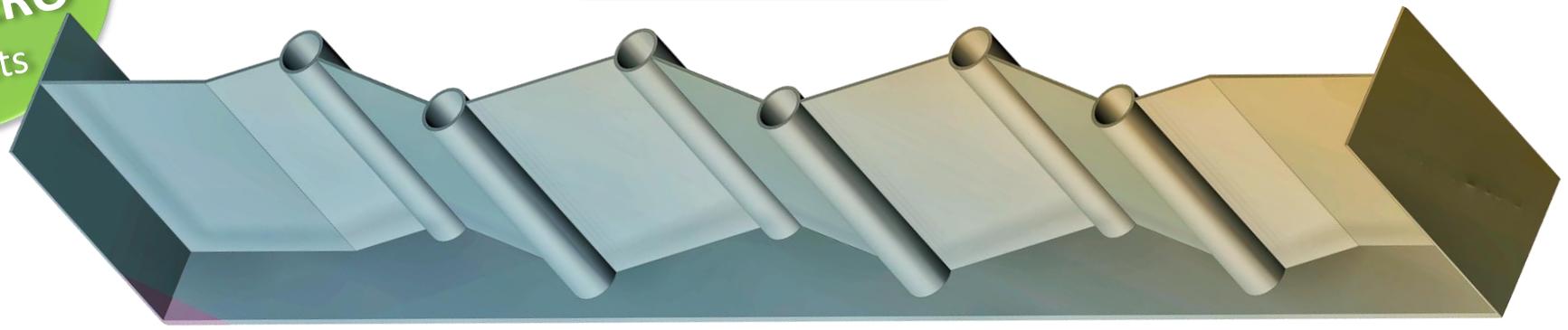


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Targets



**Wavebeam is the new lightweight
alternative to the i-beam and uses 35% less steel to manufacture**

**This new lightweight structural steel beam could be
adapted for use by the MOD**

The lightweight beam for heavyweight military applications



35% reduction in weight compared to a standard I-beam



When it come to building lightweight mobile bridges to support heavy armored vehicles, Wavebeam will provide greater strength and lateral torsional resistance, and gives increased spanning capabilities.



35% reduction in weight compared to a standard I-beam



Being 35% lighter for the same strength, will mean that bridge equipment could be either moved much quicker over rough terrain by using much less fuel to carry the same pay load, or alternatively, carrying the same weight and having the ability to cover 35% longer bridge span



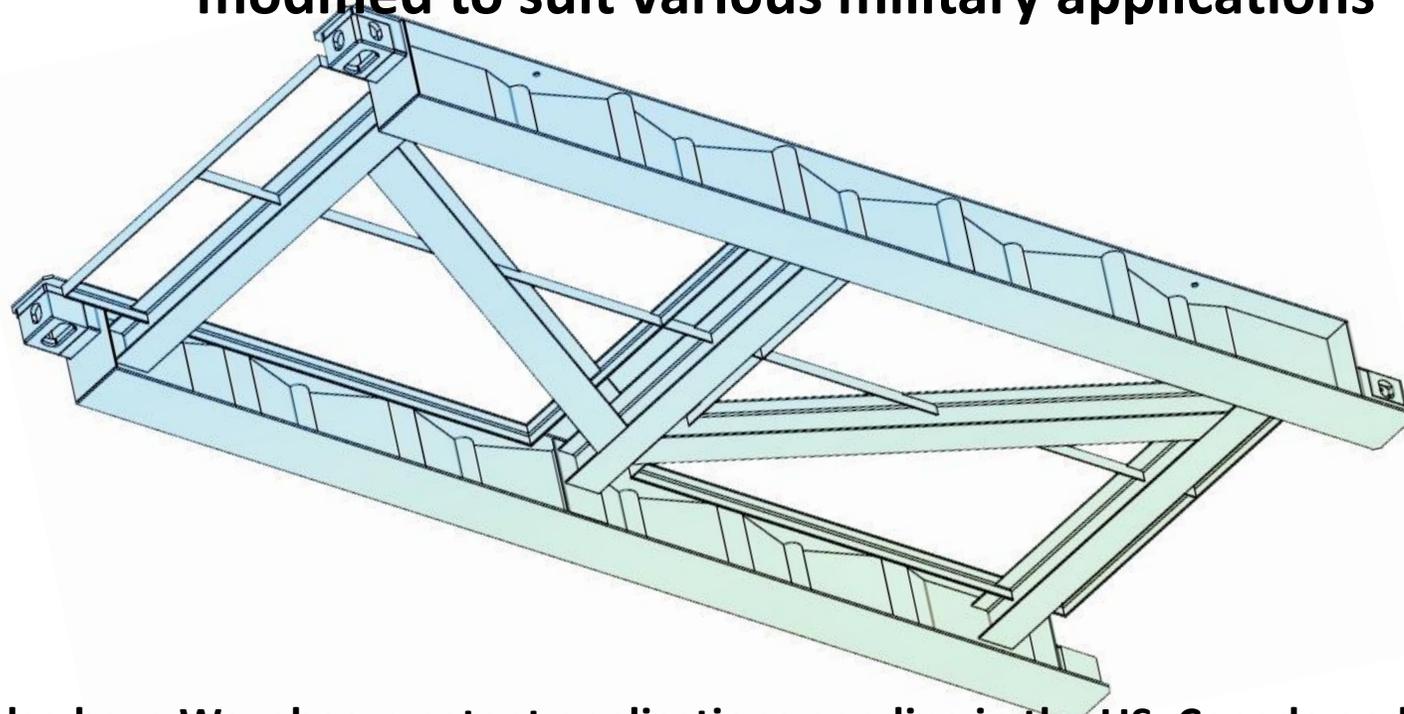
Up to 35% reduction in weight compared with Plate Girders



