

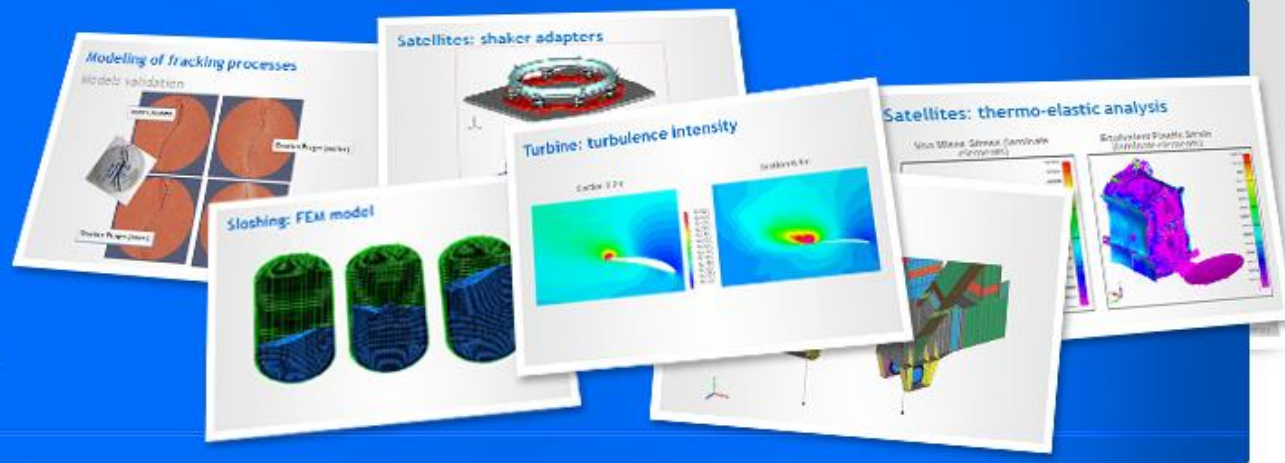


SIM&TEC

Simulación y Tecnología

Simulation and Technology

FROM SCIENCE
TO TECHNOLOGY



Modeling for:

- ☐ Aero and Astro industry
- ☐ Construction industry
- ☐ Oil and gas industry
- ☐ Steel industry

OUR CUSTOMERS

BW Offshore | <https://bwoffshore.com/>
EPRI | <http://www.epri.com>
ExxonMobil Upstream Research Co. | <http://www.exxonmobil.com>
FAdeA S.A. | <http://www.fadeasa.com.ar>
Instituto Nacional de Tecnología Industrial (INTI) | <http://www.inti.gov.ar>
INVAP S.E. | <http://www.invap.com.ar>
Nucleoeléctrica Argentina S.A. (NA-SA) | <http://www.na-sa.com.ar>
Patagonia Shales Services | <http://www.patss.com.ar>
PTC-Alliance | <http://www.ptcalliance.com/>
QUIP | <http://www.quip.com.br>
REPSOL-Bolivia | <http://www.repsol.com>
ROCH S.A. | <http://www.roch.com.ar/>
Socotherm Americas | <http://www.socotherm.com.ar>
TECHINT E&C | <http://www.techint-ingenieria.com/>
TENARIS | <http://www.tenaris.com>
TERNIUM | <http://www.ternium.com>
Tubo Trans Electric S.A. | <http://www.ttesa.com.ar>
Veng S.A. | <http://www.conae.gob.ar>
YPF | <http://www.ypf.com>
YTEC S.A | <http://www.ypf.com/ypfylaindustria/YPFTecnologia/Paginas/YPF-Tecnologia-S-A.aspx>

MANAGEMENT SYSTEM CERTIFICATE

Certificate No:
148513-2014-AQ-ARG-RvA

Initial certification date:
15 January 2014

Valid:
15 January 2018 - 15 January 2020

This is to certify that the management system of

SIM&TEC SOCIEDAD ANONIMA

Av. General Juan M. de Pueyrredón 2130 5ºA, C1119ACR, Ciudad Autónoma de Buenos Aires, Argentina

has been found to conform to the Quality Management System standard:
ISO 9001:2015

This certificate is valid for the following scope:

Development of research projects and development of projects, using computer simulation, for manufacturing companies, service companies, consulting firms, government agencies and academic institutions.

Desarrollo de proyectos de investigación y desarrollo de proyectos, utilizando la simulación computacional, para empresas manufactureras, empresas de servicios, empresas consultoras, instituciones gubernamentales e instituciones académicas.

Place and date:
São Paulo, 16 January 2018



The RvA is a signatory to the IAF MLA

For the issuing office:
DNV GL – Business Assurance
Av Alfredo Egydio de Souza Aranha, 100 -
Bloco D- 3º andar - Vila Cruzeiro, São
Paulo, SP, Brazil

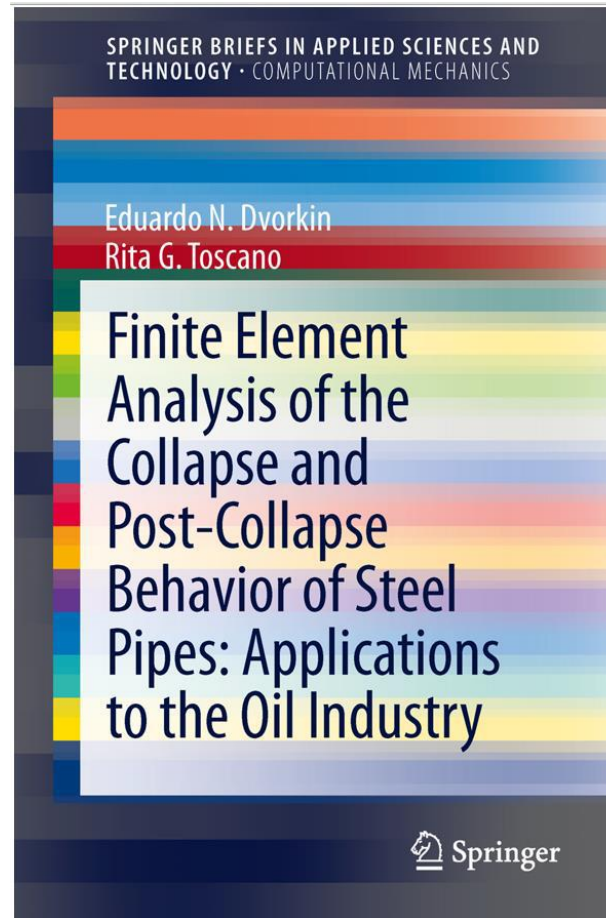

Mauricio Venturin
Management Representative

Lack of fulfillment of conditions as set out in the Certification Agreement may render this Certificate invalid.
ACCREDITED UNIT: DNV GL Business Assurance B.V., ZWOLSEWEG 1, 2994 LB, BARENDRECHT, NETHERLANDS. TEL: +31102922689.
assurance.dnvgl.com

Applications

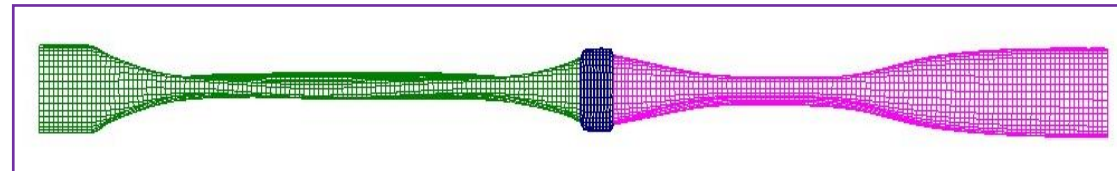
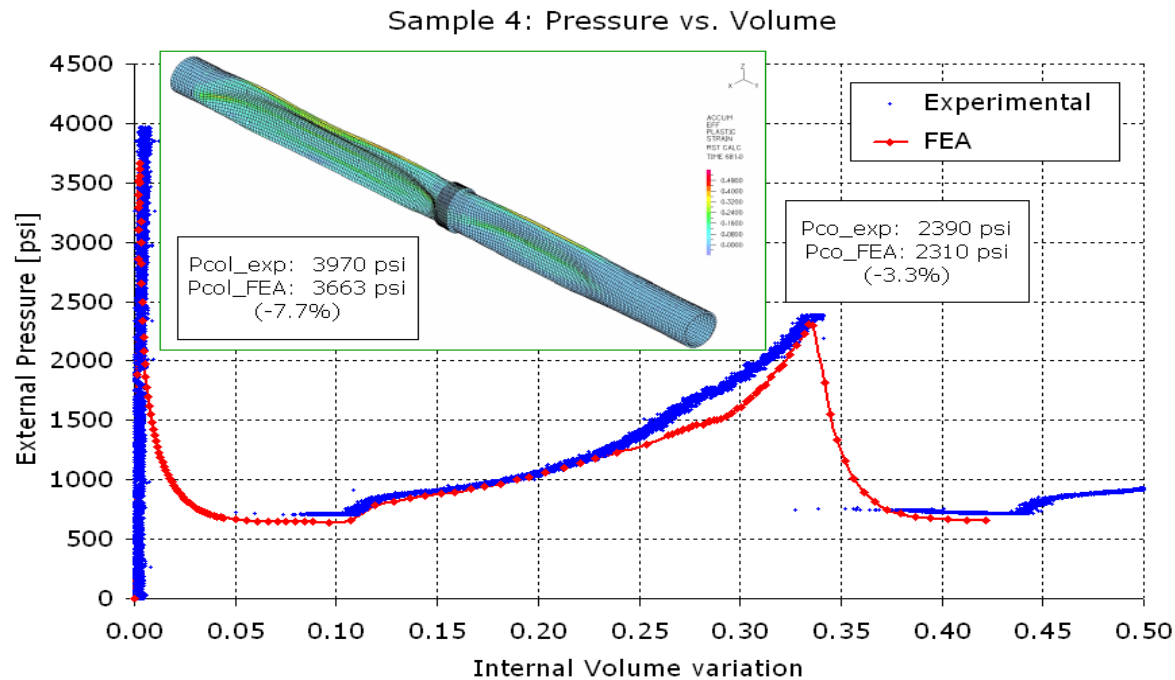
1. Collapse of tubular products
2. Flexible risers: meso-scale model
3. SAGD pipes
4. OCTG threaded connections
5. Sucker rod connections
6. Modeling of hydraulic fracturing
7. Fracture of mechanical components
8. Composite pressure vessels (COPVs)
9. Sloshing
10. Vibrations in FPSO Starboard Crane
11. Satellite structures
12. Metal forming - METFOR
13. CFD
14. FSI: LNG pipeline at Dunkerque
15. FSI: Heat exchanger

Collapse of tubular products



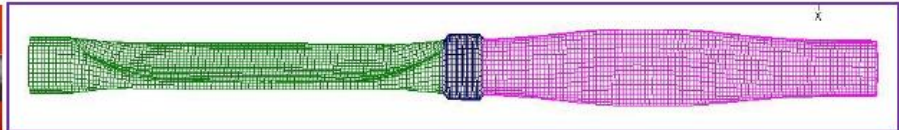
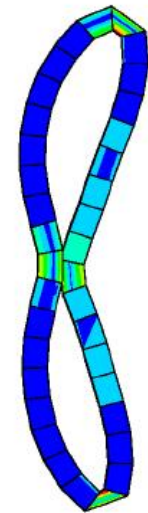
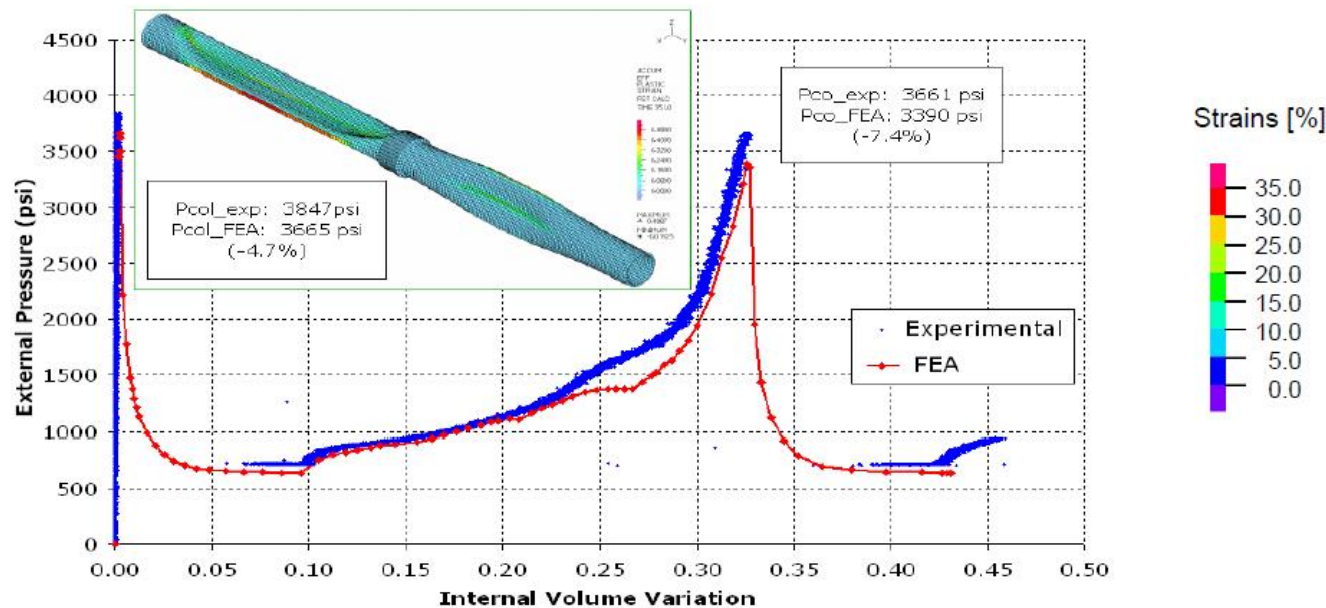
Collapse of tubular products

