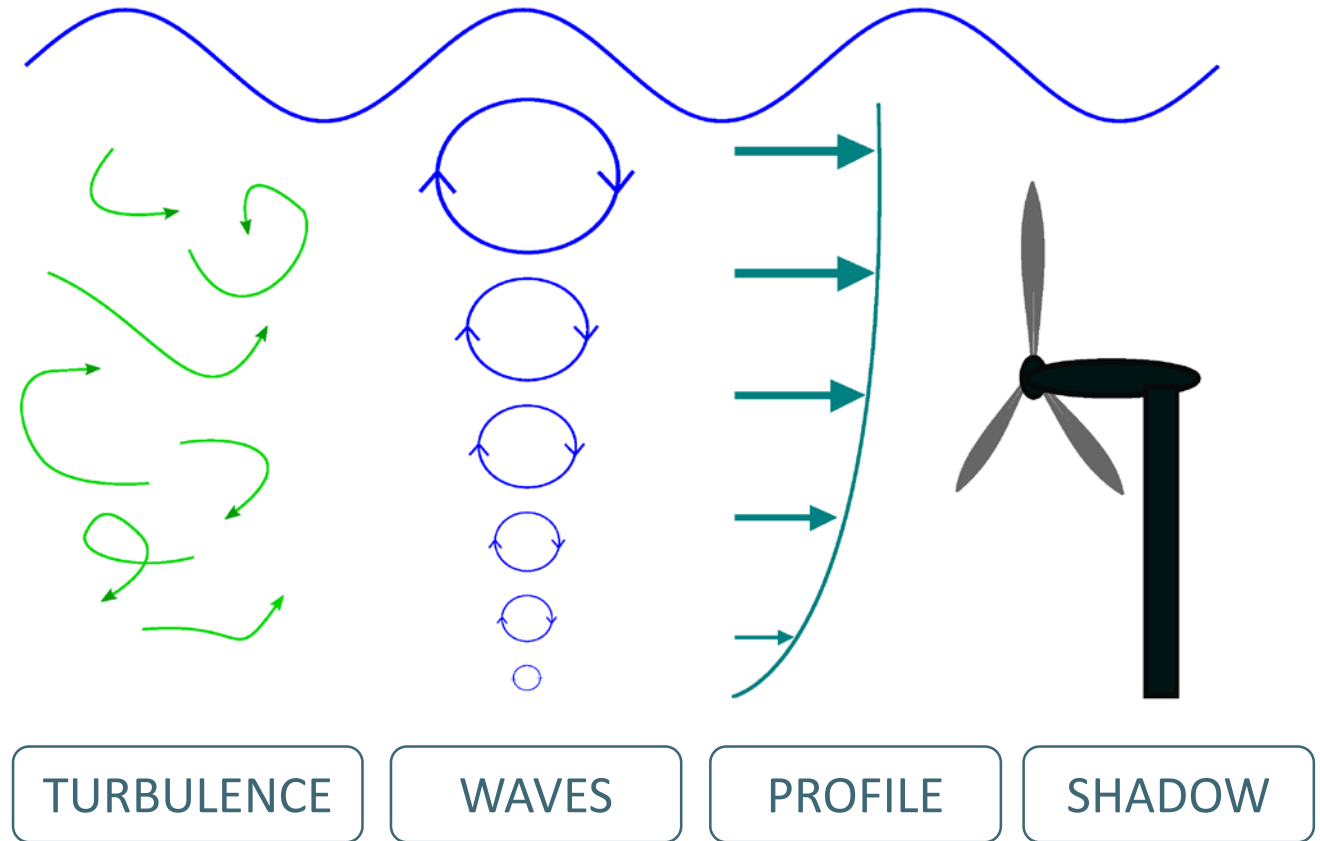
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COMPLEX FATIGUE WAVEFORMS



The hydraulic actuation system works together to flex the blade with complex load profiles and waveforms.

This will permit more advanced understanding of the fatigue impacts of the different load spectra exerted on tidal blades.