Because Wavebeam is lighter, it effectively provides greater spanning abilities, as the weight of the steel does not sag to the same extent as heavier beams when being pushed across from one bank to the other side of the river



This Wavebeam Floating floor section was originally designed for offshore oil and gas industry but the concept could also be modified to suit various military applications



We also have Wavebeam patent applications pending in the US, Canada and Europe

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Adding a Wavebeam Modular Extension will increase the laydown area on existing offshore assets

This concept could be modified for larger ships and aircraft carriers as large sections of deck could be hydraulically extended from the sides to provide additional space for all manner of equipment



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Extend the laydown areas of the deck on large aircraft carriers



hydraulically extended

hydraulically extended

Standard I-beams are far too heavy to allow this type of procedure

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Wavebeam would stop the ship bending and twisting in rough seas as is minimises the lateral torsional forces and requires less additional bracing

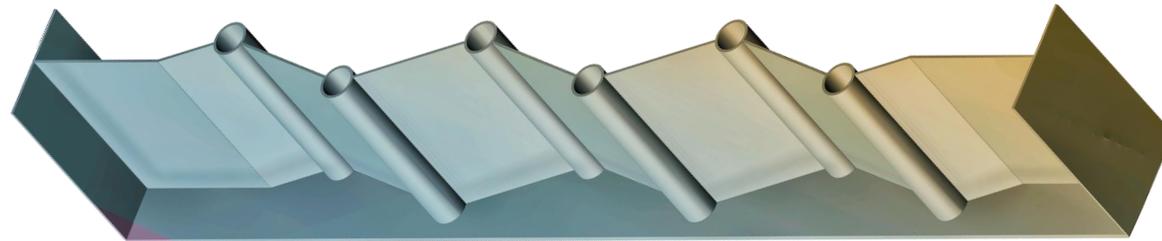


Internally, Wavebeam could be used extensively to support decks



Research and finite element analyses carried out by third parties

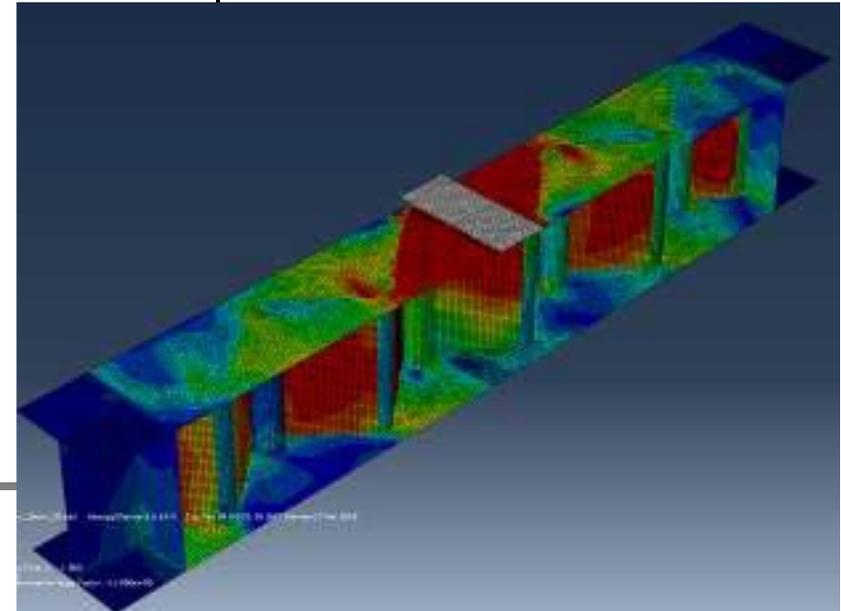
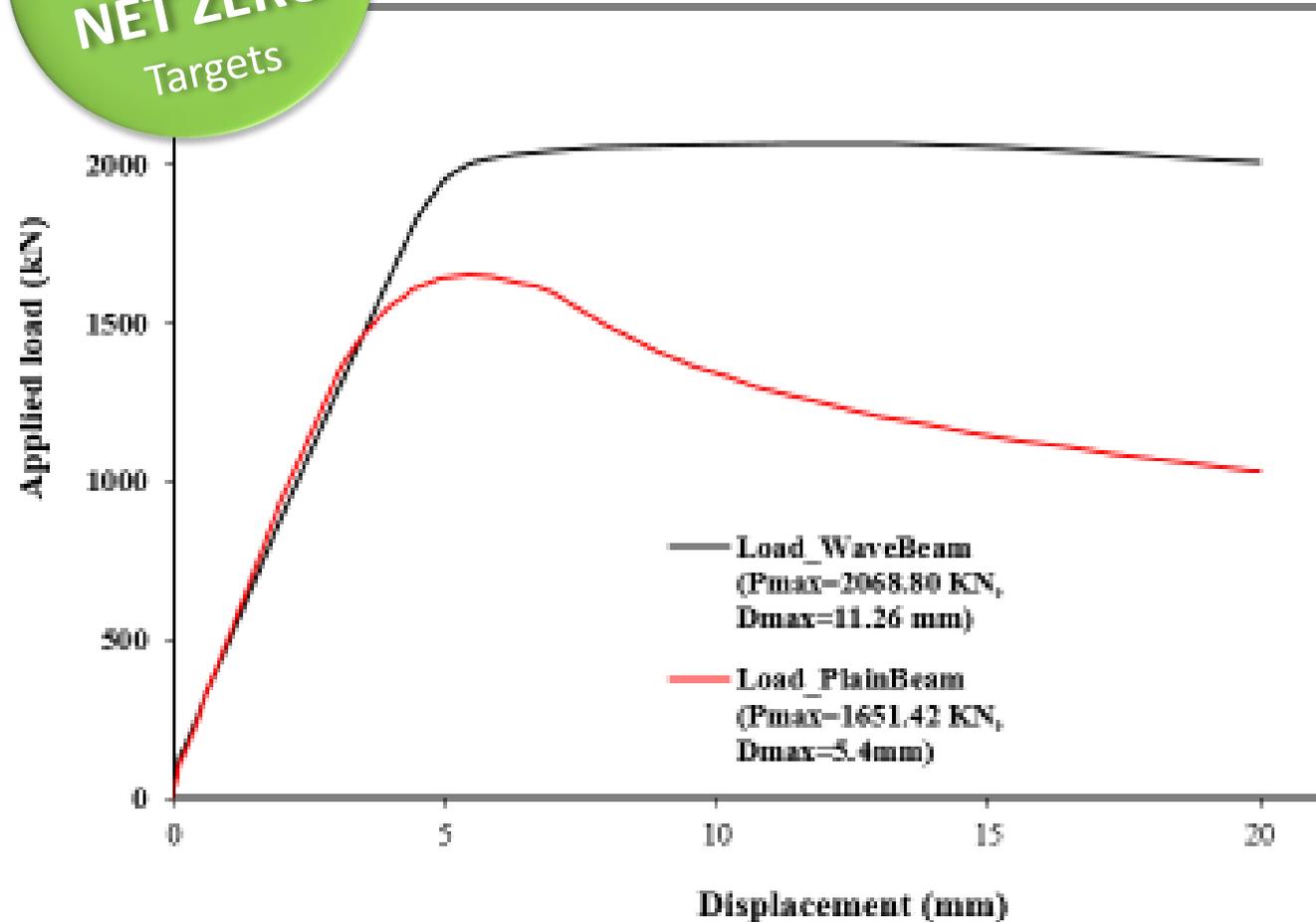
**Department of Mechanical and Aerospace Engineering
University of Strathclyde Glasgow
and
The National Manufacturing
Institute of Scotland (NMIS) Glasgow**