Comparison: numerical vs. experimental results Buckle arrestors: flattening mode



Collapse of tubular products

Comparison: numerical vs. experimental results Buckle arrestors: flipping mode



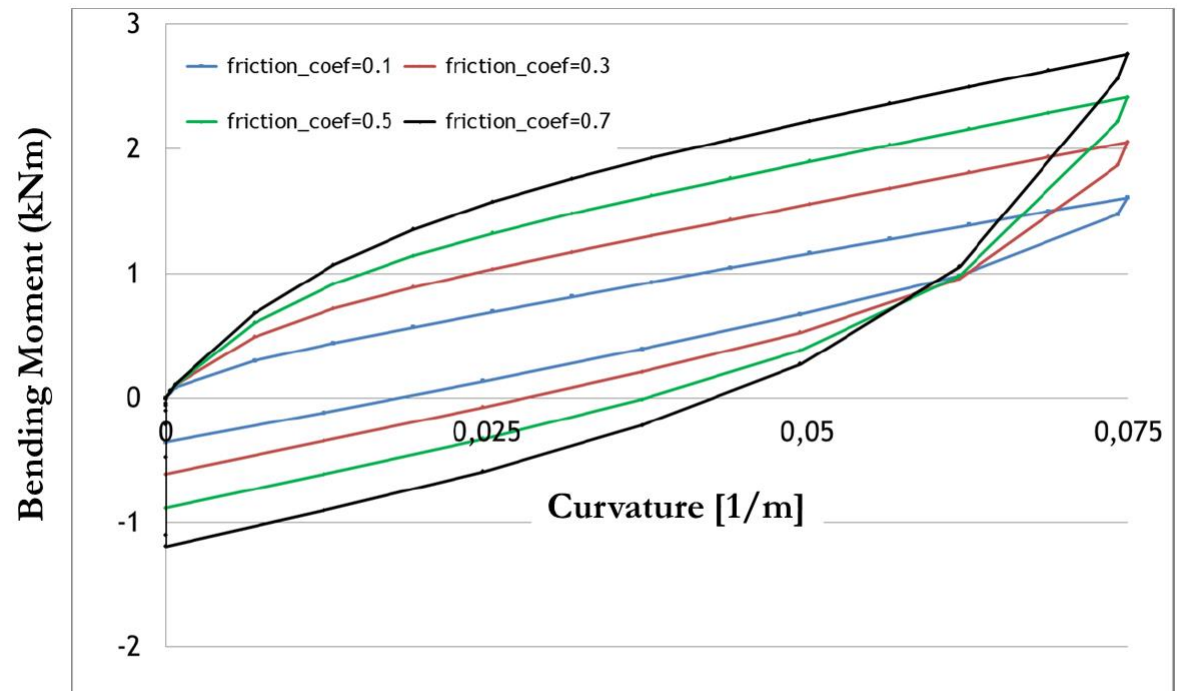
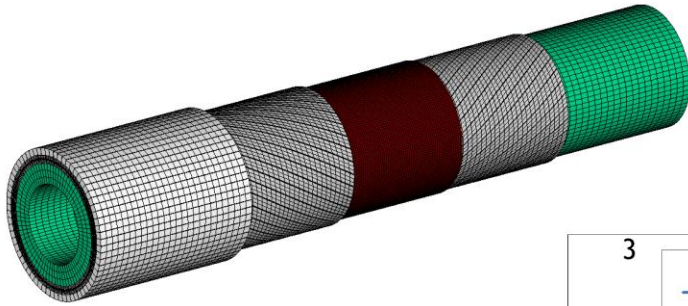
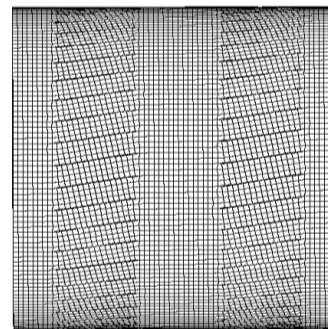
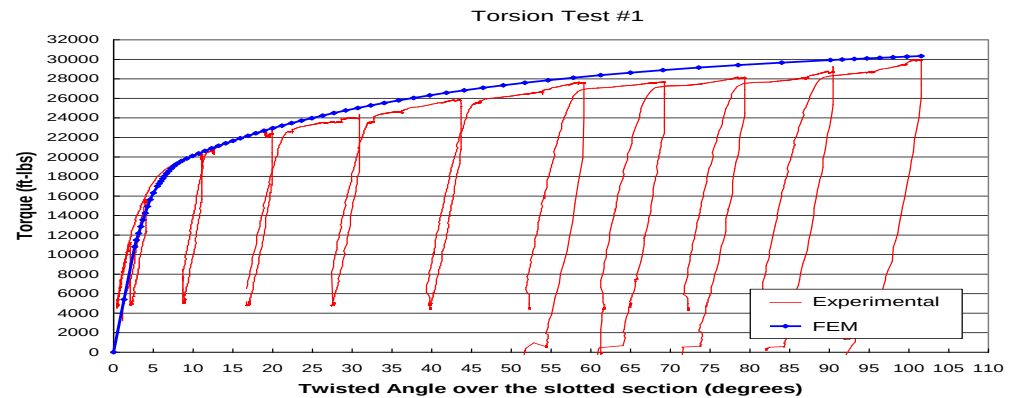
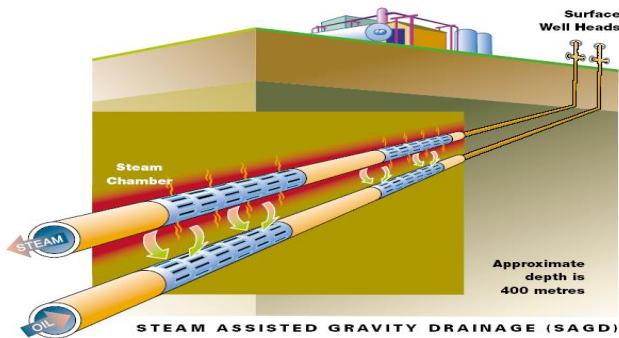
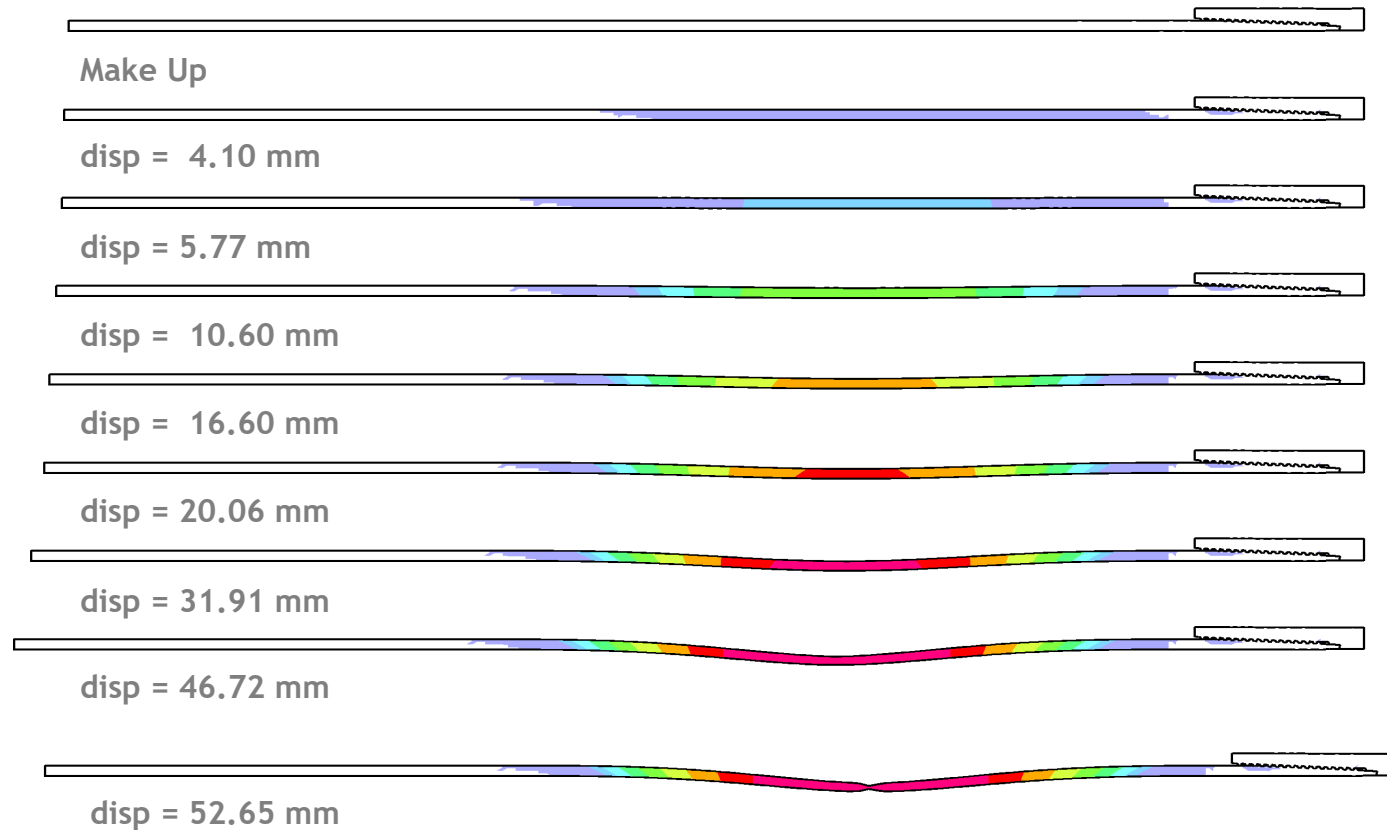


Figure 4 Friction coefficient effect – Tension (575 kN) + Bending

Comparison: numerical vs. experimental results



OCTG Premium Connections: tensile test



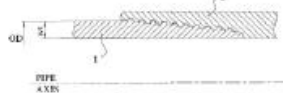
OCTG threaded connections

The
United
States
of
America

UNITED STATES PATENT
Granted on August 14, 2007

**Gabriel Carcagno
Rita G. Toscano
Hisao Nakamura
Tommaso Coppola
Tatuso Ono**
INVENTORS

TENARIS CONNECTIONS AG
7,255,374
THREADED TUBE JOINT



A threaded tube joint for the oil extraction industry has a tapered thread and a frusto-conical sealing surface (11) placed at its end and near the thread and engages, for sealing, a corresponding frusto-conical sealing surface (12) wherein the frusto-conical sealing surface (11) has a radius Rx value comprised within the range given by the formula:

$$\frac{R}{350} \left(\frac{S}{1.15} \right)^2 \leq R_x \leq \frac{S \cdot 10^{-2} \cdot \sin^2 \theta}{3480 \cdot \sigma_{\text{max}} \cdot \mu \cdot (1 - \nu^2)} \left[\frac{2(1 - \nu^2)^{0.5}}{R_{\text{ext}} \cdot \mu} \right]$$

The Director of the United States Patent and Trademark Office has received an application for a patent for a new and useful invention. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law. Therefore, this

United States Patent

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America for the term of this patent, subject to the payment of maintenance fees as provided by law.

[Signature]
Director, U.S. Patent and Trademark Office

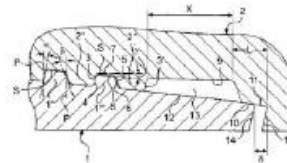
The
United
States
of
America

UNITED STATES PATENT
Granted on June 14, 2005

**Gabriel E. Carcagno
Giuseppe Della Pina
Rita G. Toscano
Antonio Podrini**

INVENTORS

TENARIS CONNECTIONS AG
6,905,150
THREADED PIPE JOINT



Threaded pipe joint comprising a male element (1) and a female element (2), threaded and provided with respective complementary sealing surfaces, which define, when screwed together, a notch (15) formed on the female element (2) of a predetermined length (X), and a space (7, 8) between the threads of the male element (1) and the female element (2), forming a reservoir to house the joint lubricant, which comes out of the volume between the threads of the female (2) and male (1) elements during the tightening of the joint.

The Director of the United States Patent and Trademark Office has received an application for a patent for a new and useful invention. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law. Therefore, this

United States Patent

Grants to the person(s) having title to this patent the right to exclude others from making, using, offering for sale, or selling the invention throughout the United States of America or importing the invention into the United States of America for the term of this patent, subject to the payment of maintenance fees as provided by law.

[Signature]
Director, U.S. Patent and Trademark Office

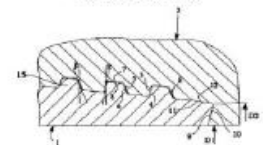
The
United
States
of
America

UNITED STATES PATENT
Granted on February 8, 2005

**Gabriel E. Carcagno
Giuseppe Della Pina
Rita G. Toscano
Tommaso Coppola**

INVENTORS

TENARIS CONNECTIONS B.V.
6,851,727
THREADED PIPE JOINT



Threaded joint for pipes consisting of a male member (1) and a female member (2), which are provided on the outer and inner surfaces respectively with two threading portions presenting a lead-in flank β such that $10^\circ \leq \beta \leq 52^\circ$, an abutment surface (9) being present at the end of said male member for abutment to a corresponding annular abutment surface (10) of the female member. The lead-in flanks of the male (1) and the female (2) members, upon make-up and with unscrewed joint leave a gap (in the direction parallel to the axis (Z)) of the joint) varying from 0.01 to 0.12 mm. The internal and external diameters D3 and D4 of the pipe portion not involved in the coupling with the female member) of said male member, the inner and outer diameters D1 and D2 of the abutment surface of the female member are limited by the relationship $(D3 - D1) \cdot (D4 - D2) \geq 0.5$.

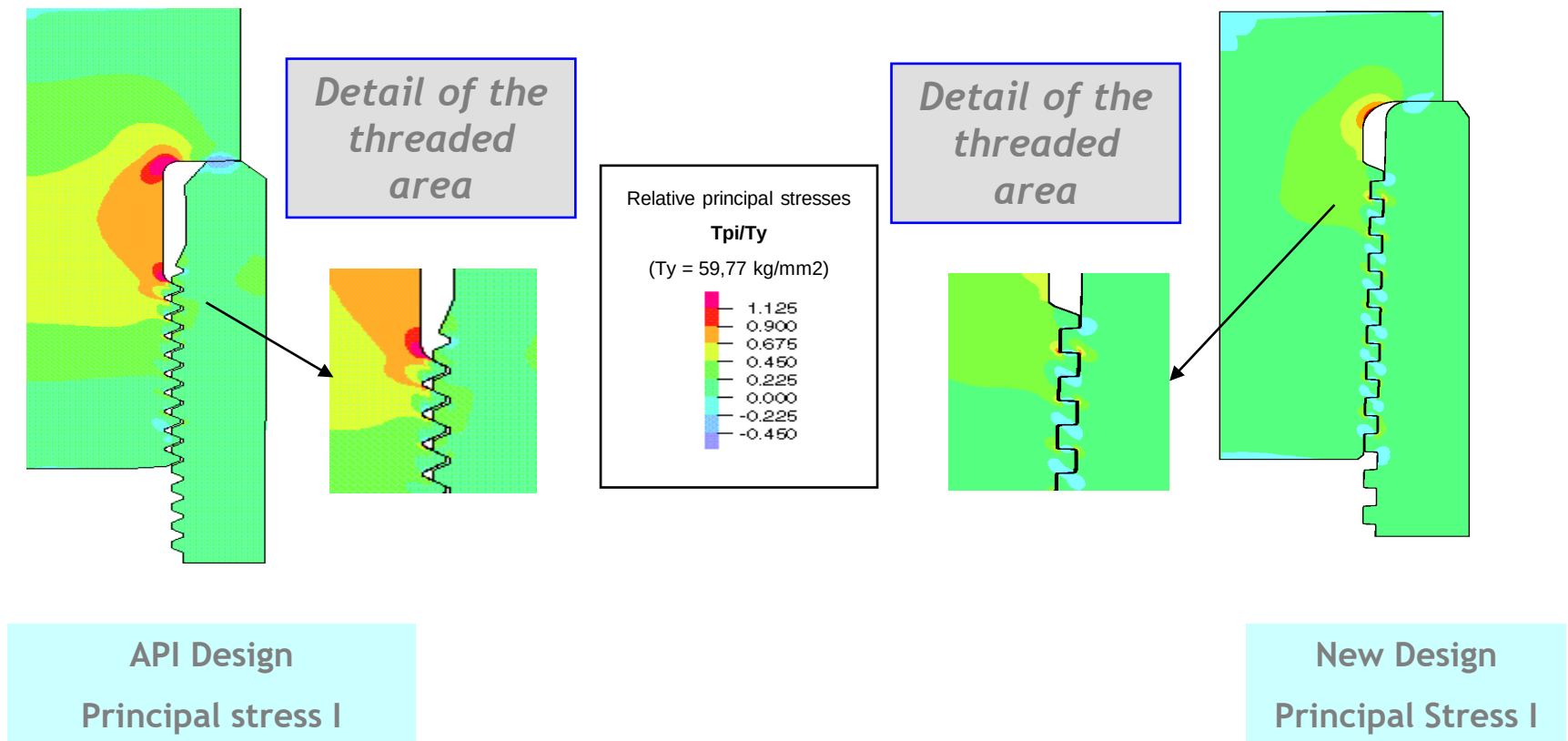
The Director of the United States Patent and Trademark Office has received an application for a patent for a new and useful invention. The requirements of law have been complied with, and it has been determined that a patent on the invention shall be granted under the law. Therefore, this

United States Patent

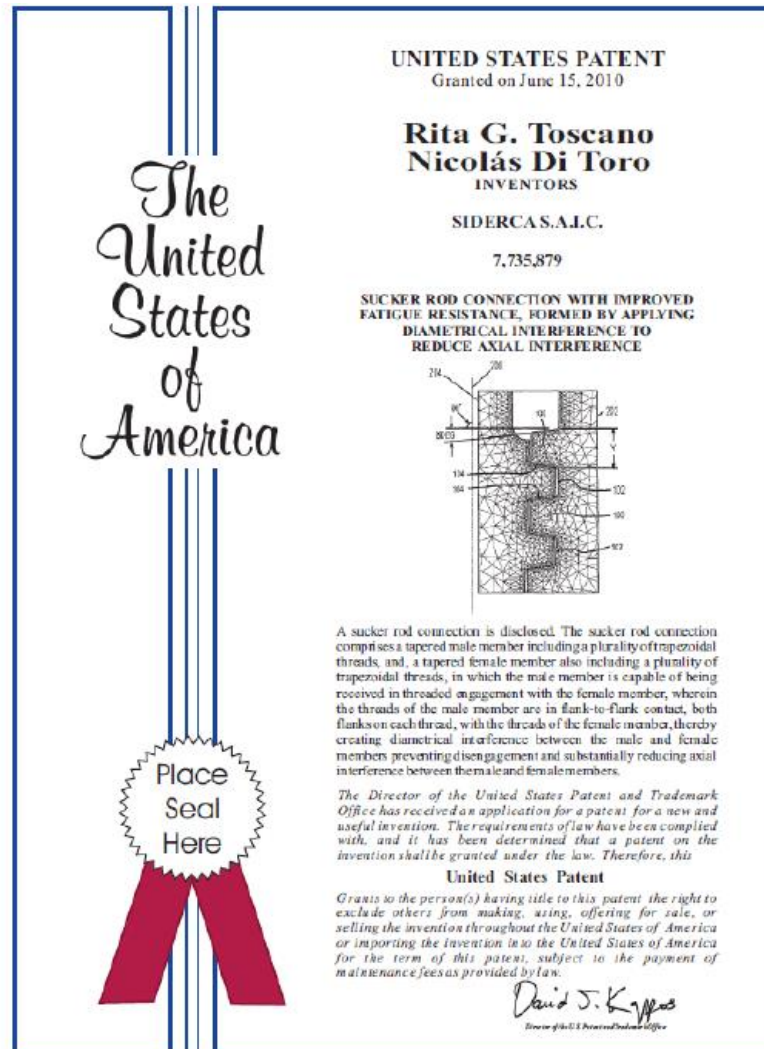
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[Signature]
Director, U.S. Patent and Trademark Office

