The lightweight beam for **Heavyweight** applications

The impact of this lightweight steel beam will revolutionise the international high-rise construction industry

Tony Zaccarini and Dr Patrick O’Brien

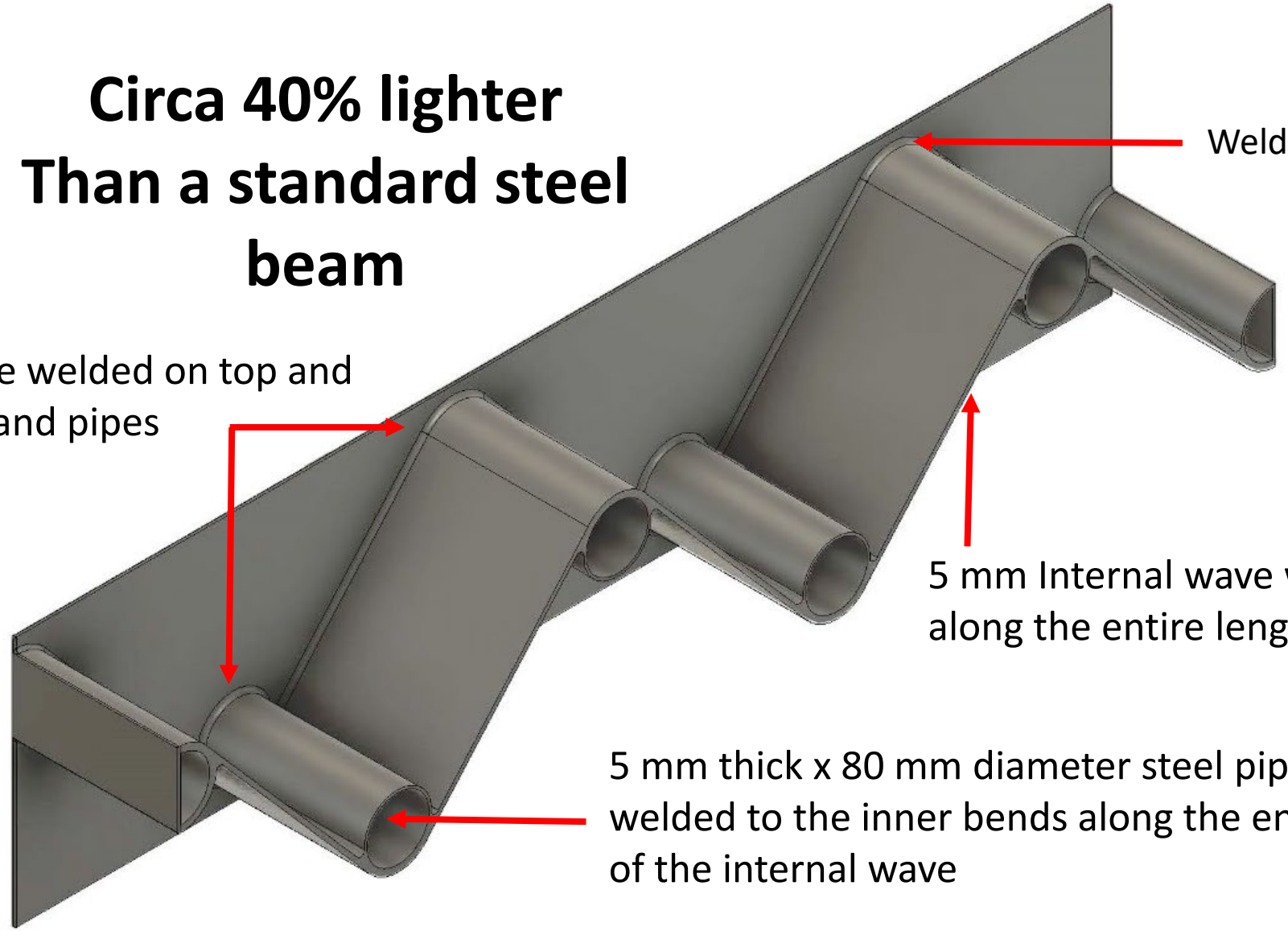
The lightweight beam for **Heavyweight** applications

Patent Applied For :
United Kingdom Patent Application
No. 1905977.3 - IP Title: Wavebeam

Wavebeam is a light-weight structural beam which has the ability to revolutionise the international construction industry. Because of its unique design, Wavebeam will carry similar loads as existing steel beams, but will be up to 40% lighter.

Ultimately, the Wavebeam concept will be manufactured in other structurally efficient materials including but not limited to aluminium, carbon fibre reinforced polymer and composites.