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Web buckling

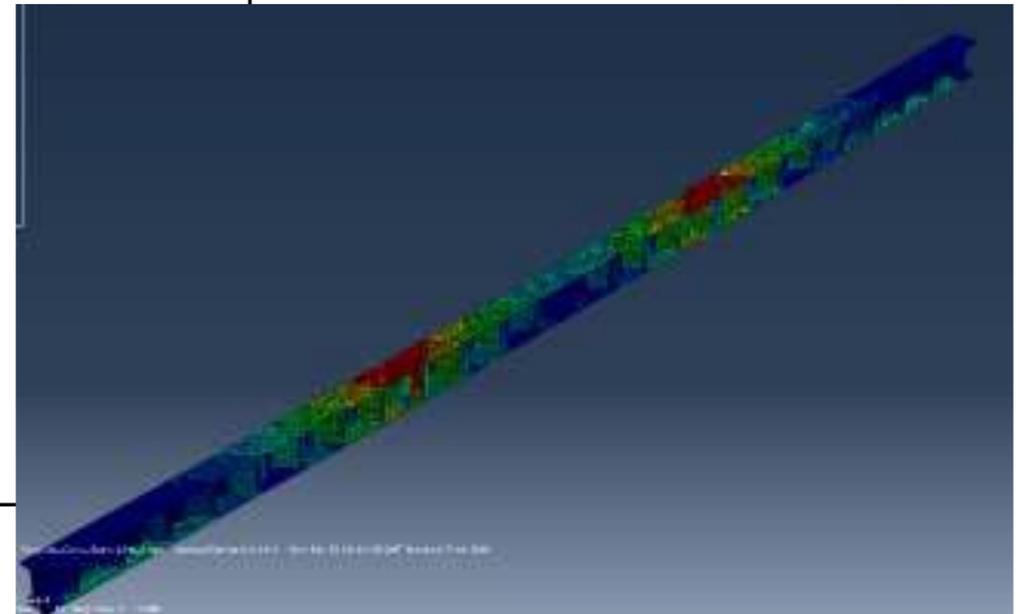
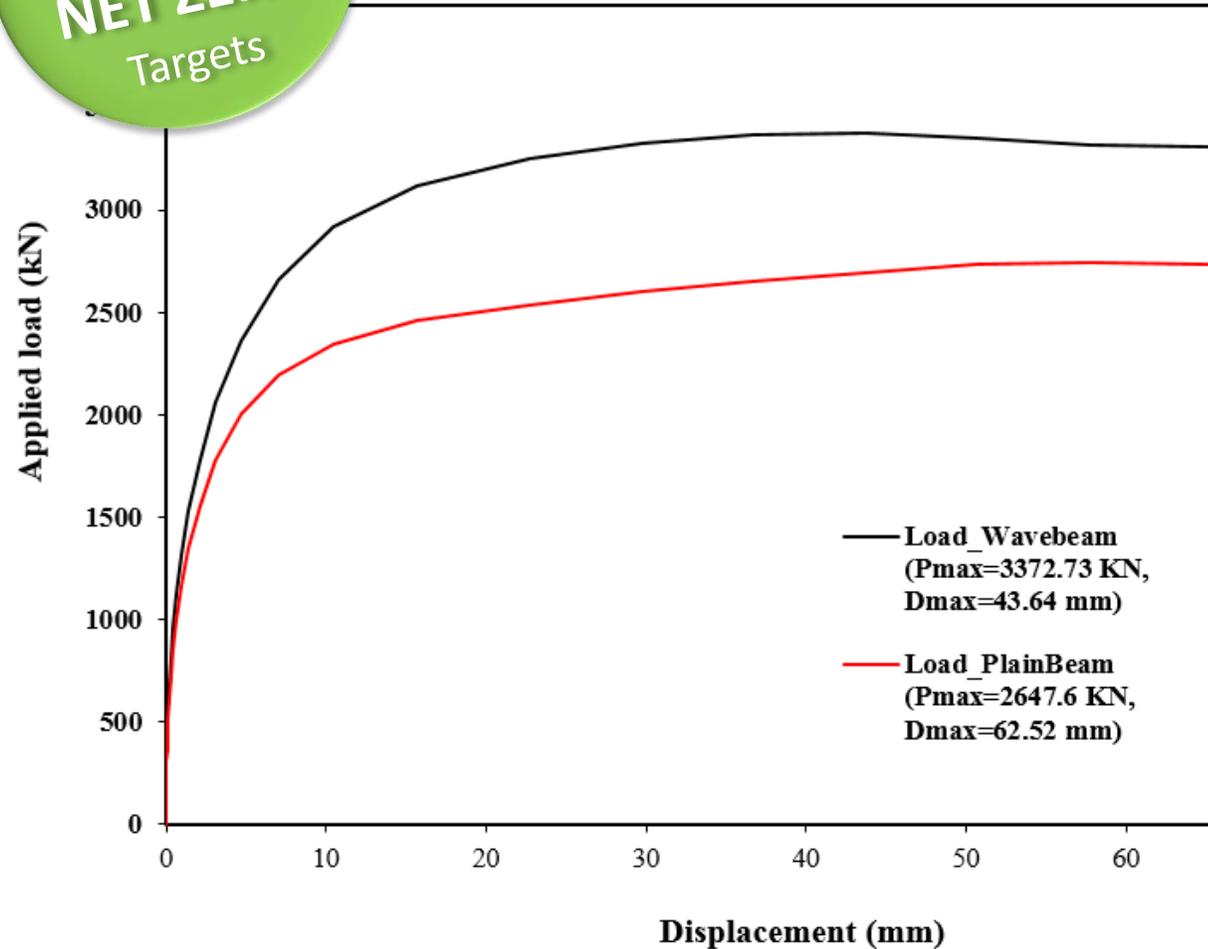
Sample analyses of University of Strathclyde results