Premium connections design

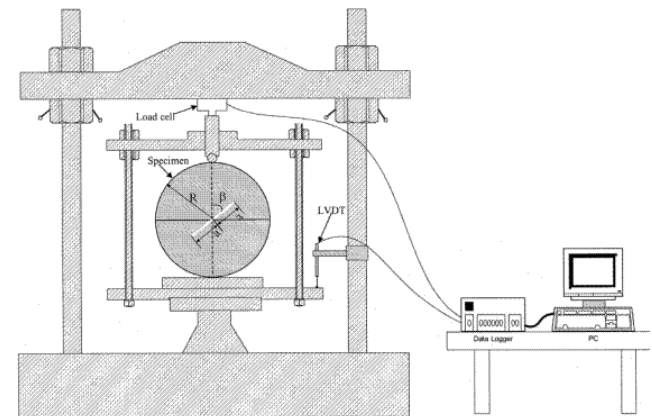
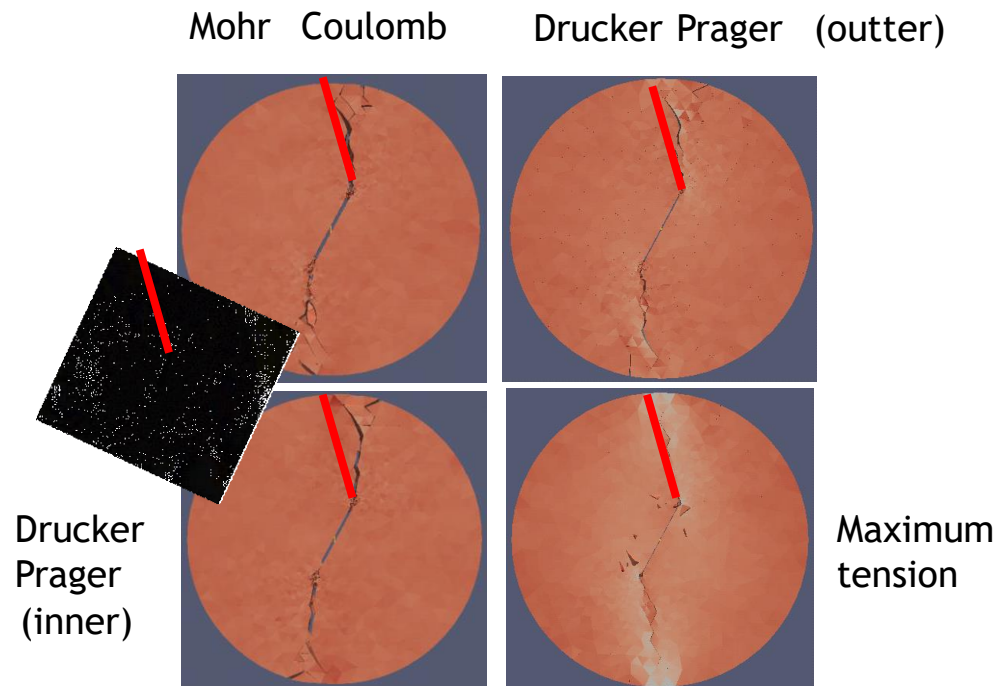


Sucker rod connections



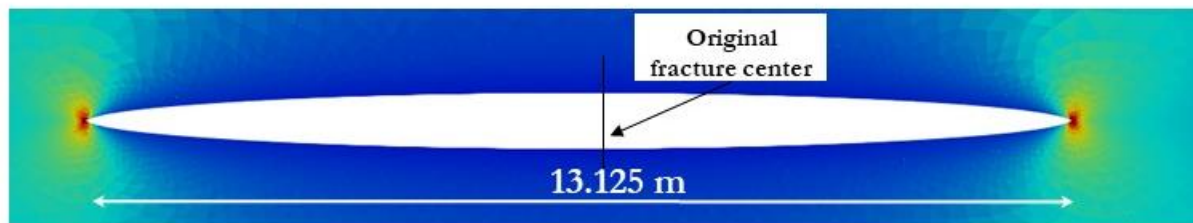
Brazilian test with a slot

Model validation: numerical simulation with different material models

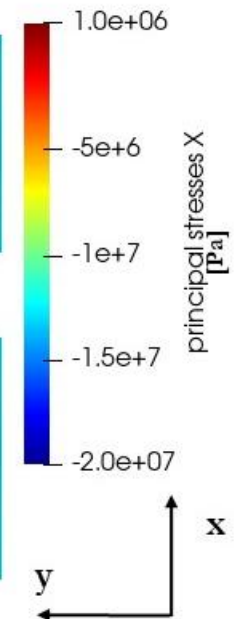
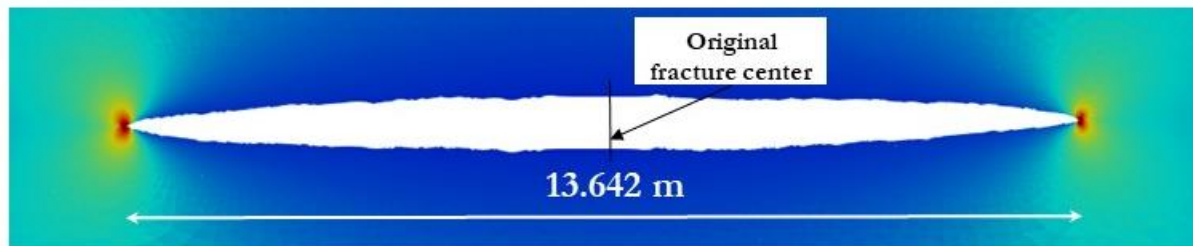