Circa 40% lighter Than a standard steel beam

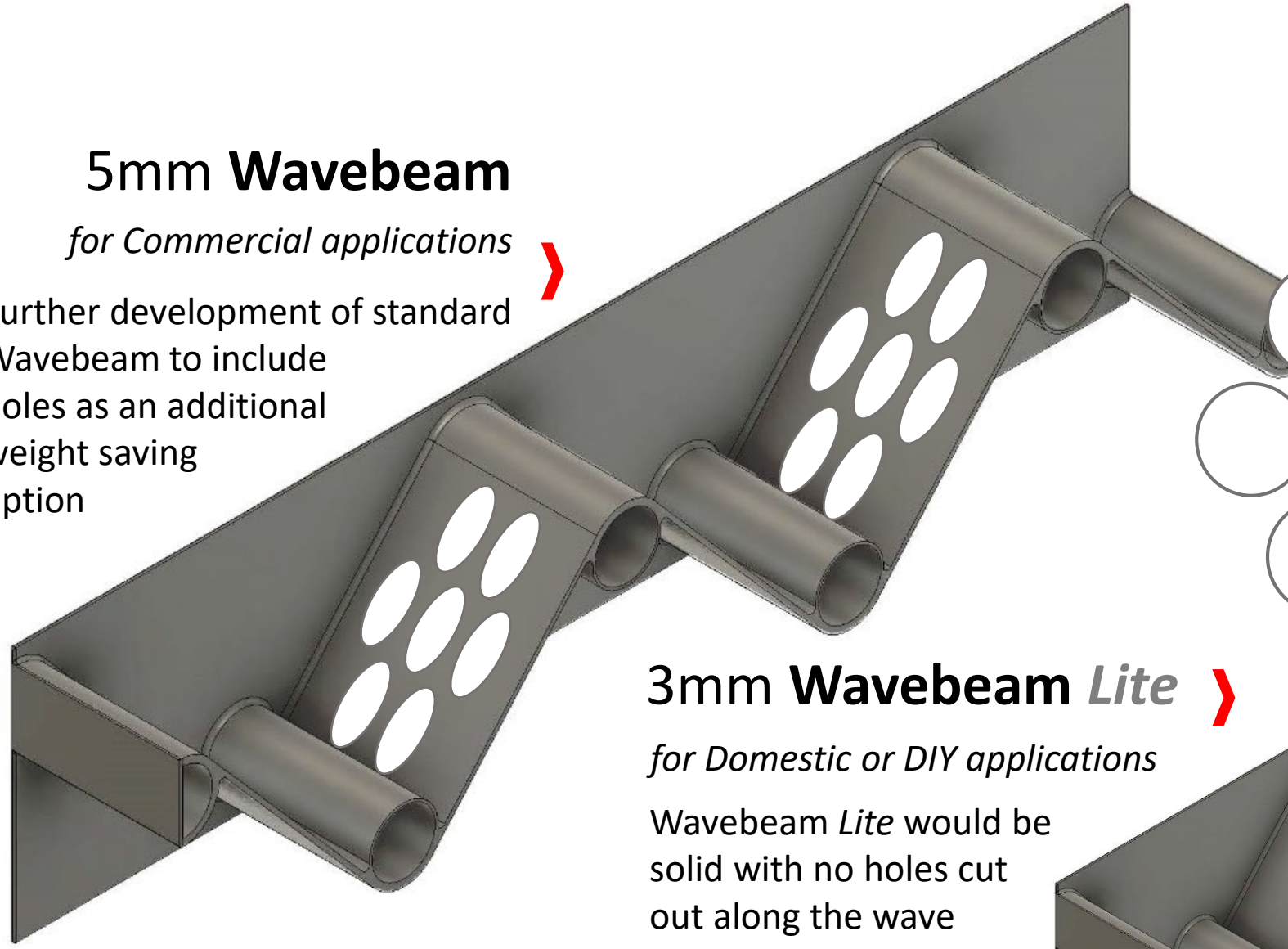


The dimensions of a standard Wavebeam would be 300 mm wide x 400 mm deep

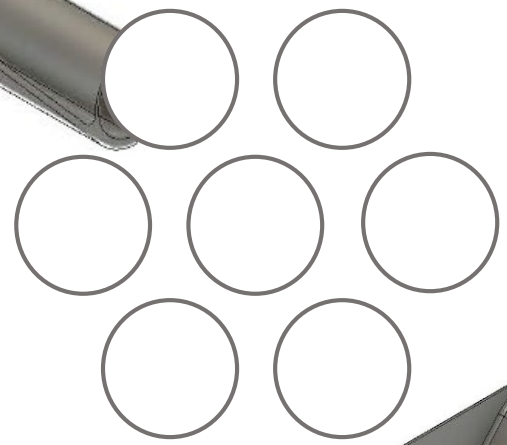
5mm **Wavebeam**

for Commercial applications

Further development of standard Wavebeam to include holes as an additional weight saving option