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4-Point Bending

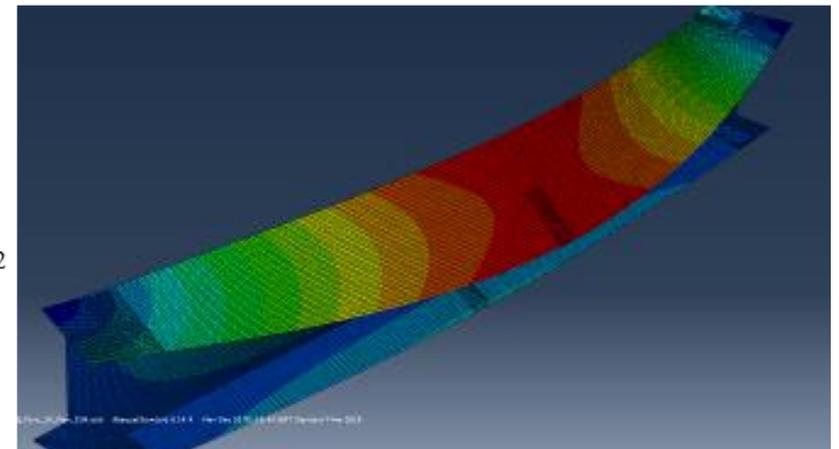
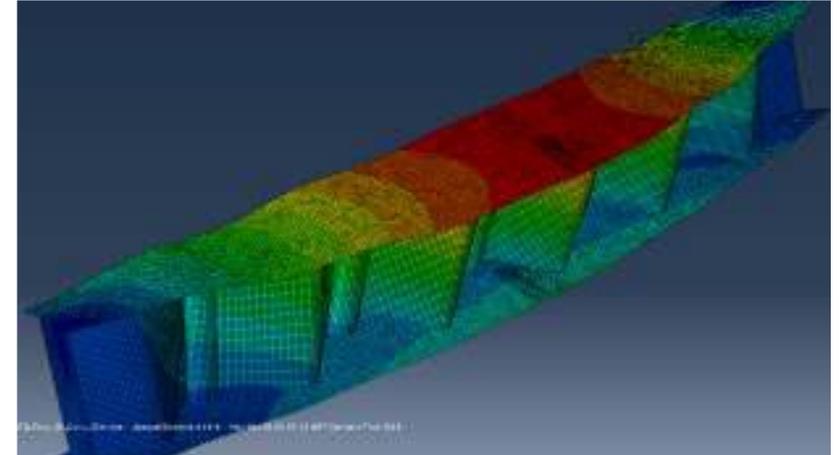
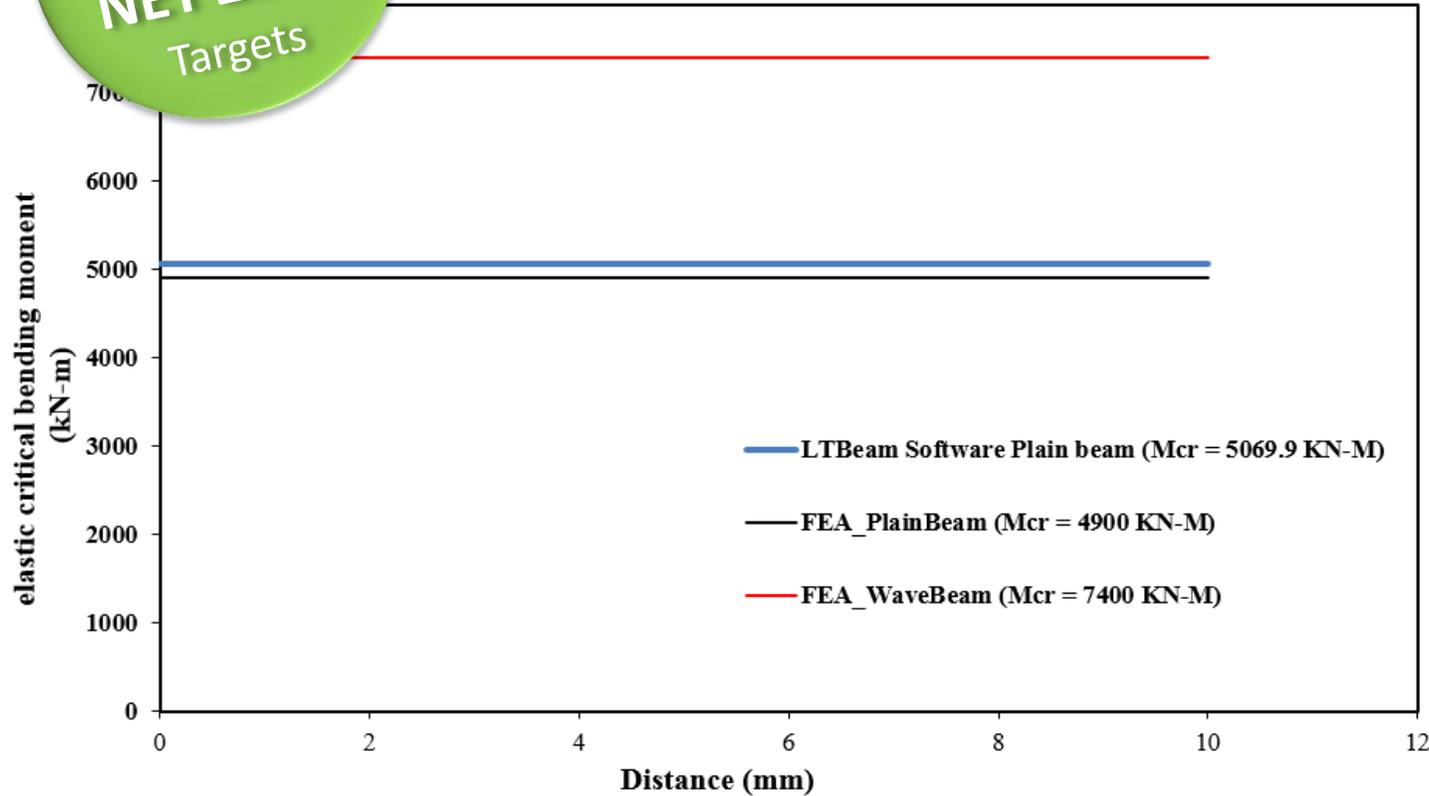
Sample analyses of University of Strathclyde results