Modeling of hydraulic fracturing

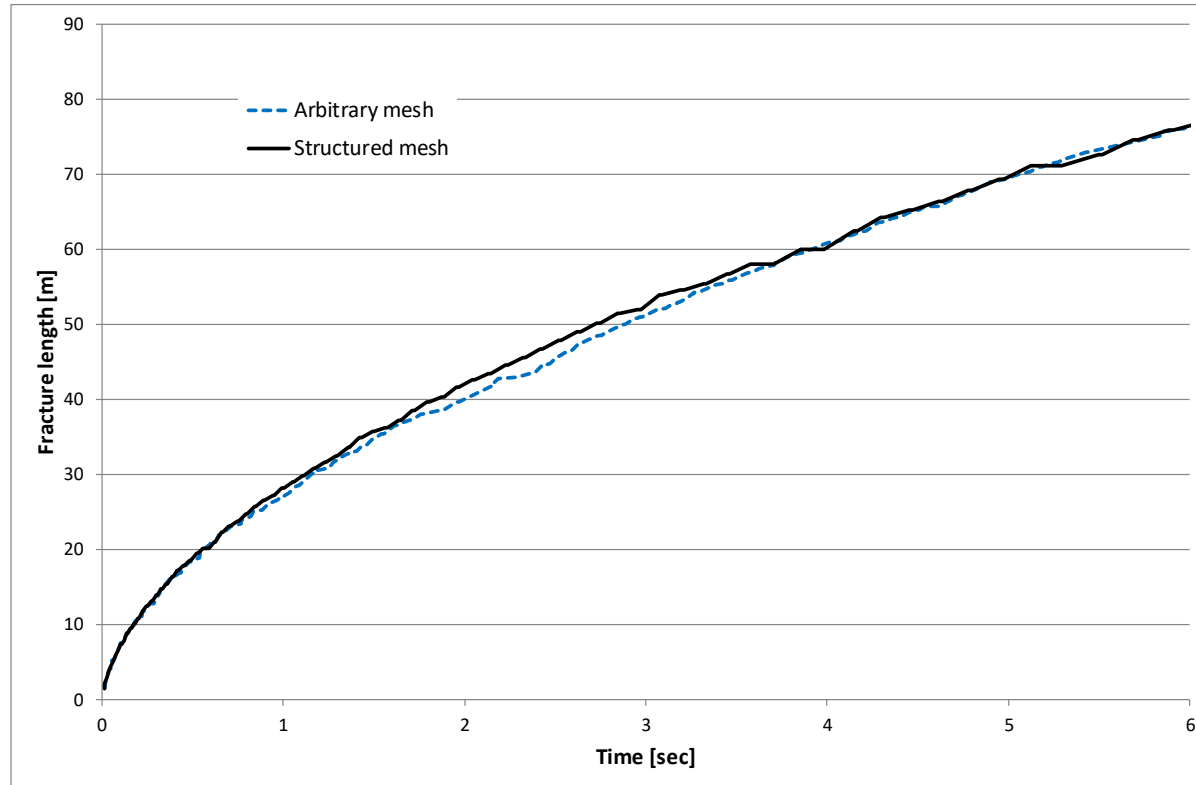
Structured mesh



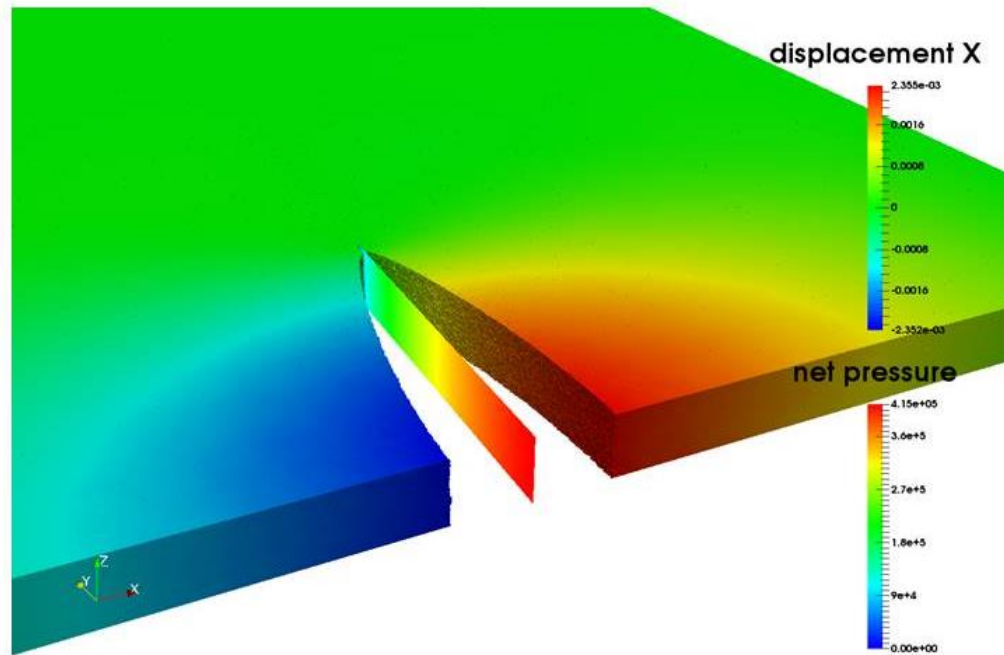
Unstructured mesh



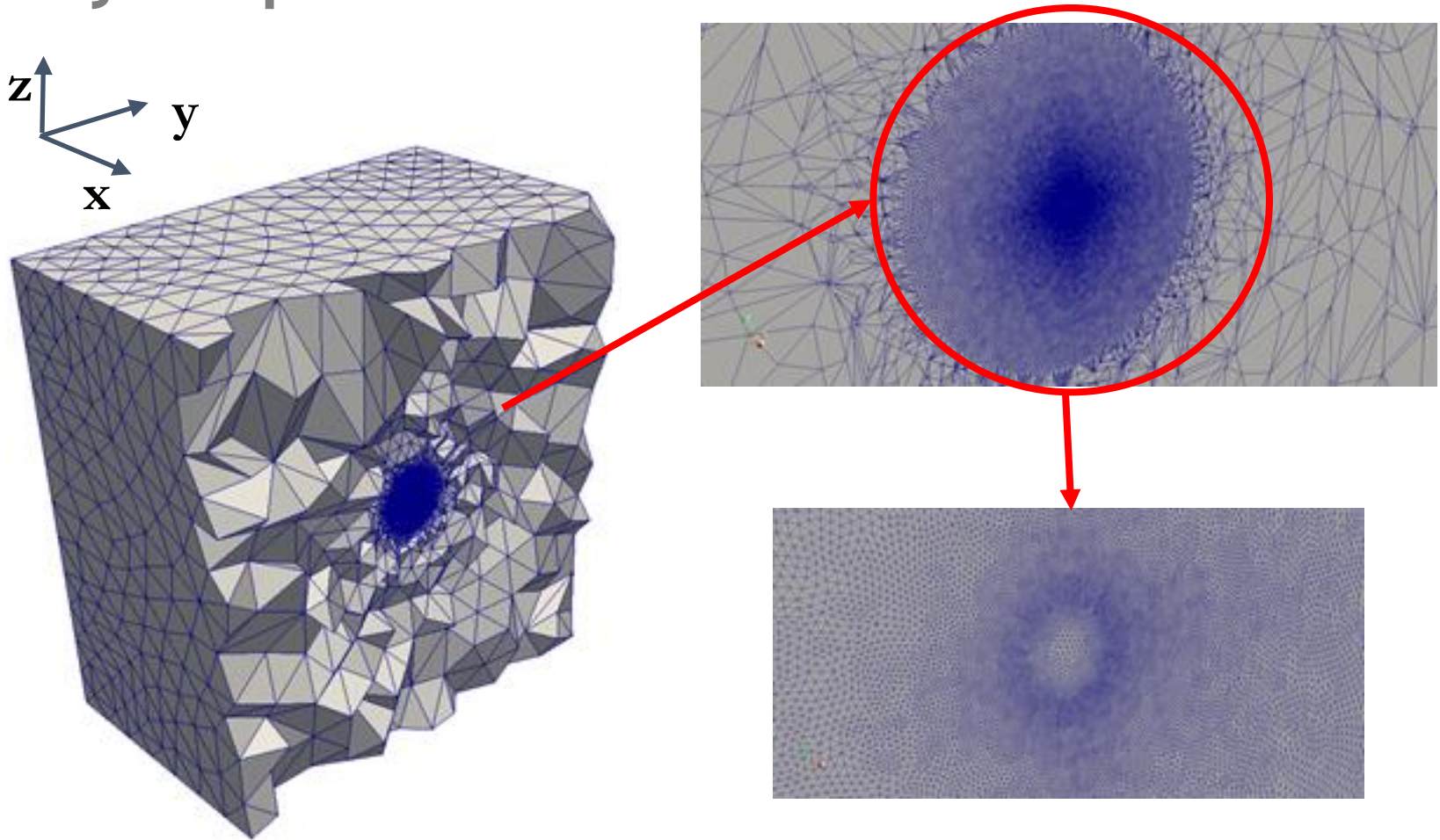
Modeling of hydraulic fracturing



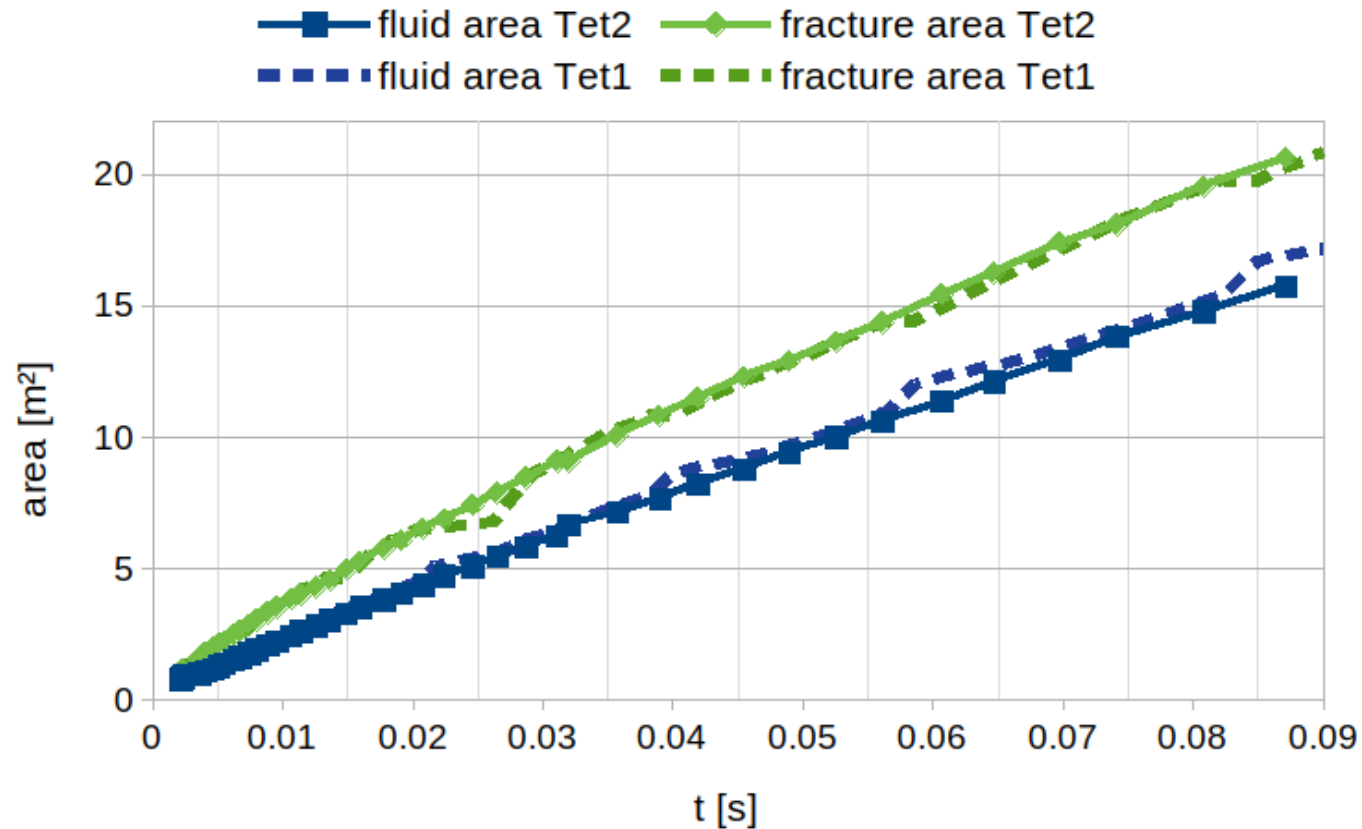
KGD



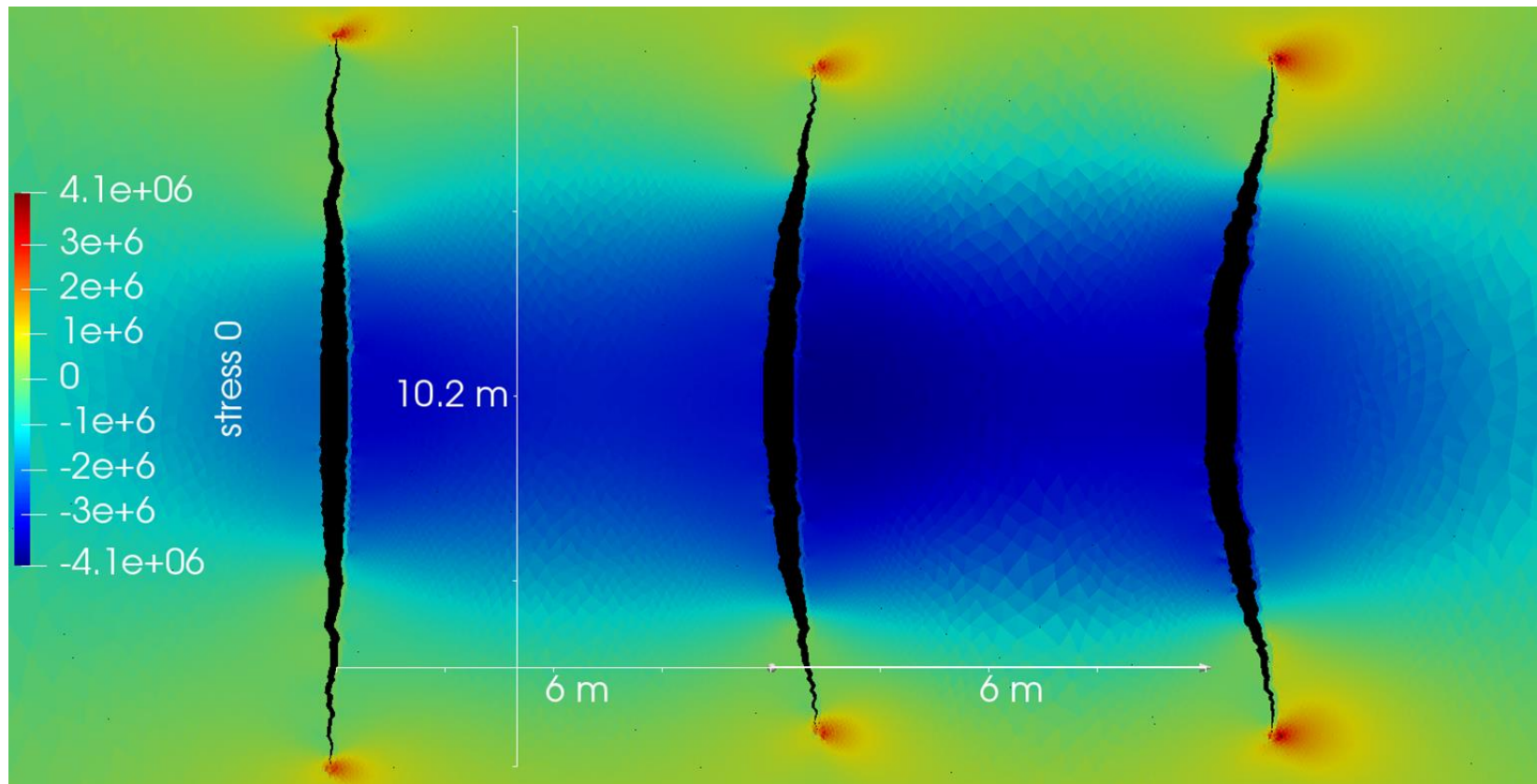
Penny Shape



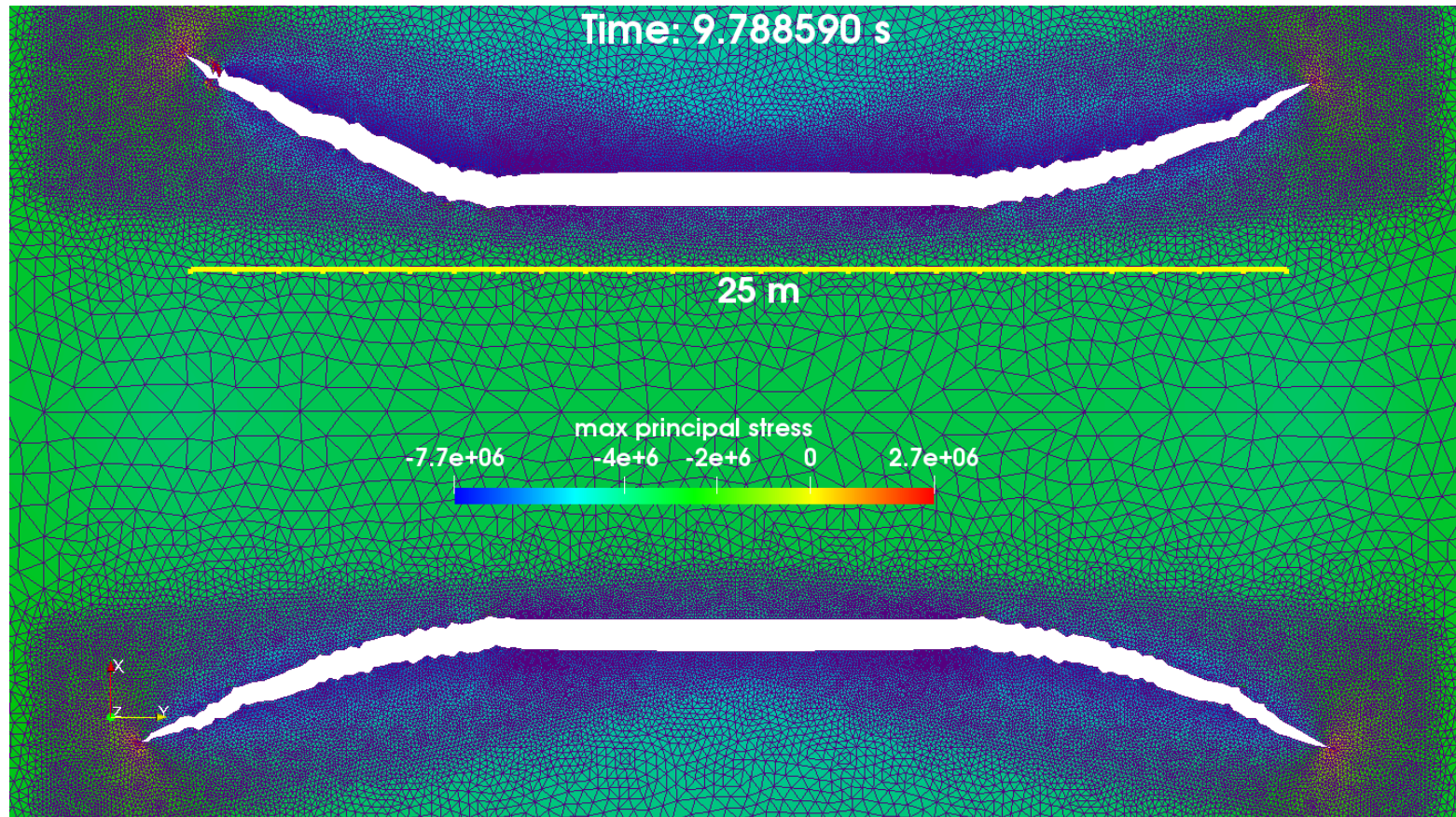
Penny Shape



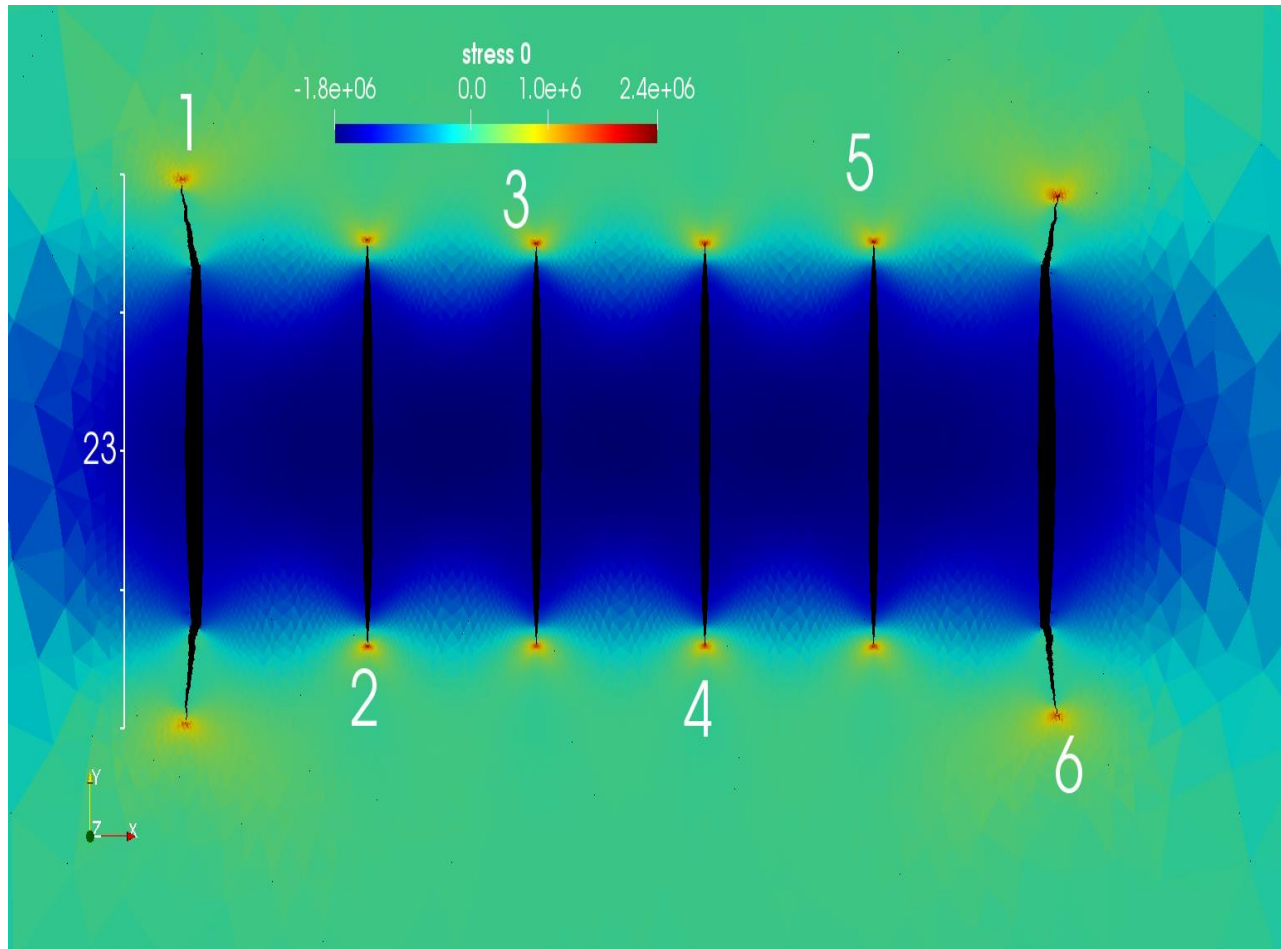
Sequential fractures



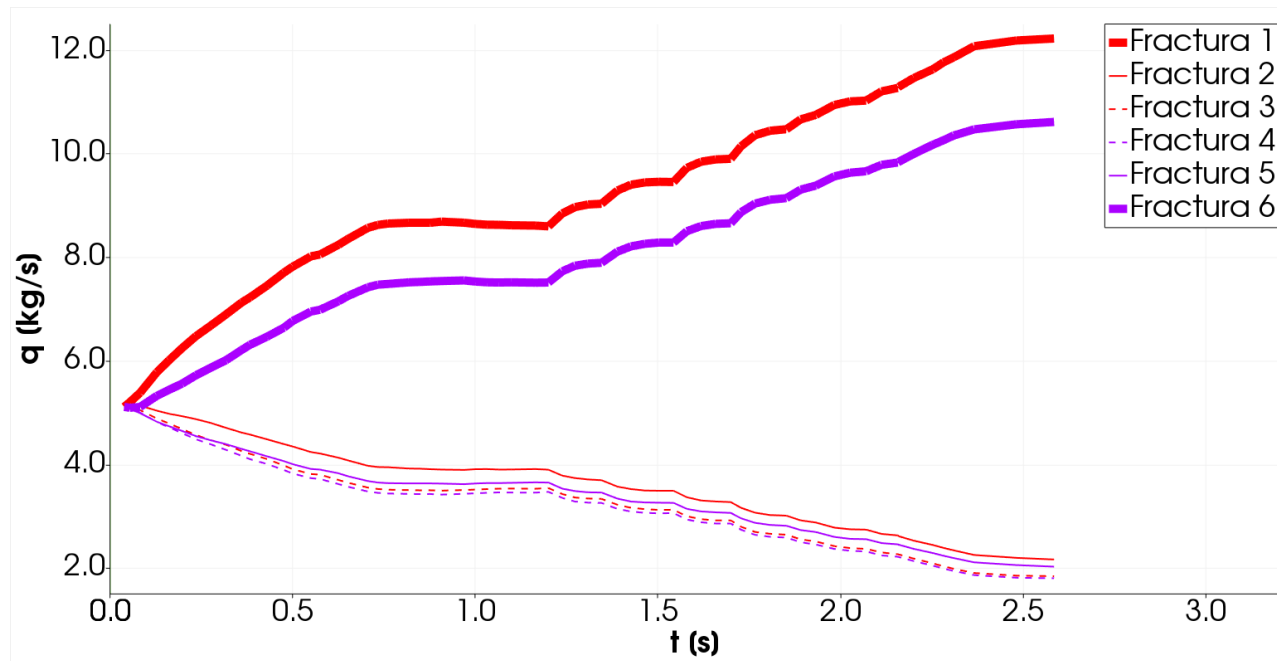
Simultaneous fractures



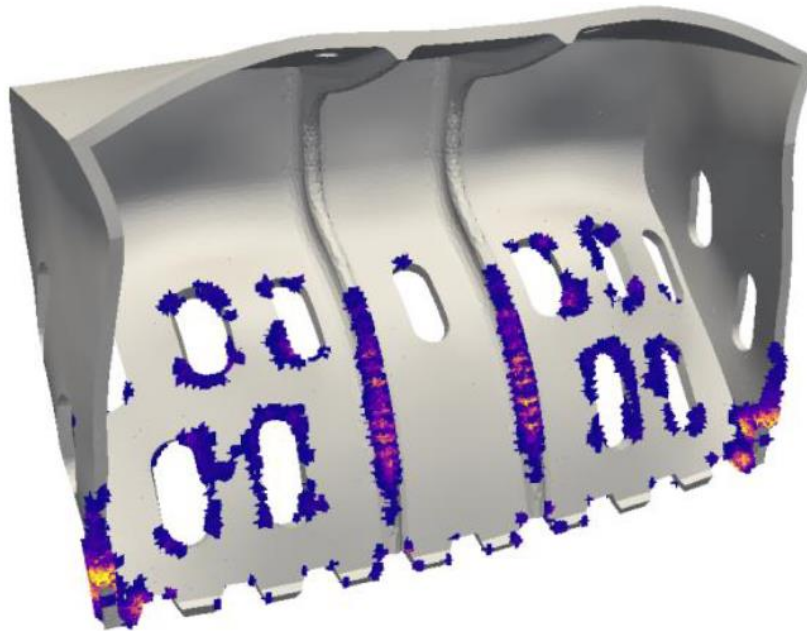
Simultaneous fractures



Simultaneous fractures



Clam bucket



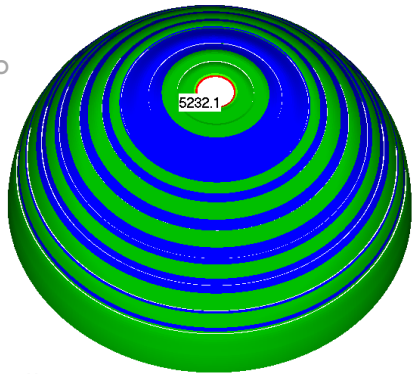
Interface damage (%)