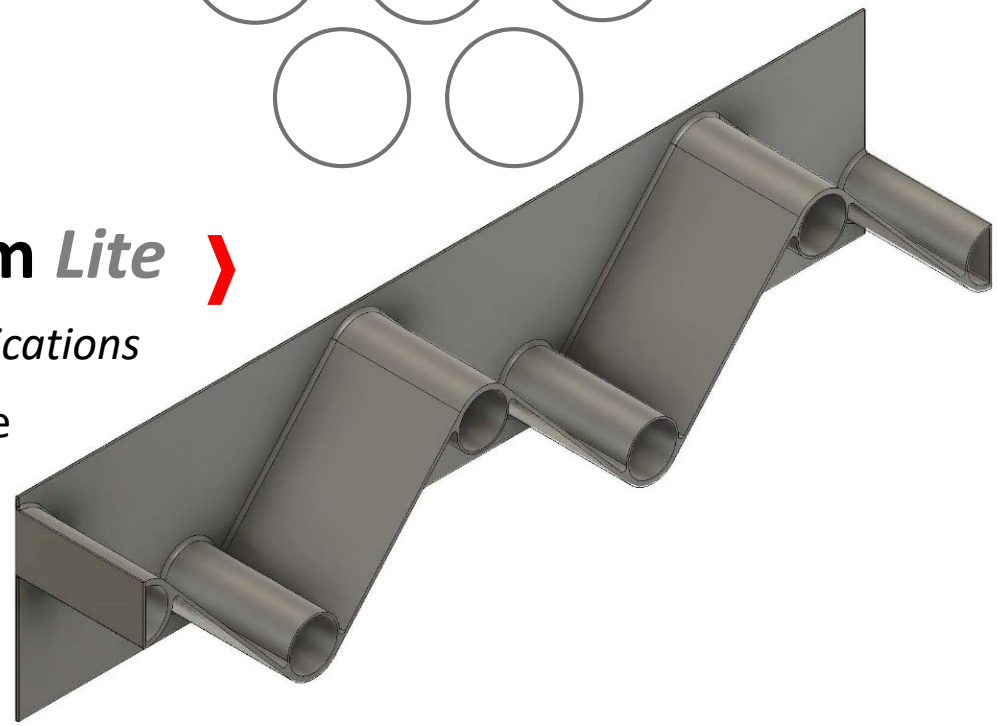
Gun barrel
hole configuration



3mm **Wavebeam** *Lite*

for Domestic or DIY applications

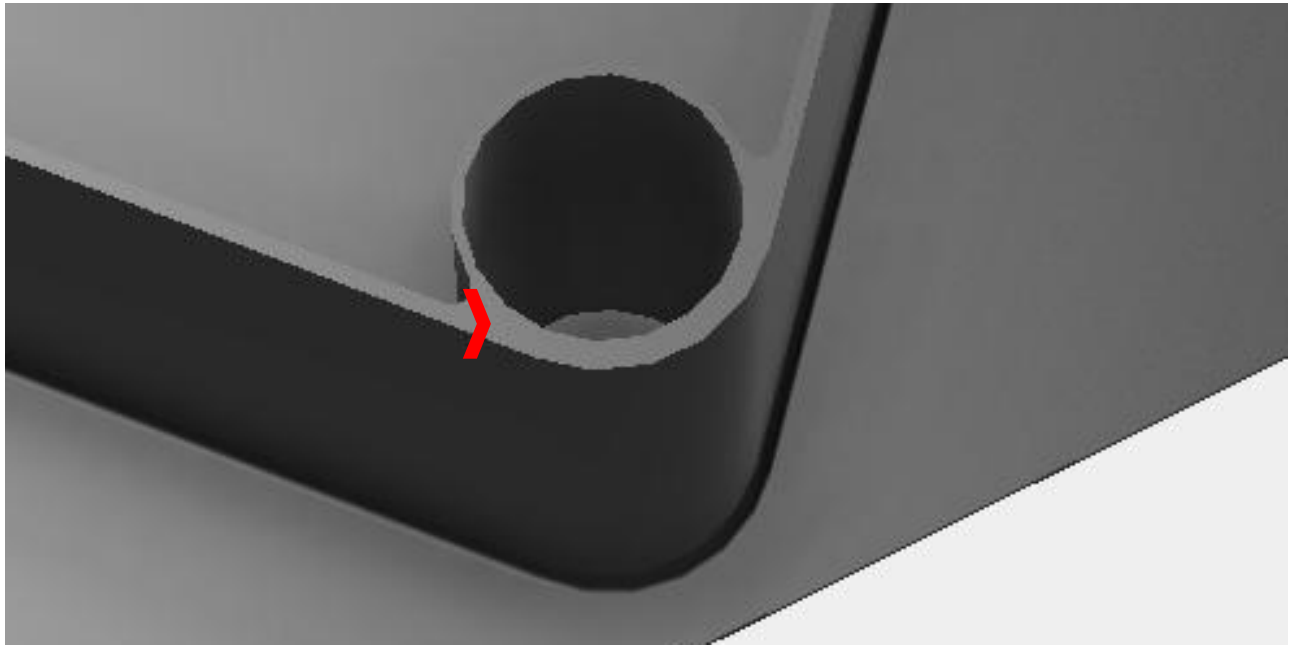
Wavebeam *Lite* would be solid with no holes cut out along the wave



The lightweight beam for **Heavyweight** applications

Steel pipes are welded to the inside curve of the wave and to the upper and lower flanges, adding further compression support to the steel beam.

Note :- At the point where the pipes meet the wave, the thickness at the intersection increases from 5 mm to 10 mm. This further supports the loading capacity on the edges.



As the wave and pipes alternately deviate from one side of the beam to the other, there is less likelihood of it buckling under extreme pressures.

The lightweight beam for **Heavyweight** applications

The **Critical Design Factors** in Wavebeam being a successful design include the thickness of steel which is used, and the various elements including flanges, wave and cylinders

Other factors such as the angle of wave deviation, circumference of cylinders and position and width of flanges relative to the depth of beam, all play a critical role in Wavebeam being an effective product

This successful design has the ability to withstand extreme lateral torsional forces.