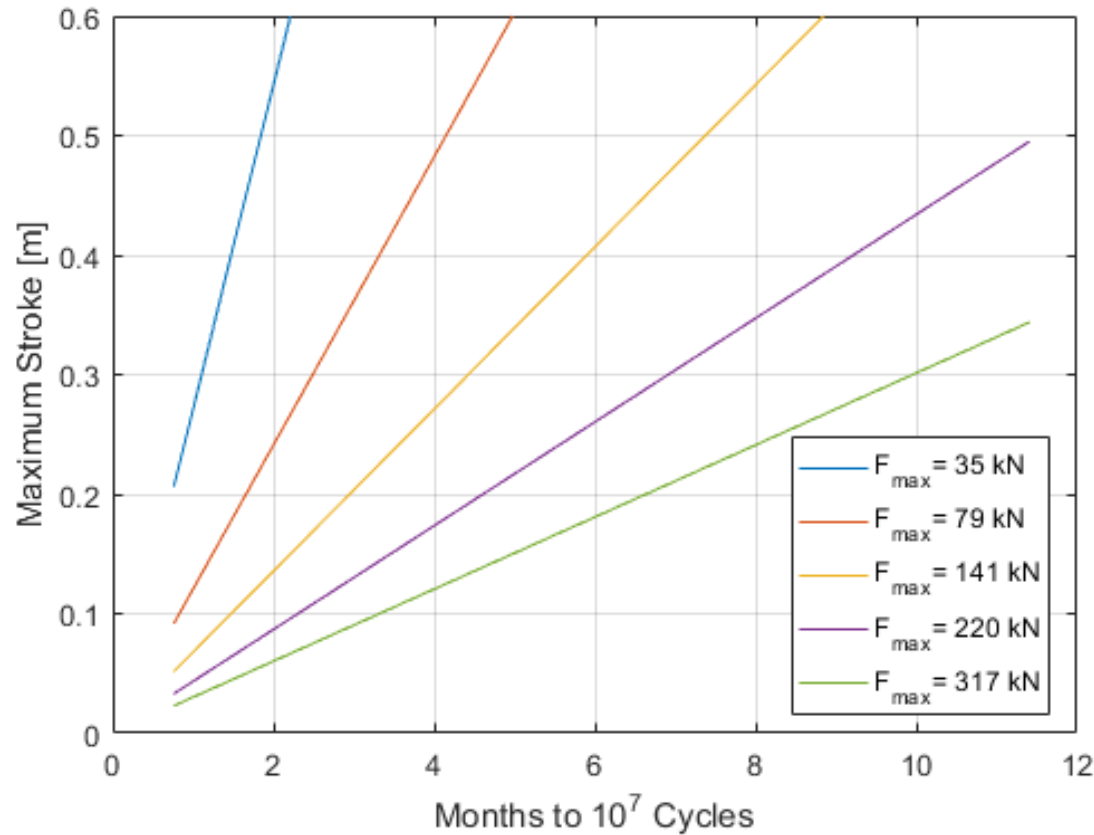
HOW FAST IS FASTBLADE?



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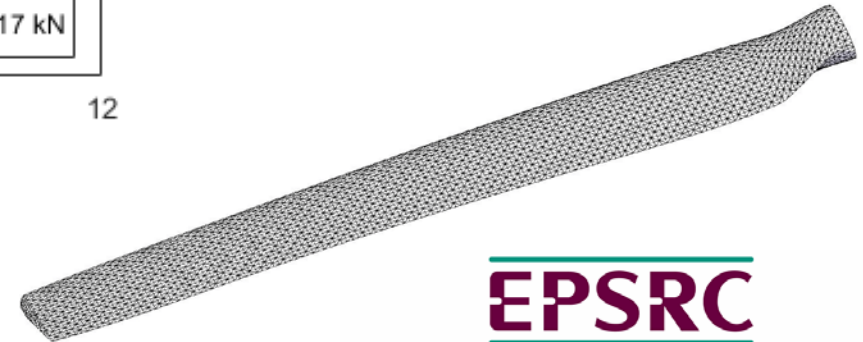
1Hz
Faster Fatigue