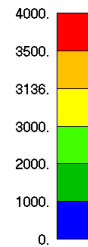
Maximum Damage 19%

Stresses in different layers

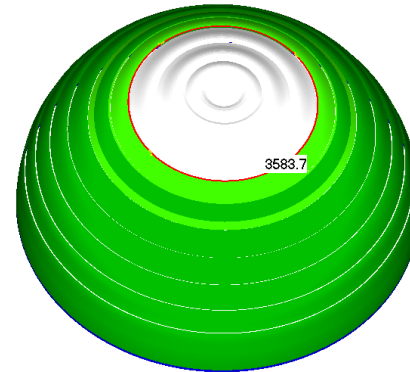
#1
 $\varphi = 4.8^\circ$



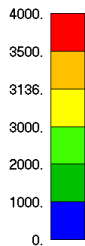
Output Set: Case 4 Time 60.
Elemental Contour: Lam Ply1 X Normal Stress



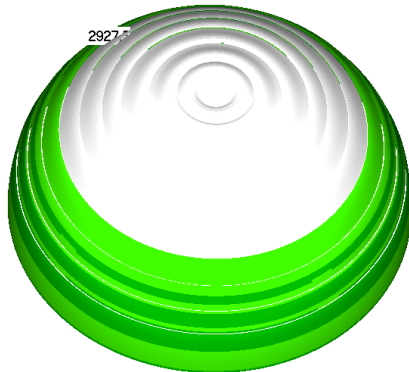
#1
 $\varphi = 26^\circ$



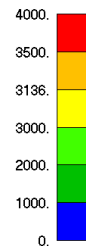
Output Set: Case 4 Time 60.
Elemental Contour: Lam Ply57 X Normal Stress



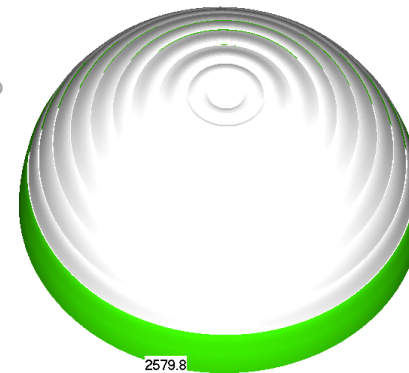
#1
 $\varphi = 48^\circ$



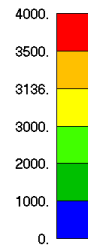
Output Set: Case 4 Time 60.
Elemental Contour: Lam Ply97 X Normal Stress



#1
 $\varphi = 72^\circ$



Output Set: Case 4 Time 60.
Elemental Contour: Lam Ply153 X Normal Stress



50 lt vessel burst test

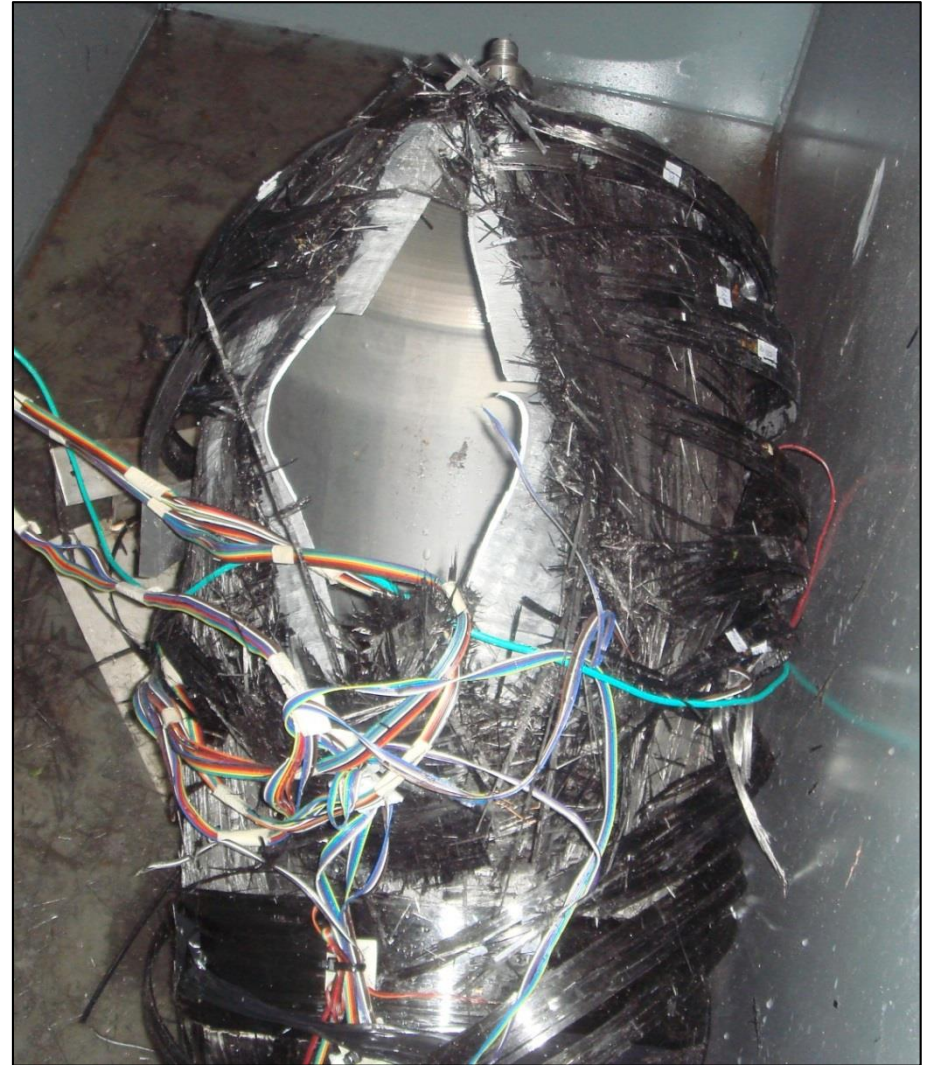
Test burst pressure :

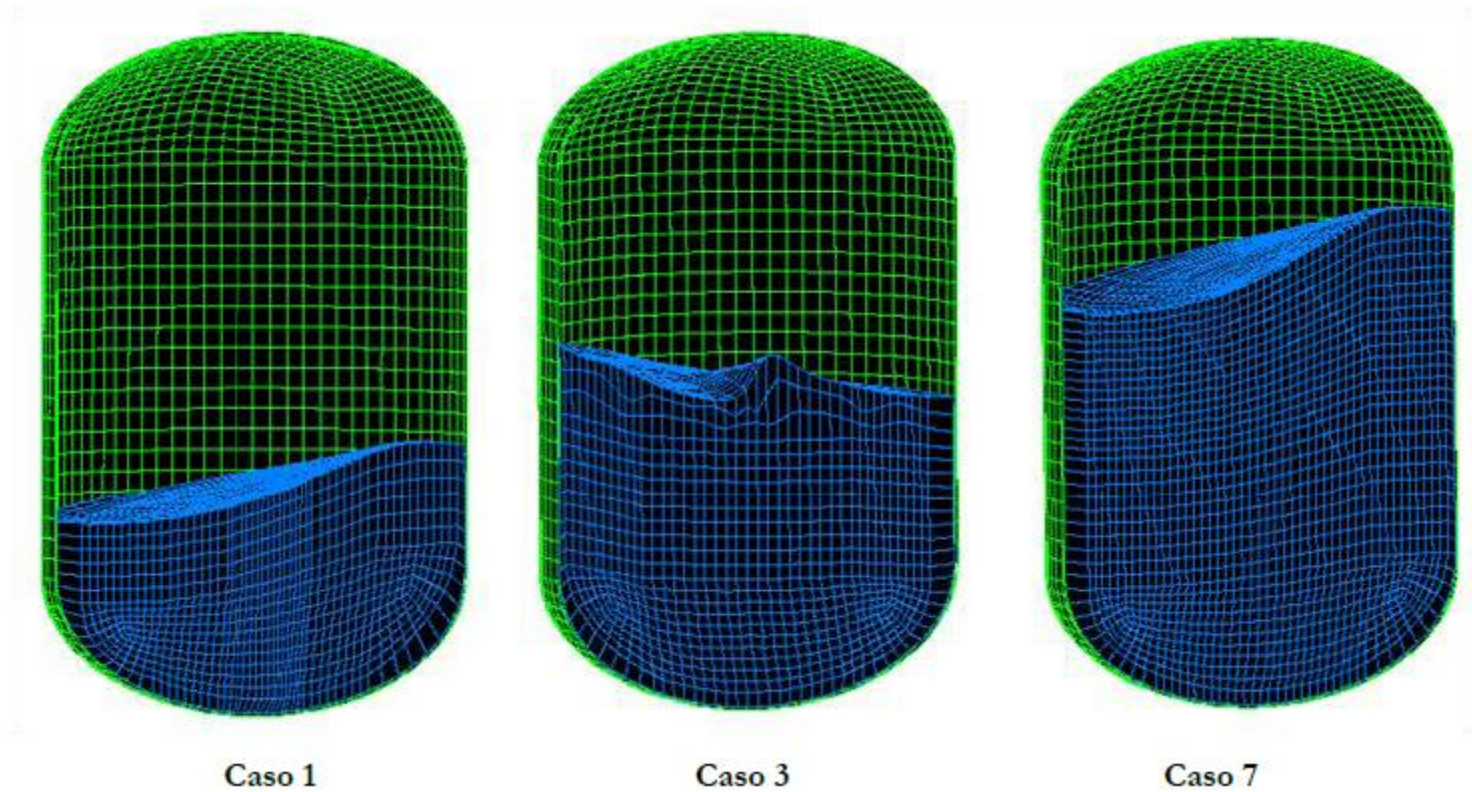
$$P_e = 54 \text{ MPa}$$

FEM burst pressure :

$$P_{MEF} = 52 \text{ MPa}$$

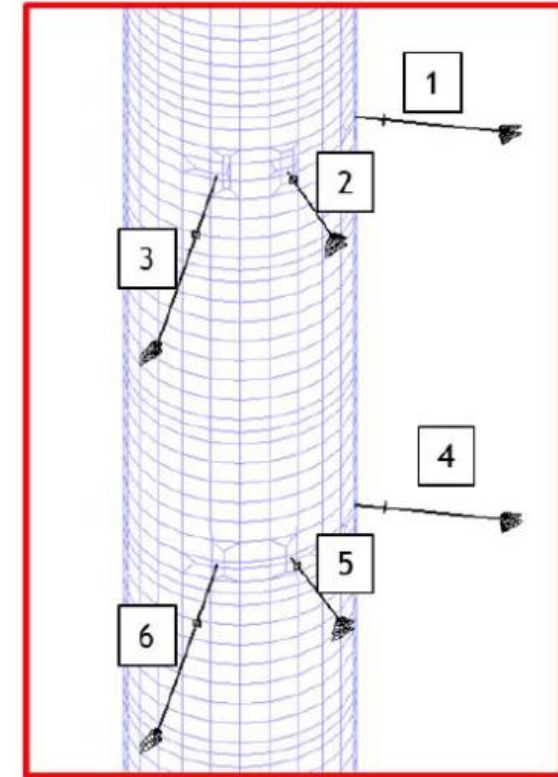
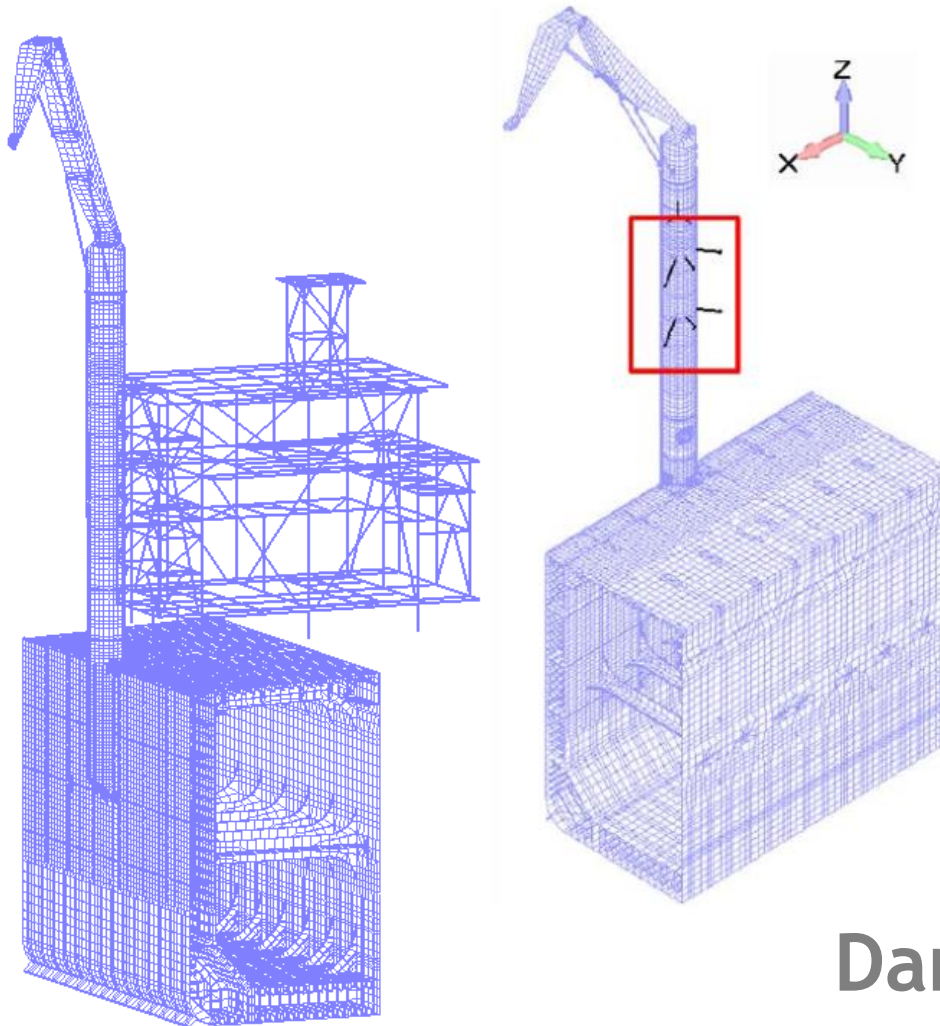
$$P_{MEF} / P_e = 0.963$$