An extensive Literature Review was carried out by the University of Strathclyde prior to the Wavebeam model being developed and tested

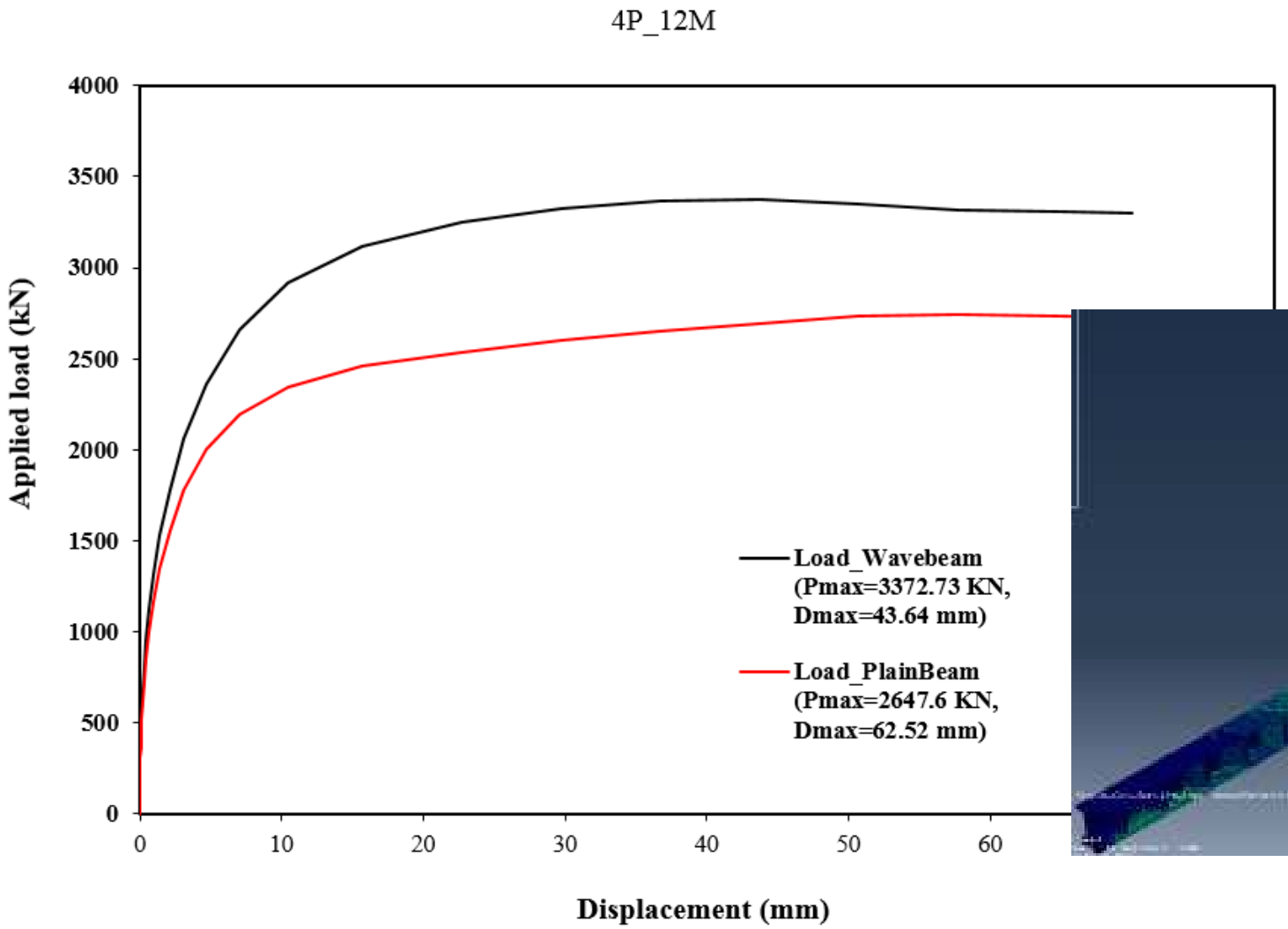
University of Strathclyde Engineering

^^^^^^^3P_4P_Web_KUCHTA_Courru_
^^^LTB_Load_IMP_SHARIF_Realated to ABASS
3P or Shear_4P middle_FEA_Elgaaly
3P_Kalid_DONE
3P_Stiff_LTB_Load_ICE_Ezzeldin Yazeed Sayed-Ahmed
3P or Shear_4P middle_FEA_Elgaaly
3P_Kalid_DONE
3P_Stiff_LTB_Load_ICE_Ezzeldin Yazeed Sayed-Ahmed

^^^^^^^LTB^ANSYS CODE^TU Theesis^ELateral-torsional buckling of laterally restrained steel beams.pdf
^^^^Bending_Shear_Normal Force^ABAQUS CODE _SOLID_ TU Thesis ^ .pdf
^^^^LTB^ TU Journal^Lateral torsional buckling design imperfections for use.pdf
^^^^LTB^ TU Journalpaper_sdss2016_imperfection_study_for_LTB_as_published.pdf
^^^^LTB^ TU Thesis ^C SectionLateral torsional buckling of channel shaped sections.pdf
^^^^LTB^ TU Thesis ^Shear resistance of I-shaped steel beams and the influence of shear on the bending.pdf
^^^^LTB^ABAQUS CODE^TU Thesis^Lateral torsional buckling analysis of multiple laterally restrained I-beams in bending.pdf
^^^^LTB^ABAQUS CODE_load^Plain^TU Thesis^Numerical assessment of the design imperfections for steel beam lateral torsi...
^^^^LTB^M^TU thesis Lateral torsional buckling design imperfections for use in.pdf
SHEAR^Amr Bakr Saddek^Behavior of plate girder with corrugated steel web subjected to shear loading.pdf
SHEAR^Stiffner^Qi Cao^Shear Behavior of Corrugated Steel Webs in H Shape Bridge Girders.pdf
WEB^Plain^Carden^Web Yielding, Crippling, and Lateral Buckling under Post Loading.pdf
WEB^Plain^Luci^Experimental research on I-girders subjected to eccentric patch loading.pdf
WEB^Plain^MSC Thesis^Patch loading resistance of welded I-beams with respect to misaligned web stiffeners.p
WEB^Plain^OVE^PhD Thesis^PATCH LOADING Resistance of steel girders subjected to concentrated forces.pdf
WEB^Plain^PhD Thesis^Jonas Gozzi^Patch Loading Resistance of Plated Girders.pdf
WEB^Plain^Tryland^Steel girders subjected to concentrated loading—Validation of numerical simulations.pdf
WEB_Chalmers Thesis^Girders with Trapezoidally Corrugated.pdf
WEB_Edlund^Ultimate Strength of Girders with Trapezoidally Corrugated Webs Under Patch Loading.pdf