Lateral Torsional Buckling (LTB) Eigenvalue Analysis

Sample analyses of University of Strathclyde results

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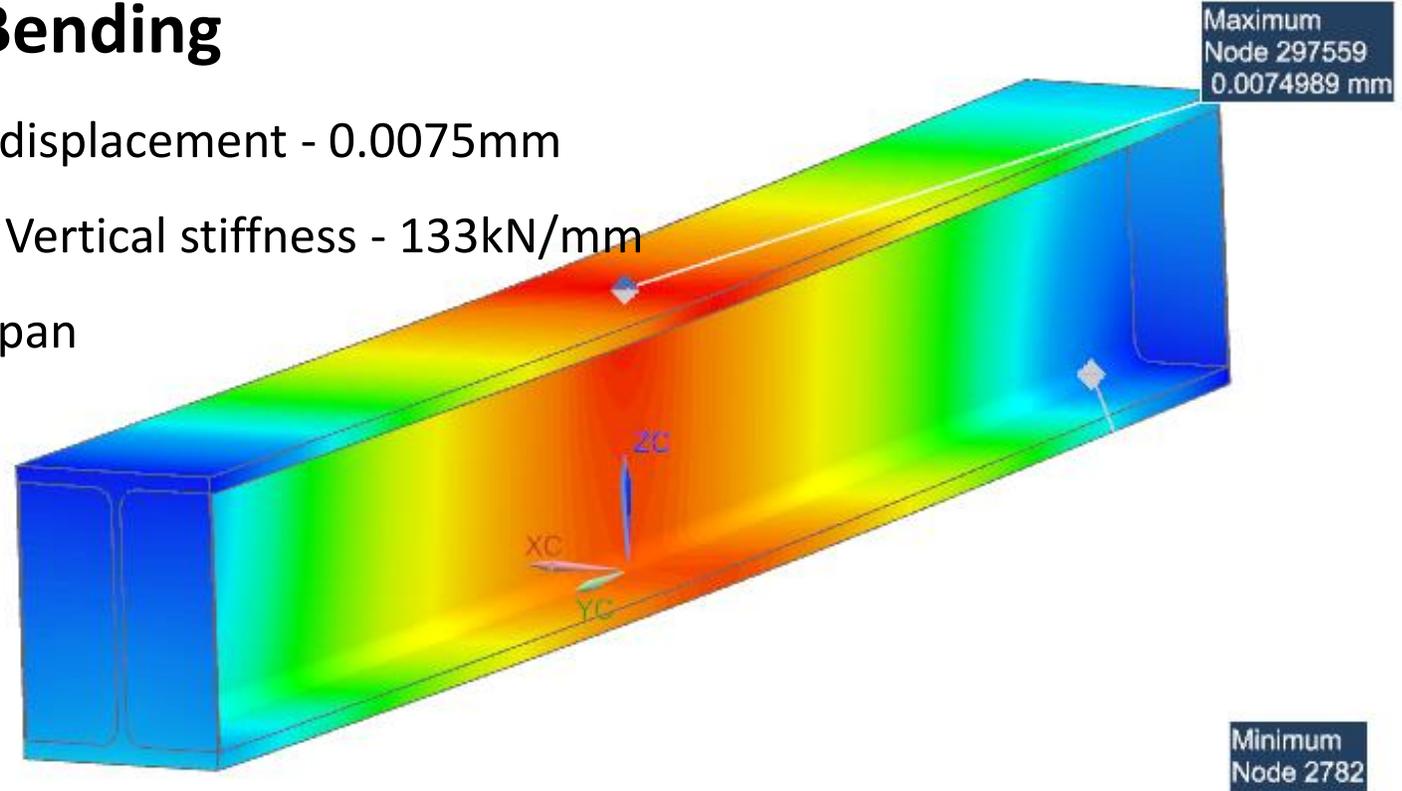


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I-Beam Bending

- ❑ Max mid-displacement - 0.0075mm
- ❑ Midpoint Vertical stiffness - 133kN/mm
- ❑ 3 metre span