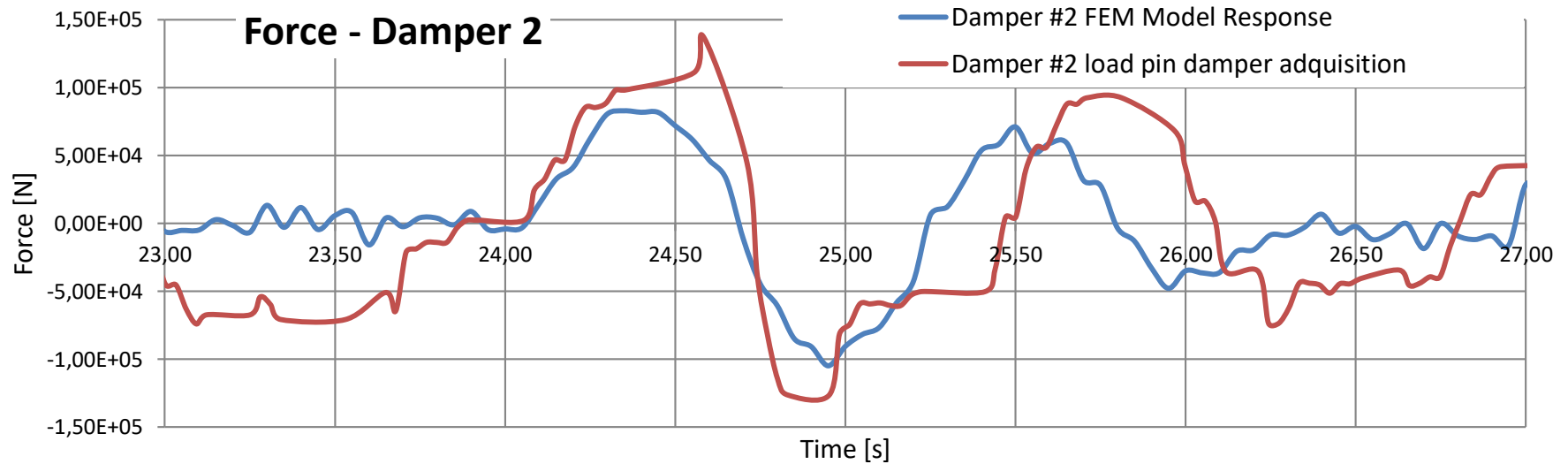
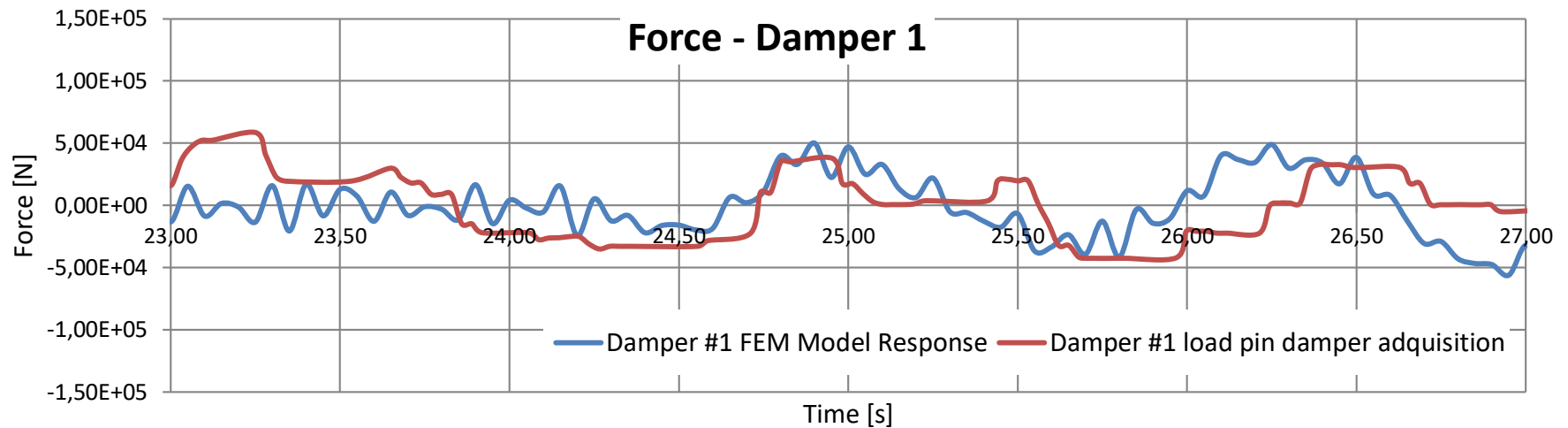
Vibrations in FPSO Starboard Crane

A
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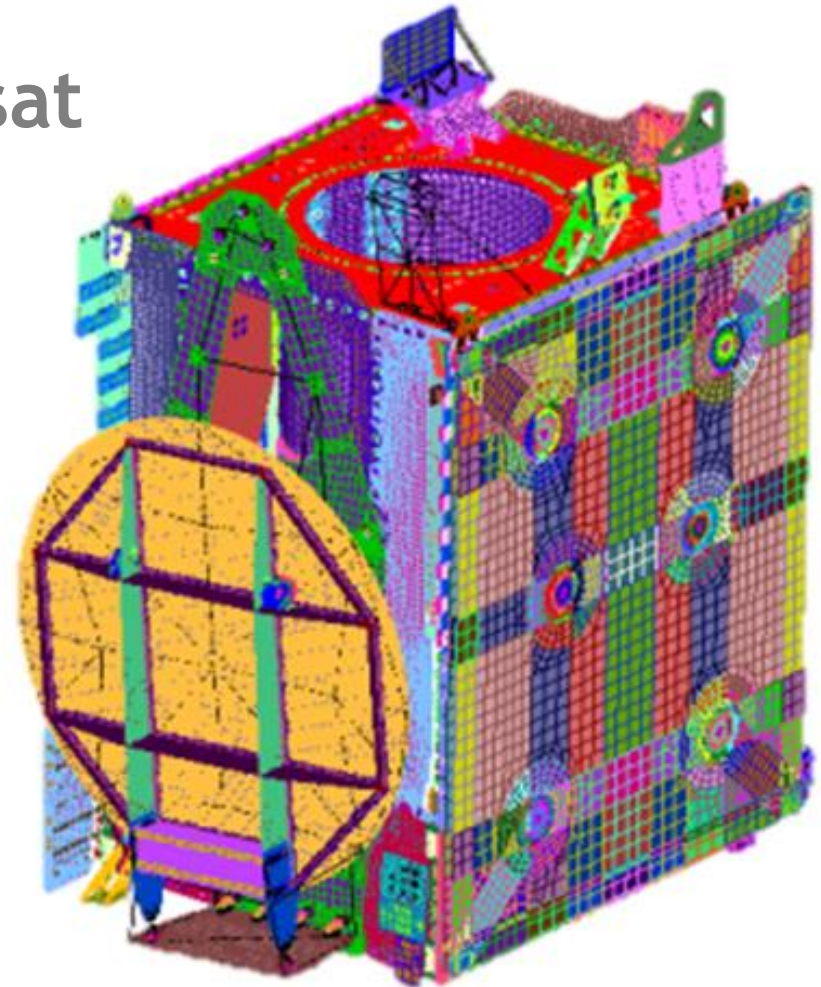
Damper locations