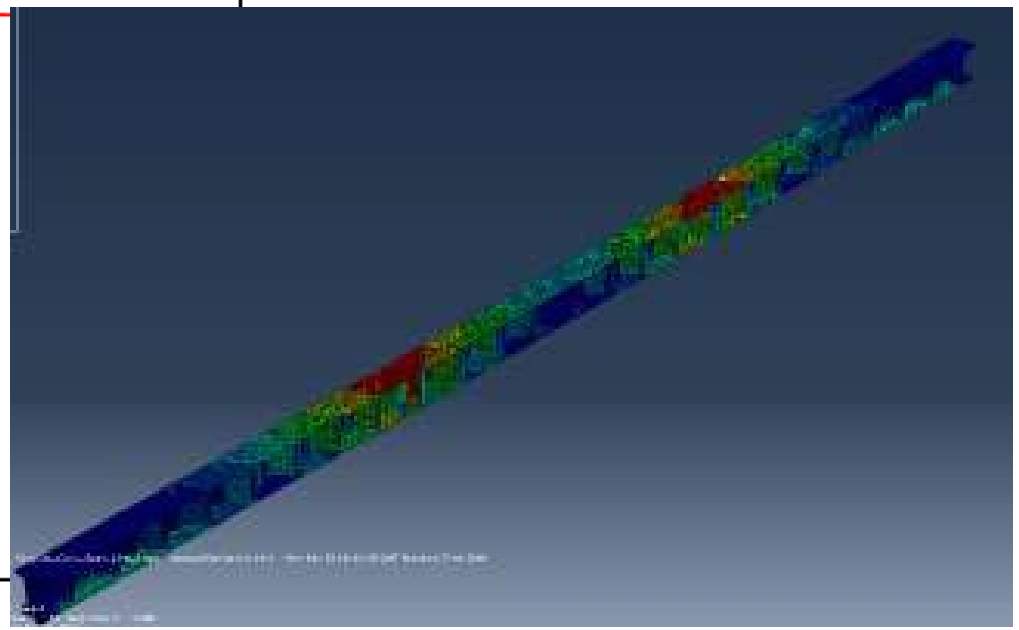
^SHEAR^Corru^Shear Buckling of Plate Girders with.pdf
^SHEAR^Shear Buckling Analysis of Steel Flat and Corrugated Web I-girders.pdf
3P^Corru^STUDY ON FLEXURAL CAPACITY OF STEEL BEAM CORRU.pdf
3P^Fatimah^NUMERICAL STUDY ON BENDING PERFORMANCE OF TRIANGULAR WEB PROFILE.pdf
3P^Fatimah^Study on Bending Behaviour of Triangular Web Profile Steel Section by.pdf
3P^Numerical Analysis of Buckling Strength of Welded Plate Girder with.pdf
3P^Raiza^Load Carrying Capacity Of Corrugated Web Beam.pdf
3P_PHD THESIS^Wang^Behavior of Steel Members with Trapezoidally Corrugated Webs and Tubular Flange.pdf
4P^Corru^_Experimental_research_of_beams_with_corrugated_web.pdf
4P^Divahar^The Effect of Web Corrugation in Cold-Formed Steel Beam with Trapezoidally Corrugated Web.pdf
4P^Divahar-Joanna^_Article_NumericalSimulationAndExperime.pdf
4P^Plain^Farida^Numerical and analytical investigation of steel beam subjected to fourpoint.pdf
Patch loading resistance of girders with corrugated webs - ScienceDirect_files
Bending and shear interaction behavior of girders with trapezoidally.pdf
Bending_Shear_and_Patch_Loading_Interaction_Behavi.pdf
Combined_shear_and_patch_loading_of_girders_with_c (1).pdf
Combined_shear_and_patch_loading_of_girders_with_c.pdf
Experimental based numerical modelling of girders with trapezoidally.pdf
Flange buckling behavior of girders with corrugated web Part I.pdf
Flange buckling behavior of girders with corrugated web Part II Numerical.pdf
Girders with trapezoidally corrugated webs subjected by combination of bending, shear and path ..
Girderswithtrapezoidallycorrugatedwebssubjectedbycombination.pdf
Interacting stabilitybehaviourofsteelI-girderswithcorrugatedwebs.pdf
main_web crippling.pdf
Patch loading resistance of girders with corrugated webs - ScienceDirect.html
Patch loading resistance of girders with corrugated webs.pdf
tezis_eng.pdf
tezis_hun.pdf
WEB^PhD Thesis^Patch loading resistance of girders with corrugated webs (2).pdf