300mm
Deflection



2019

£1.4M
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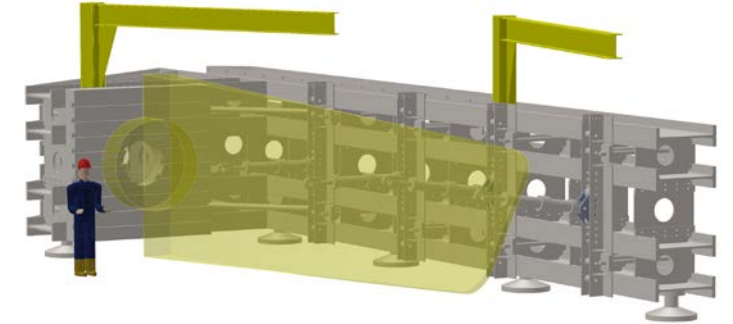
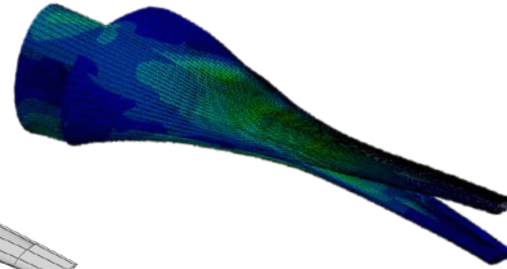
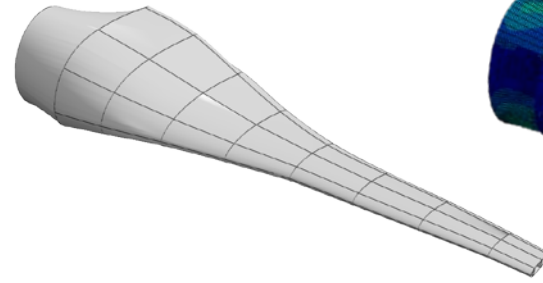
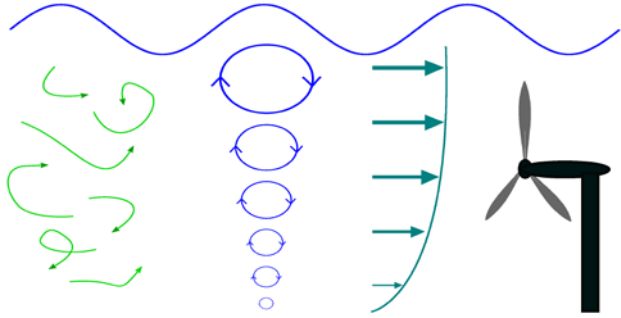


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THANK YOU



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85%

Reduction in
Energy Input

10x

Faster Fatigue

QUESTIONS

1MN

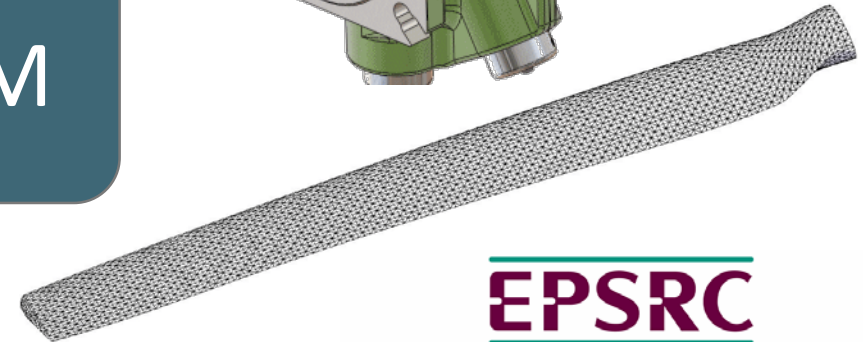
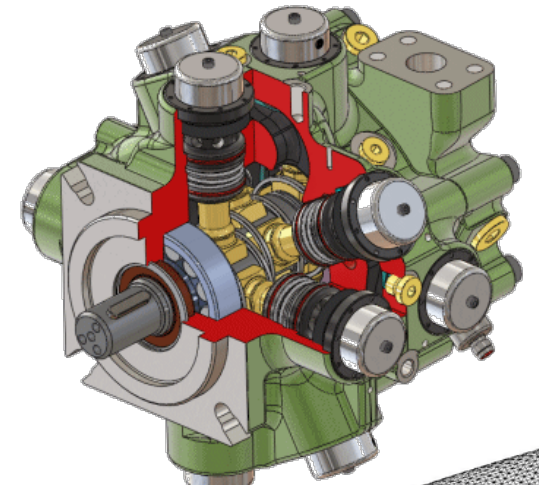
Fatigue Load

5MNm

Fatigue Moment

2019

£1.4M



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