Vibrations in FPSO Starboard Crane

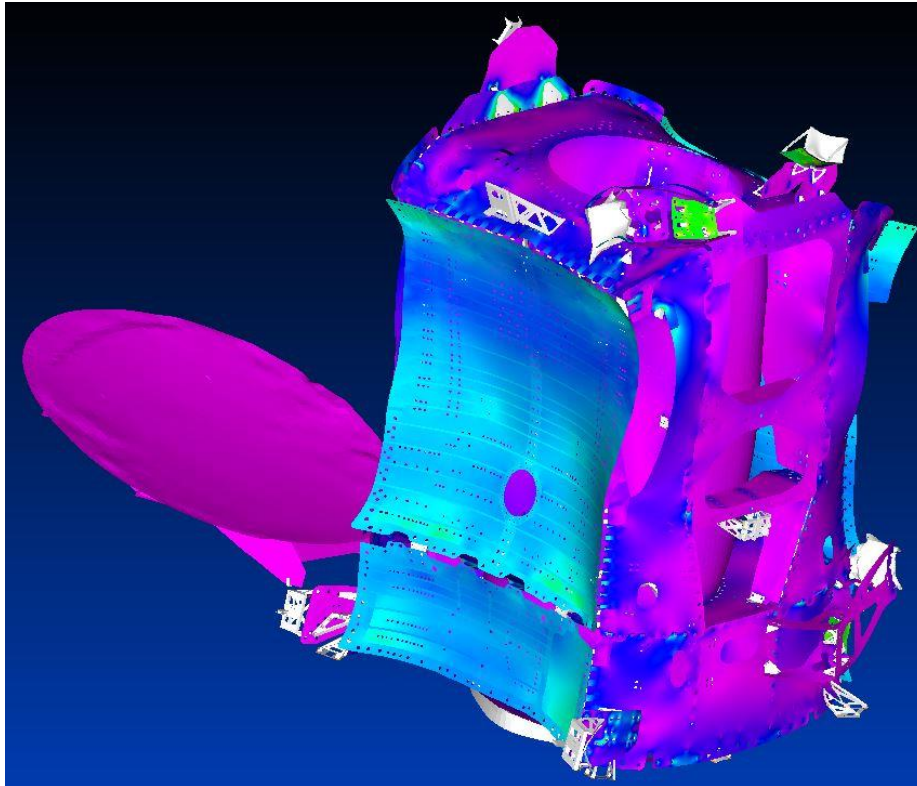




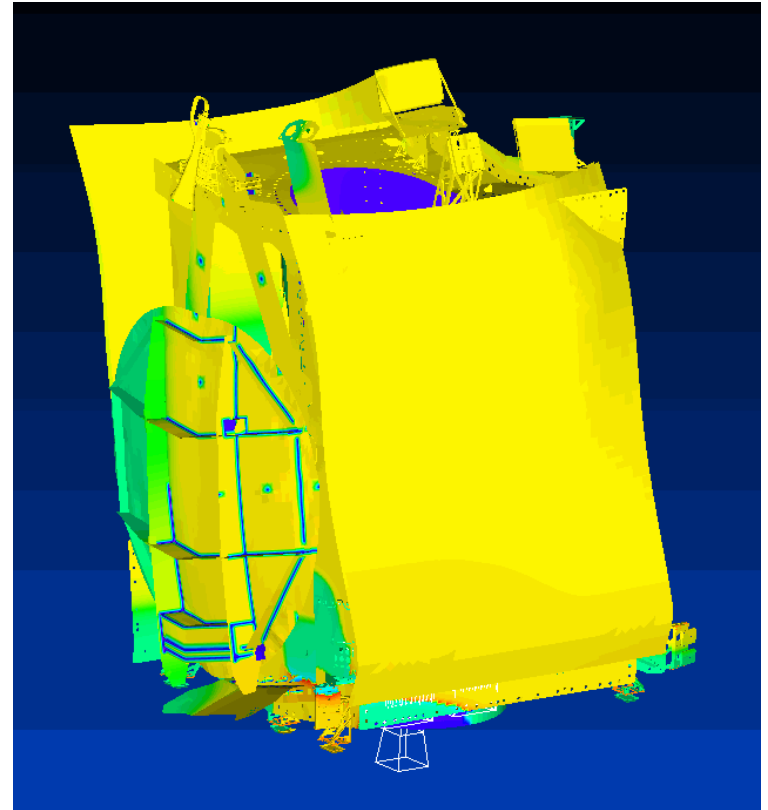
Arsat



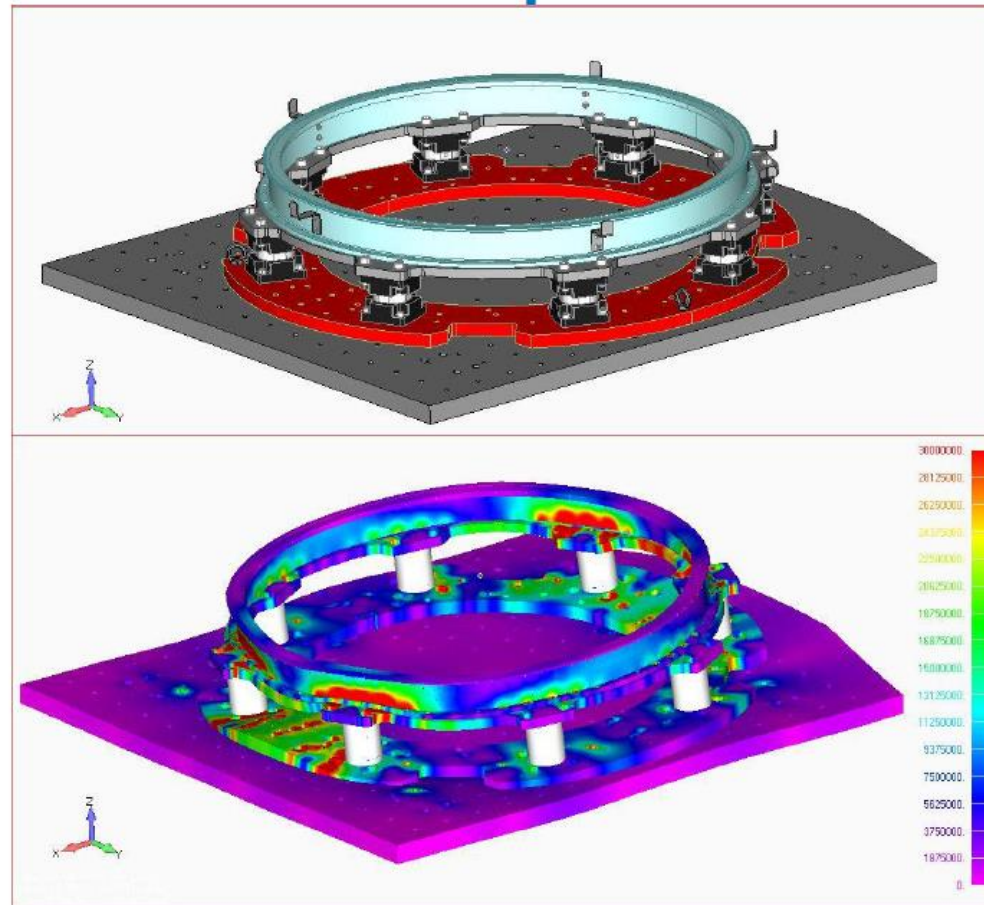
Thermoelastic analysis



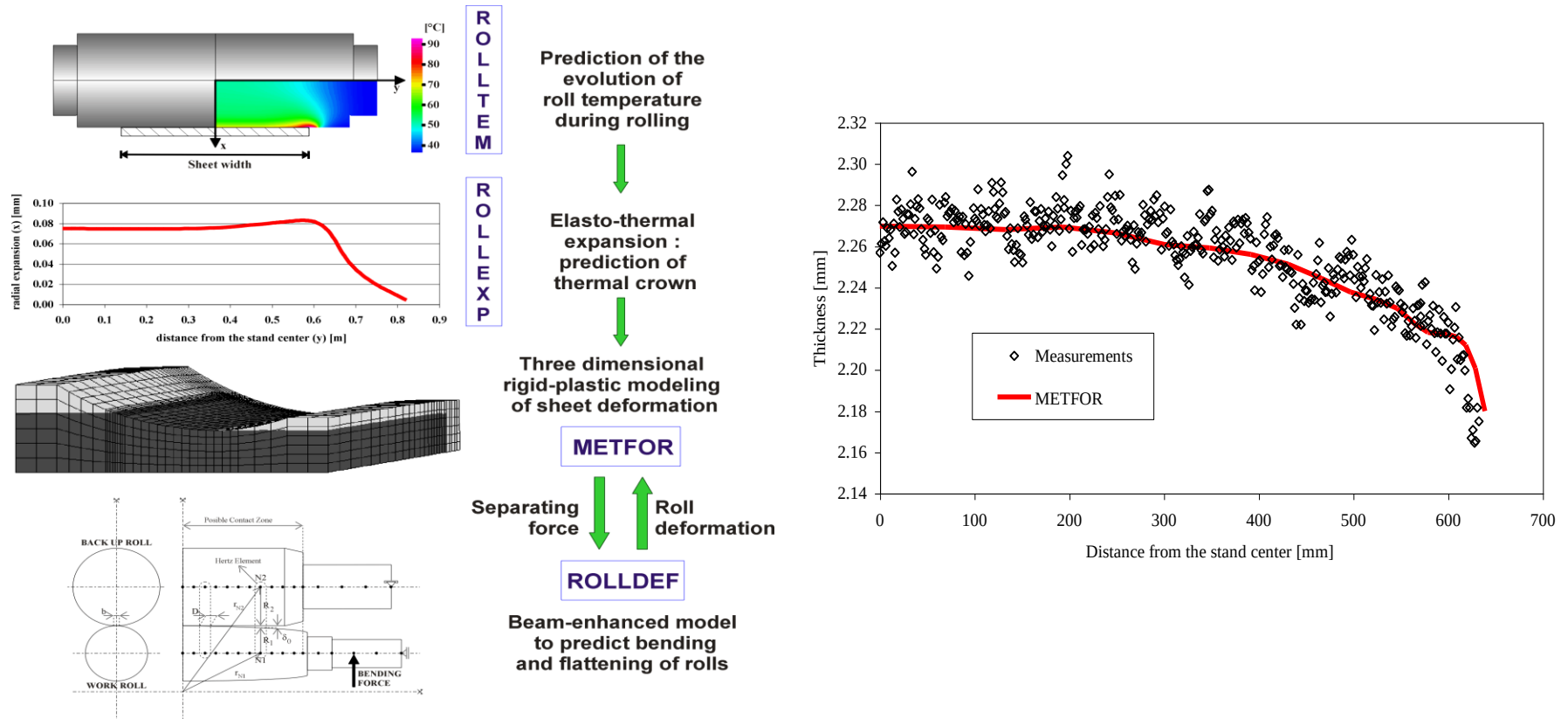
Dynamic Analysis



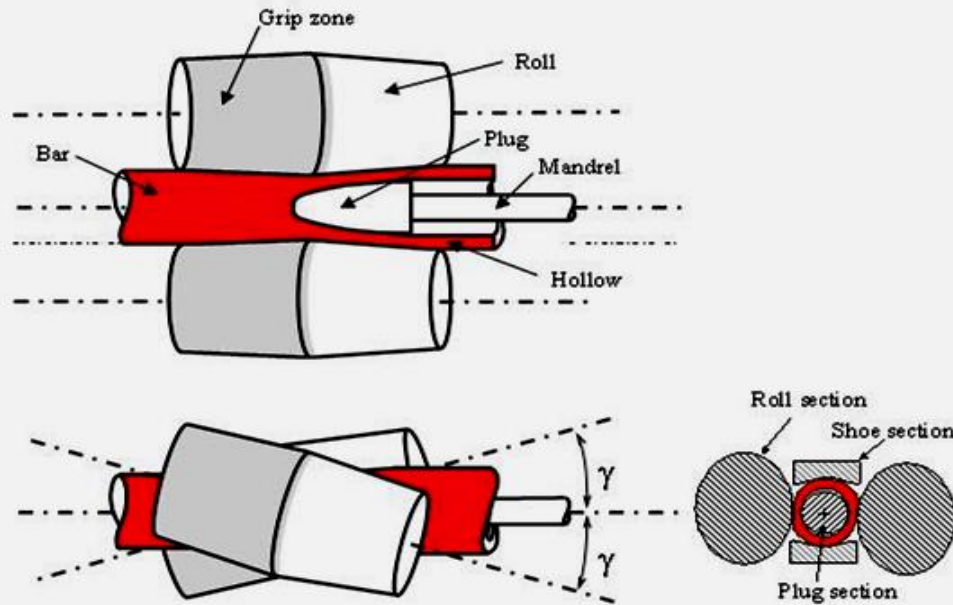
Shaker adapter



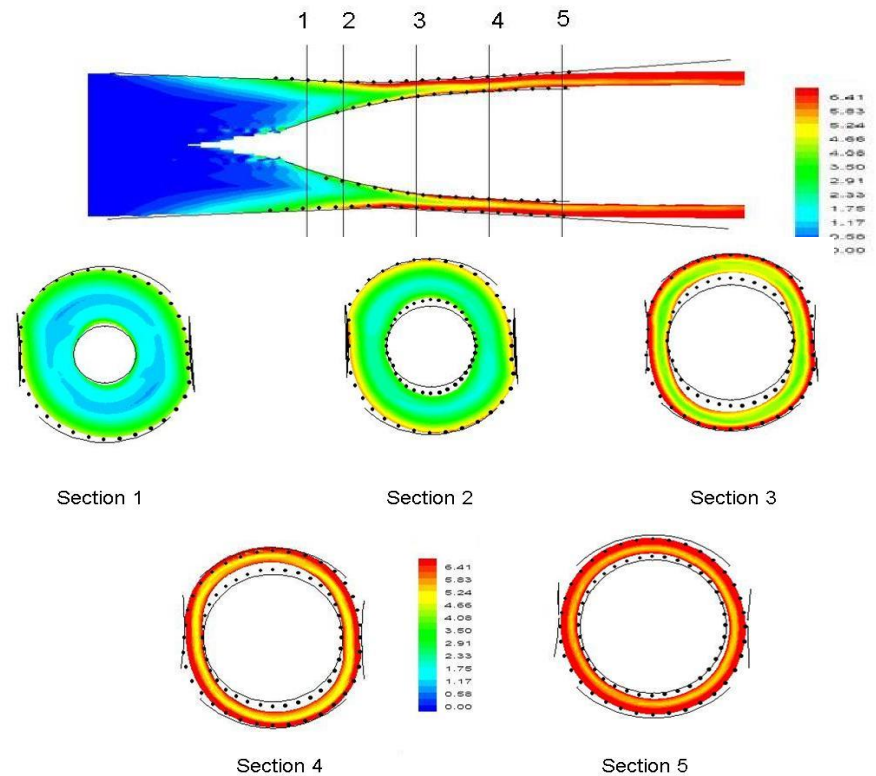
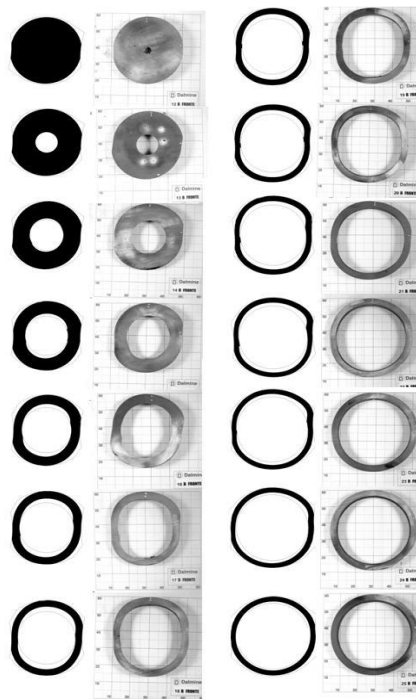
Hot rolling of flat products