The lightweight beam for **Heavyweight** applications

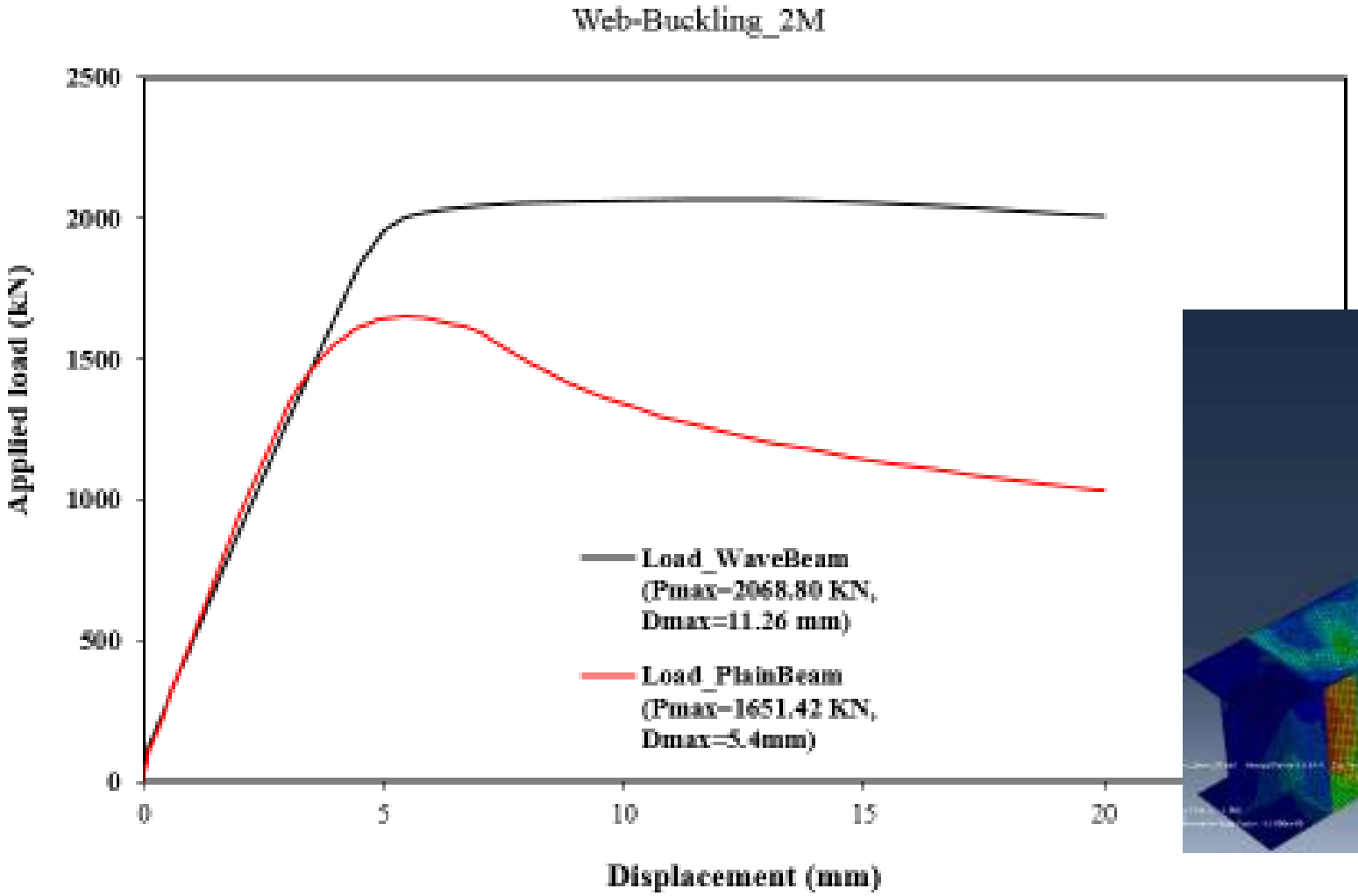


Sample analyses of Strathclyde results

Case 2: **4-Point Bending**

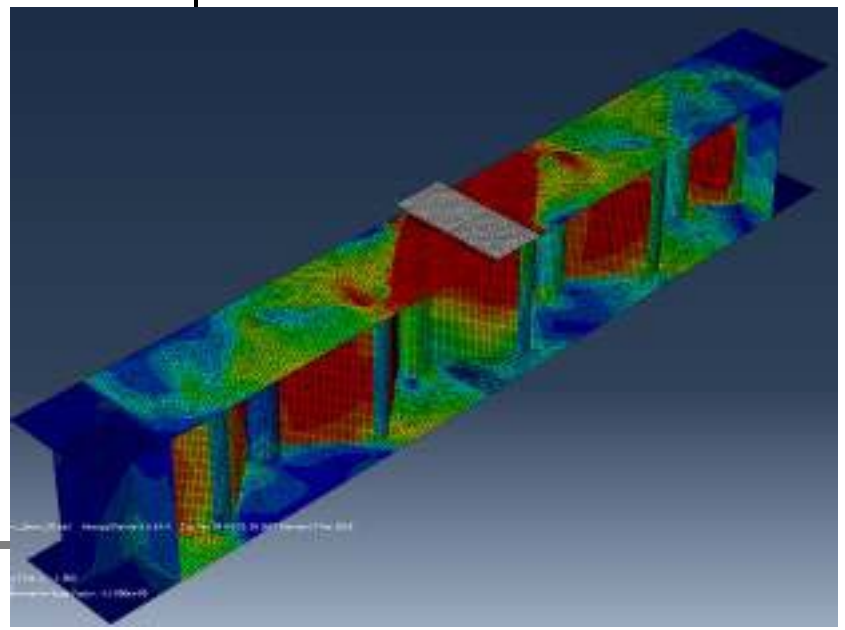


The lightweight beam for **Heavyweight** applications

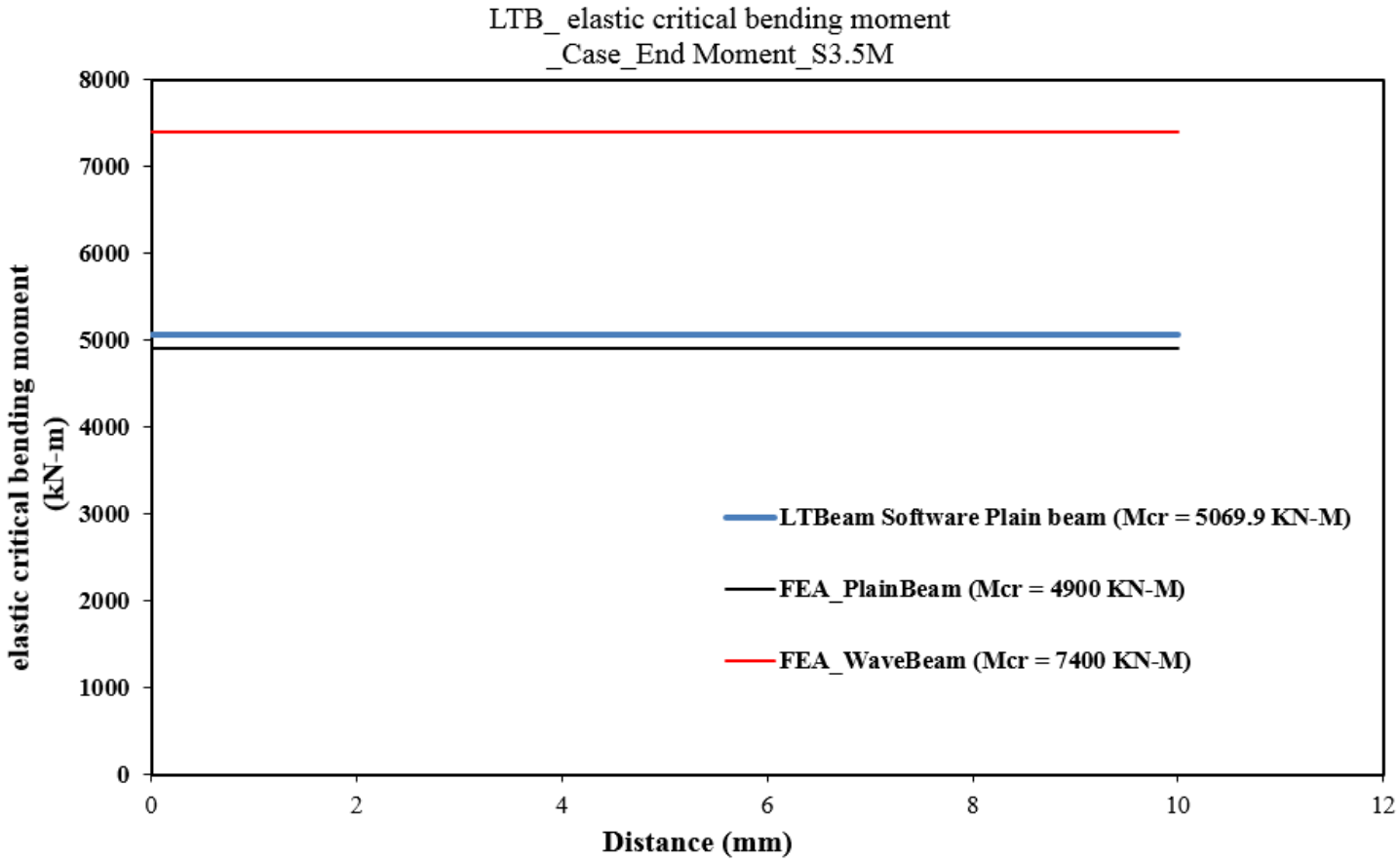