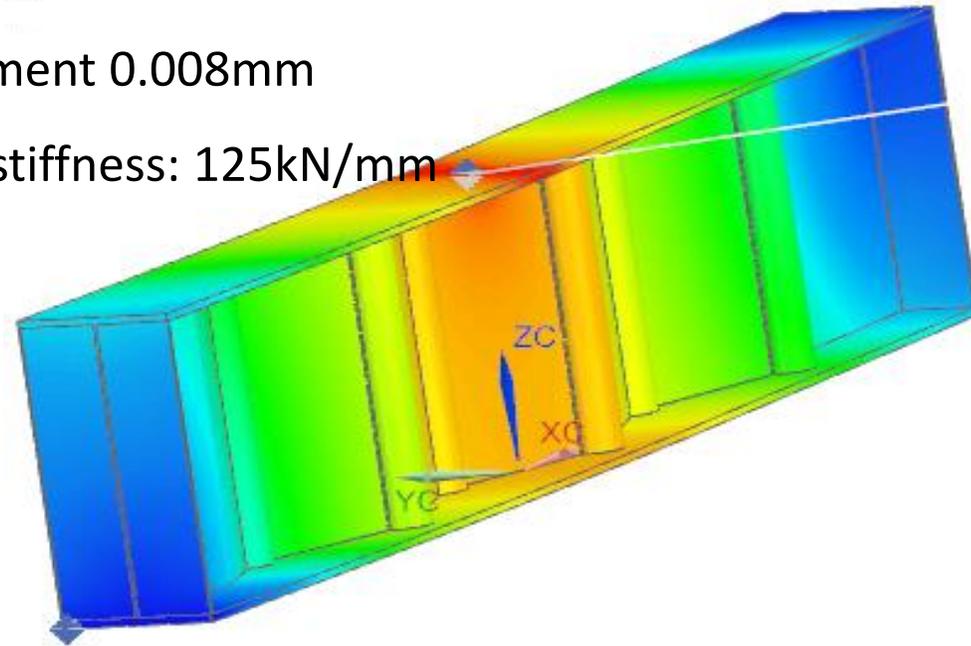
Sample analyses by the National Manufacturing Institute of Scotland NMIS

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Wavebeam Bending

- ❑ Max mid-displacement 0.008mm
- ❑ Midpoint Vertical stiffness: 125kN/mm
- ❑ 3 metre span



Maximum
Node 195629
0.00808199 mm

Minimum
Node 179
0 mm

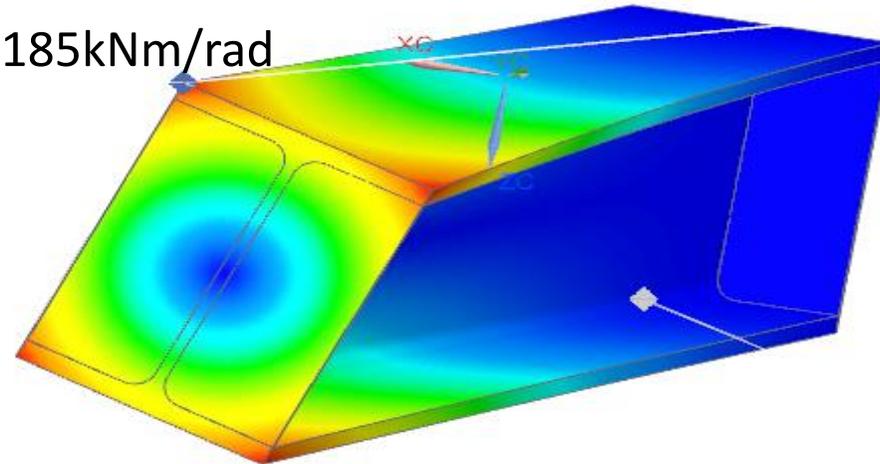
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I-Beam Torque Loading

- ❑ End Twist Rotation - 0.186 deg
- ❑ Torsional stiffness - 185kNm/rad
- ❑ 3 metre span



Maximum
Node 9
0.809705 mm

Minimum
Node 109248
0 mm

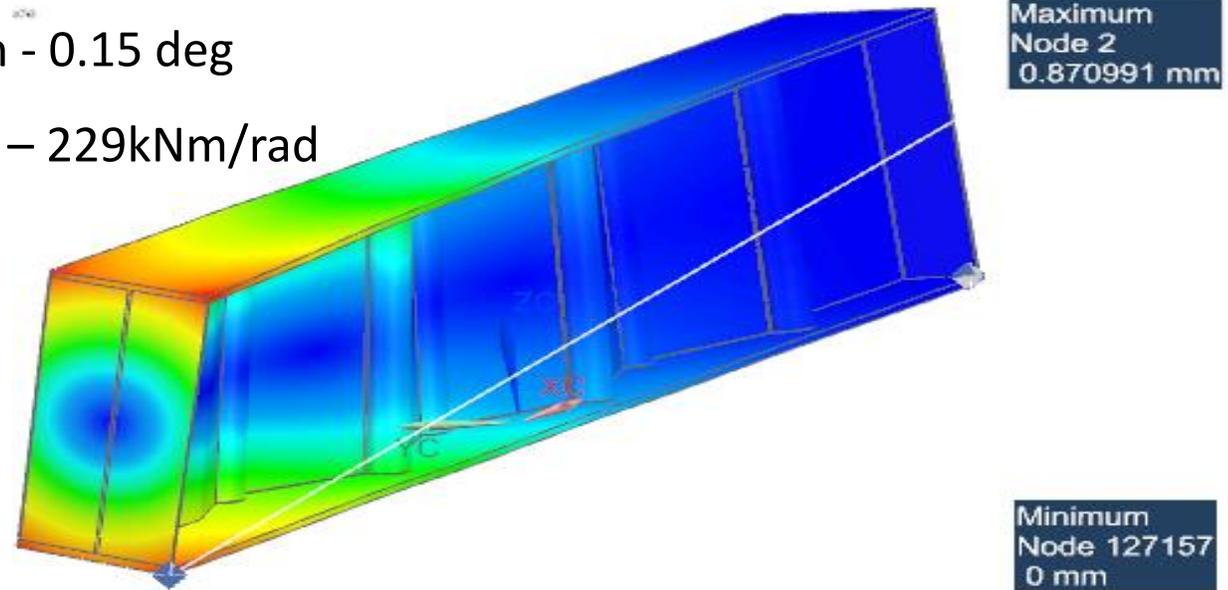
Sample analyses by the National Manufacturing Institute of Scotland NMIS