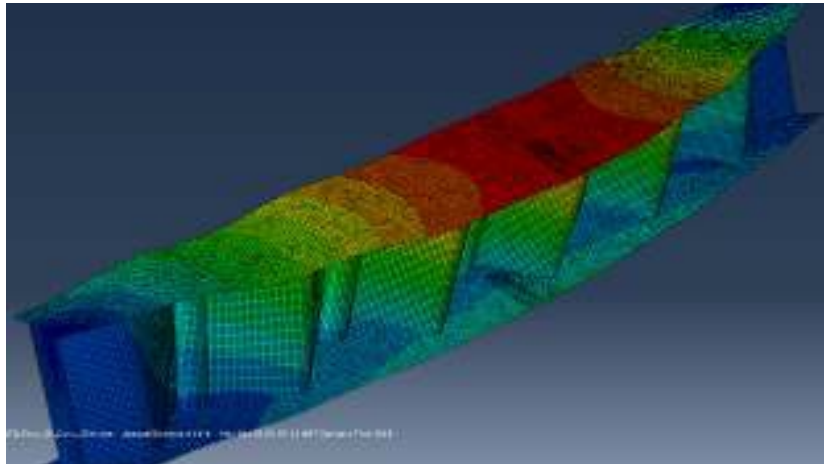
Sample analyses of Strathclyde results

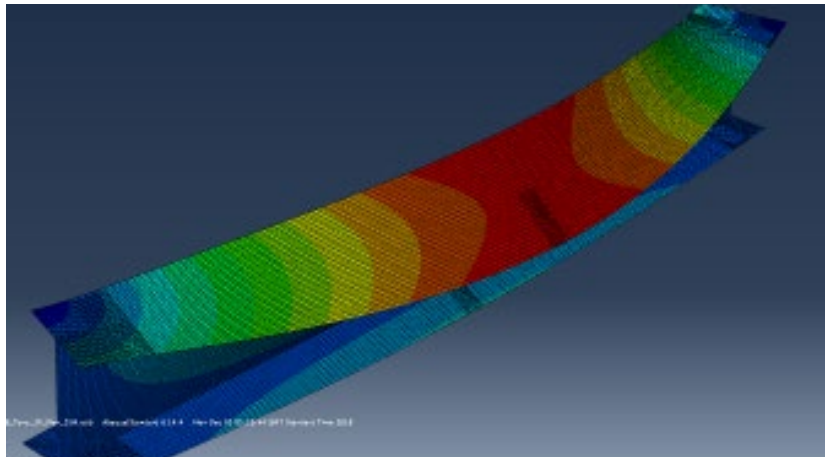
Case 3: **Web buckling**



The lightweight beam for **Heavyweight** applications

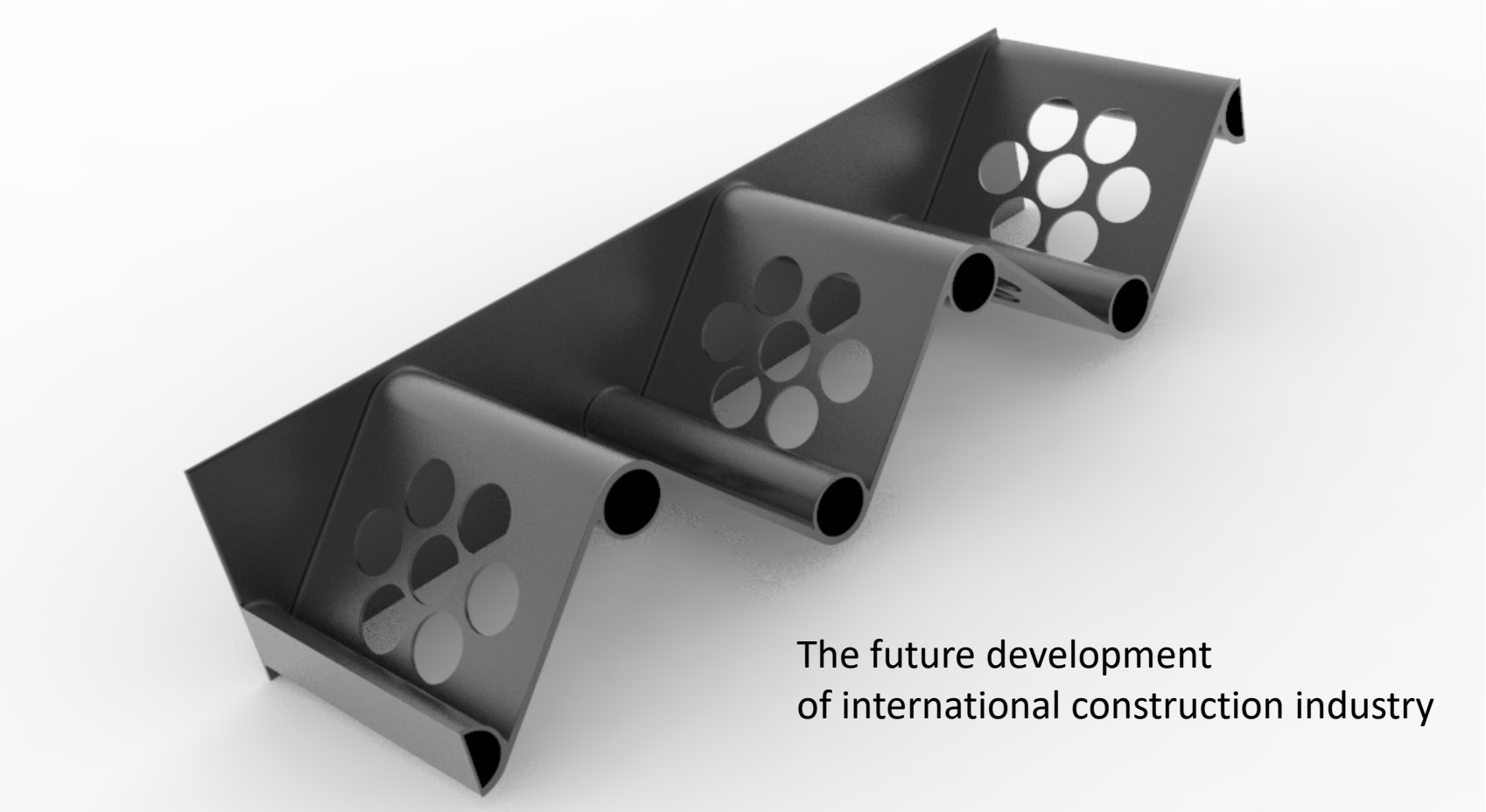






Sample analyses of Strathclyde results
Case 4: LTB **EigenVale Analysis**

The lightweight beam for **Heavyweight** applications



The future development
of international construction industry

The lightweight beam for **Heavyweight** applications

Contact us directly for further information

Tony Zaccarini and Dr Patrick O’Brien