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Wavebeam Torque Loading

- End Twist Rotation - 0.15 deg
- Torsional Stiffness – 229kNm/rad
- 3 metre span



Sample analyses by the National Manufacturing Institute of Scotland NMIS



M	Description	Mass (3m)	Midpoint Vertical Stiffness	Torsional Stiffness
1	Basic I Beam 400 high x 300 wide	475kg (100%)	133kN/mm (100%)	185kNm/radian (100%)
2	Initial Wavebeam 600 high x 285 wide	343kg (72%)	154kN/mm (116%)	216.5kNm/radian (116%)
3	Wavebeam-Welded Cylinders 600 high x 285 wide	330kg (69%)	125kN/mm (94%)	229kNm/radian (123%)
4A	Wavebeam - No Cylinders 600 high x 285 wide	305kg (64%)	114kN/mm (85%)	133kNm/radian (71%)
4B	Wavebeam - Small Cylinders 600 high x 285 wide	348kg (73%)	115kN/mm (86%)	205kNm/radian (111%)
4C	Wavebeam - Flat Bar Supports 600 high x 285 wide	343kg (72%)	117kN/mm (88%)	146kNm/radian (79%)

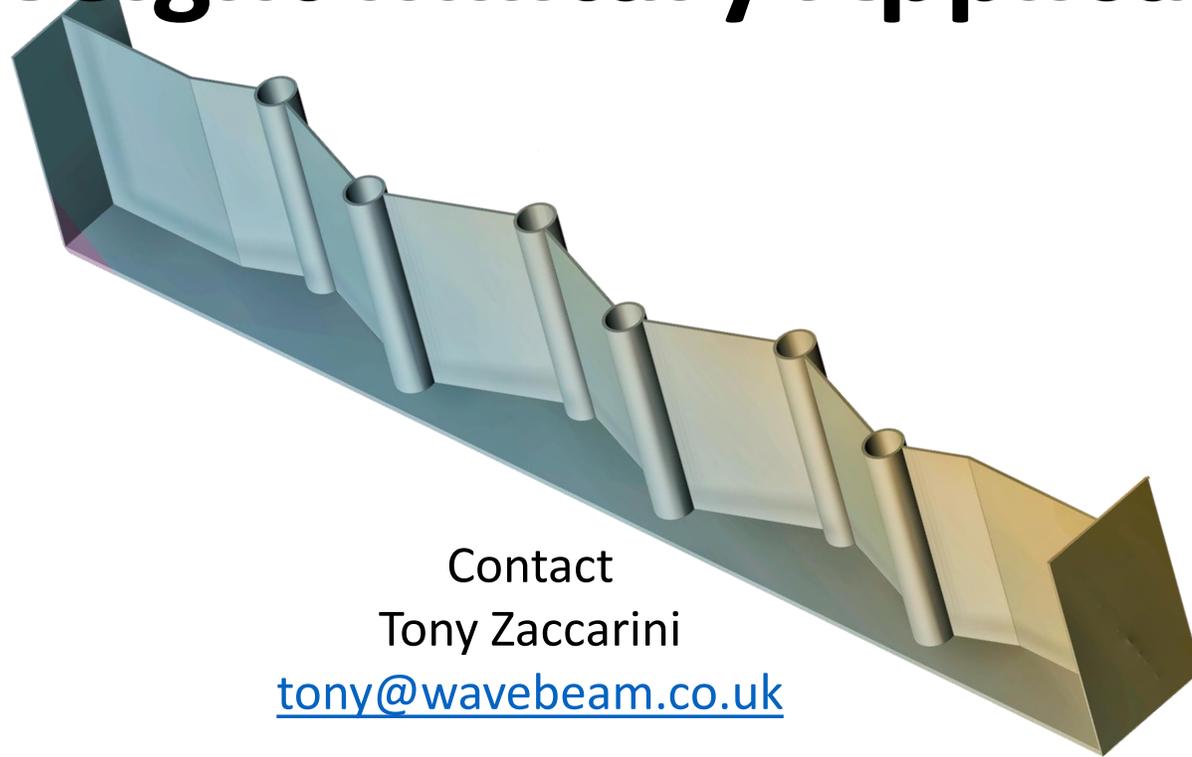
Sample analyses by the National Manufacturing Institute of Scotland NMIS

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The lightweight beam for

Heavyweight Military Applications



Contact

Tony Zaccarini

tony@wavebeam.co.uk