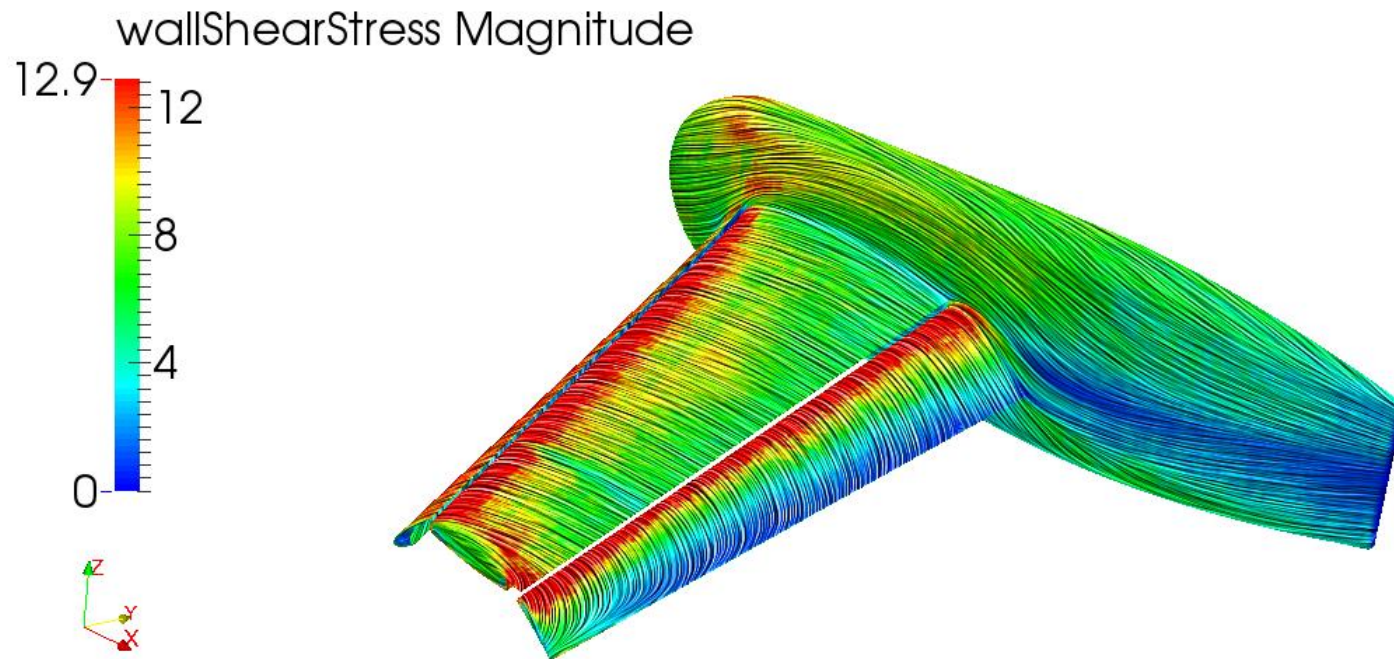
The Mannesmann piercing process



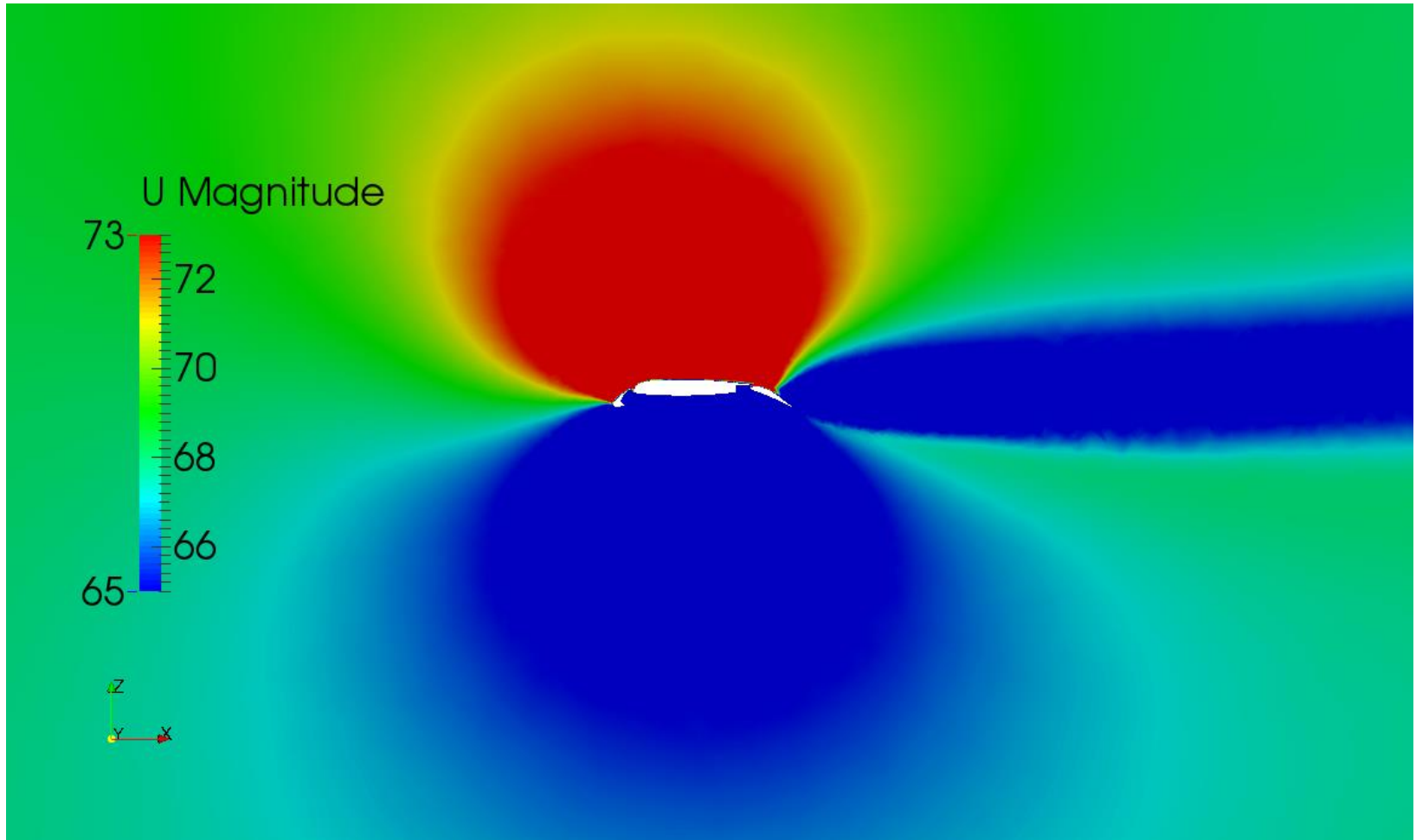
The Mannesmann piercing process



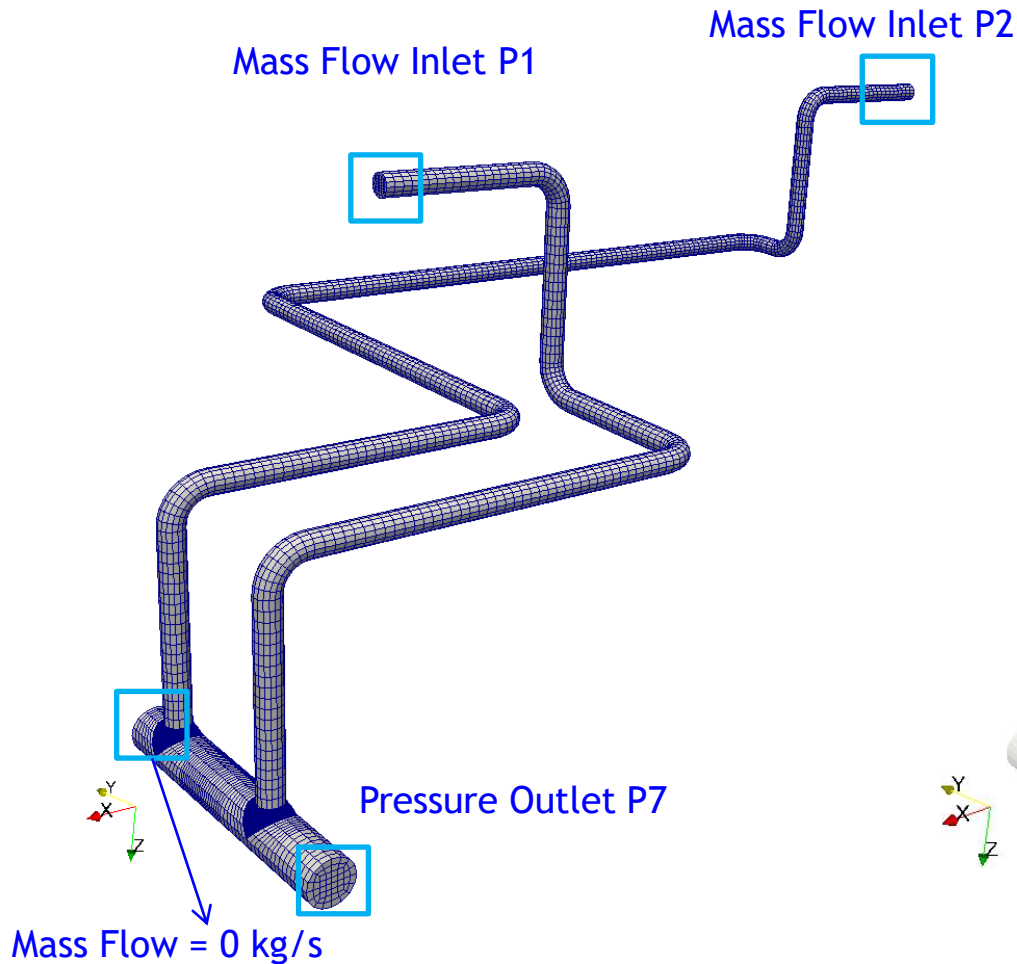
Airplane wing



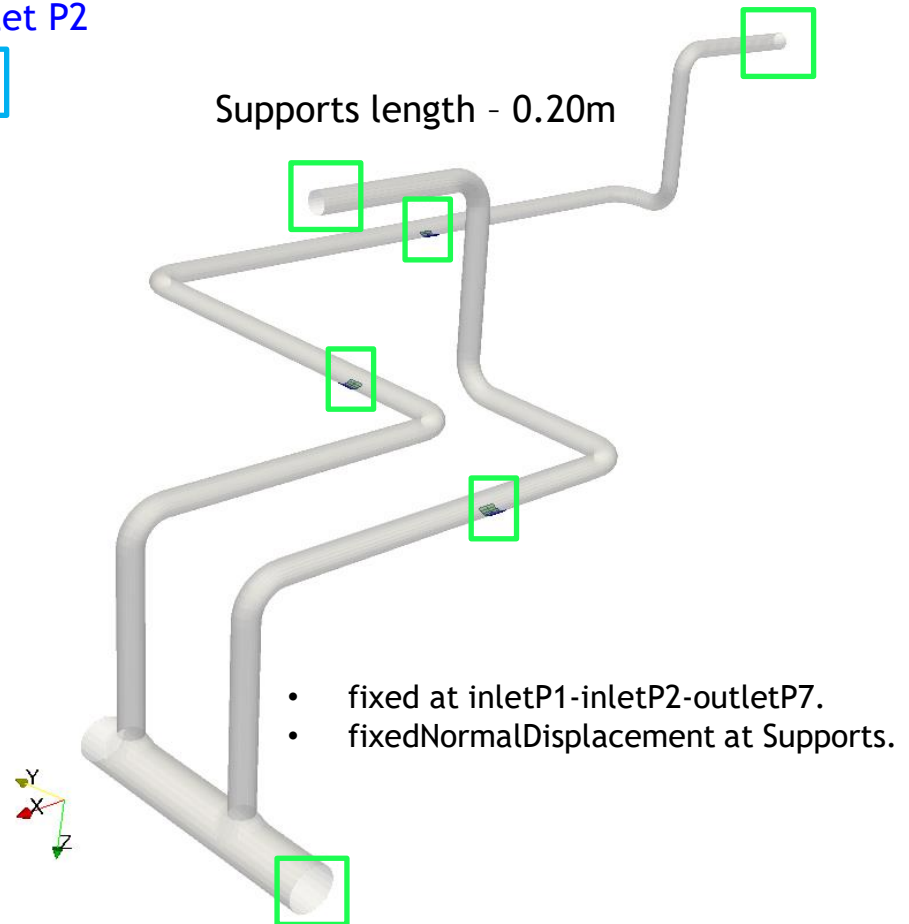
Airplane wing



Fluid mesh and BC

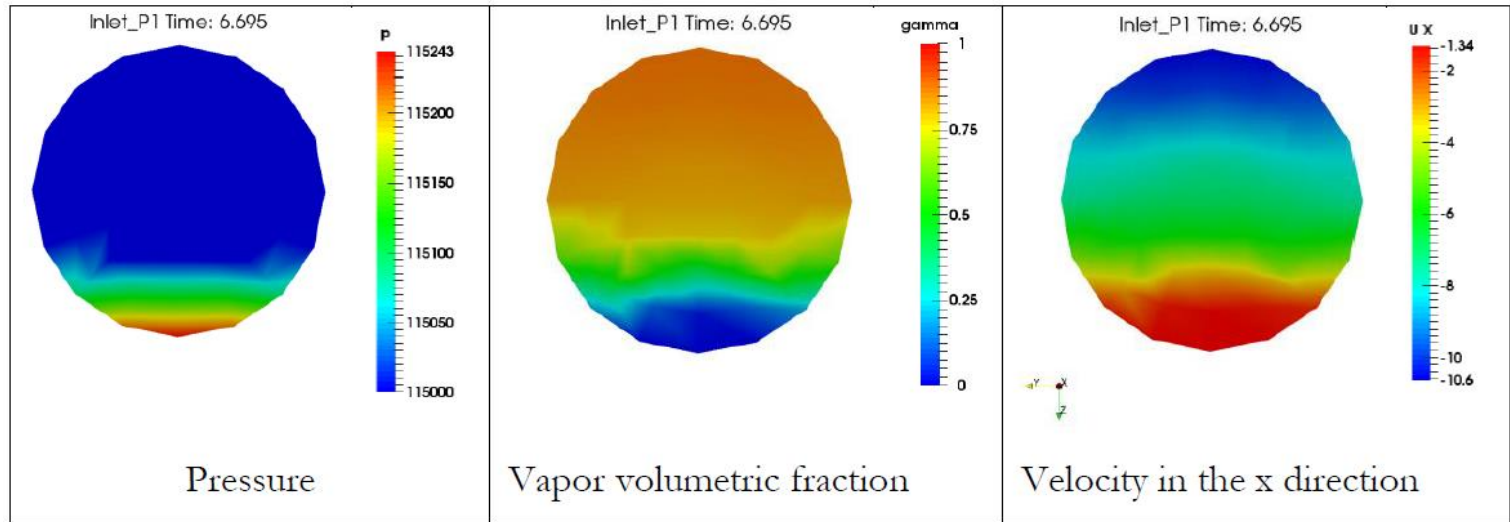


Solid mesh and BC

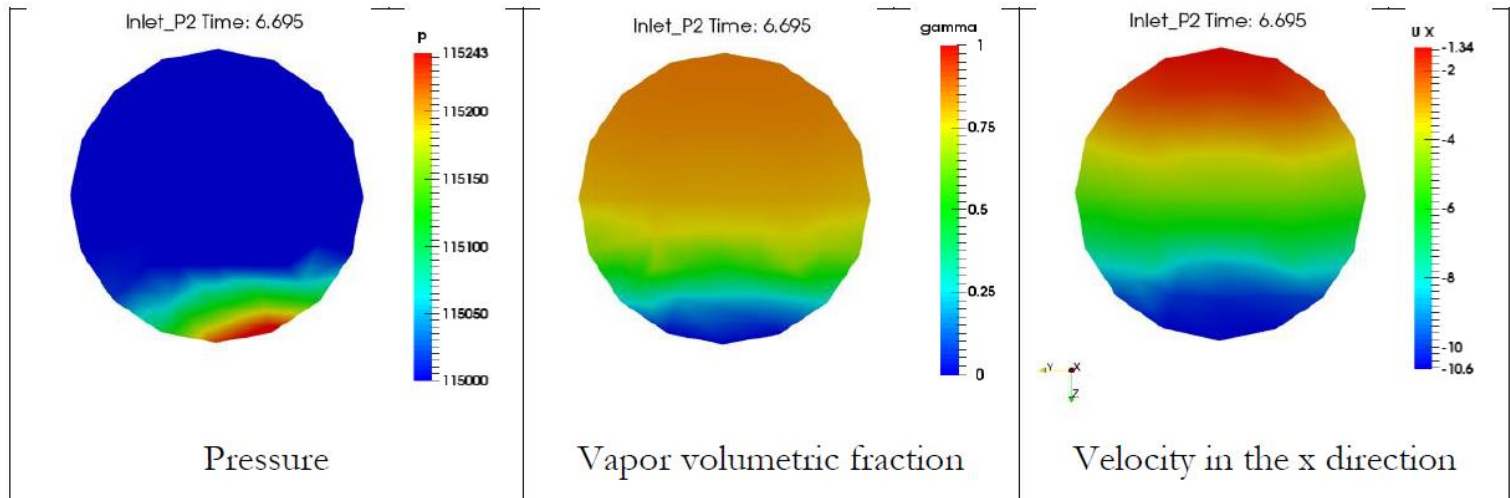


FSI: LNG pipeline at Dunkerque

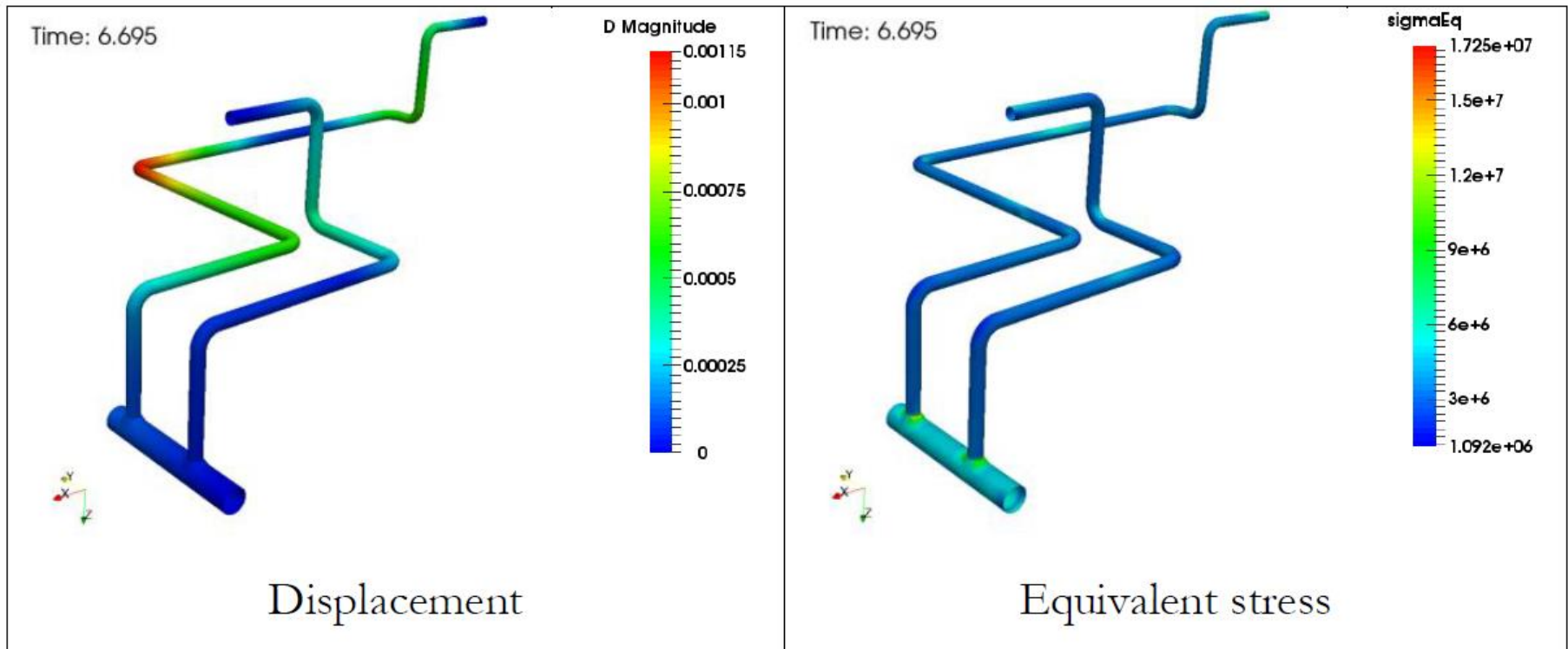
Inlet P1



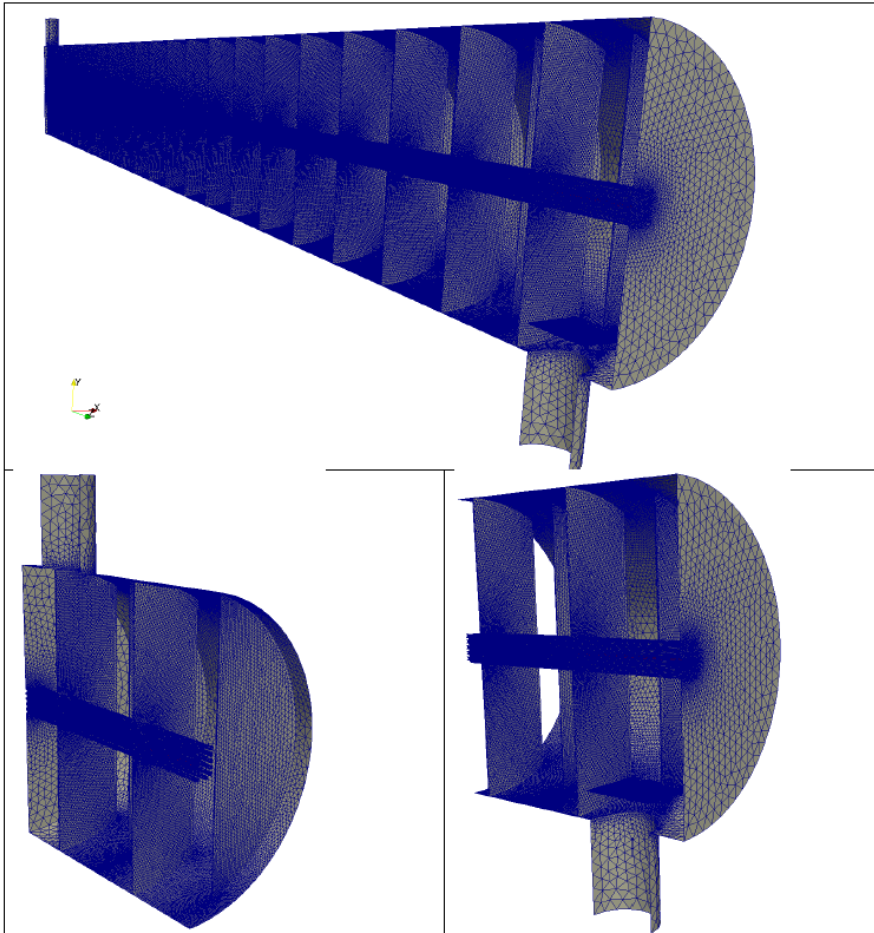
Inlet P2



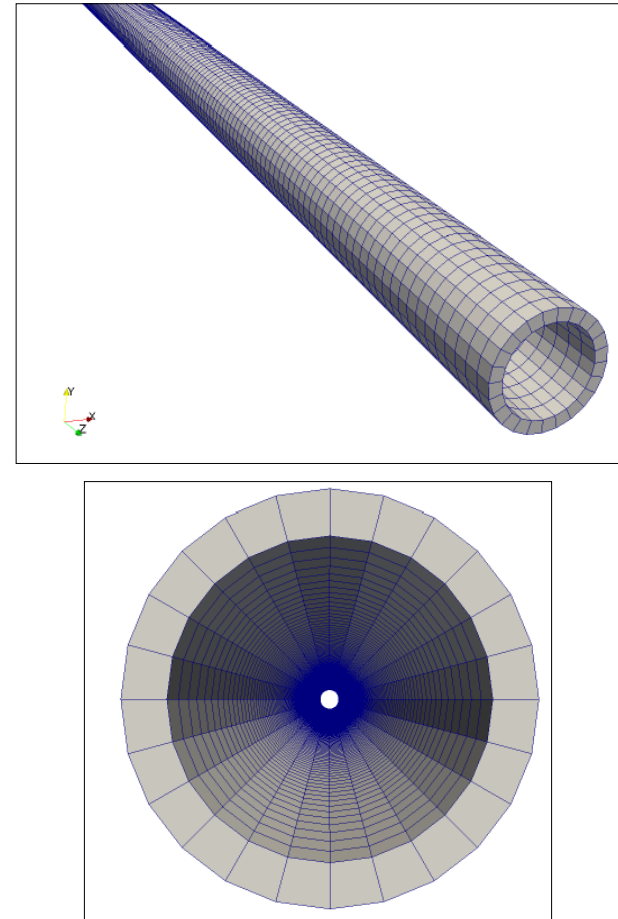
FSI: LNG pipeline at Dunkerque



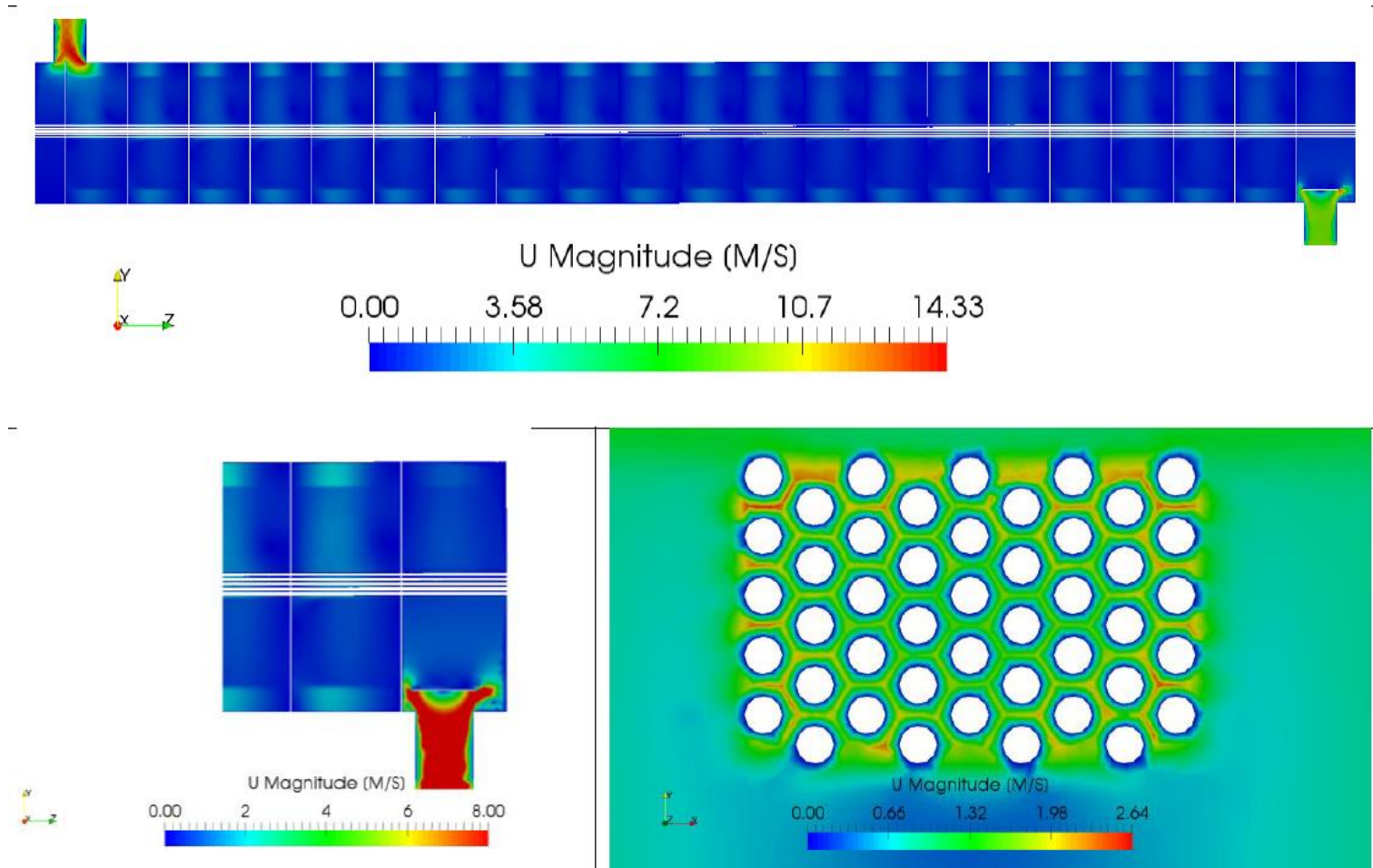
Fluid Mesh



Solid Mesh

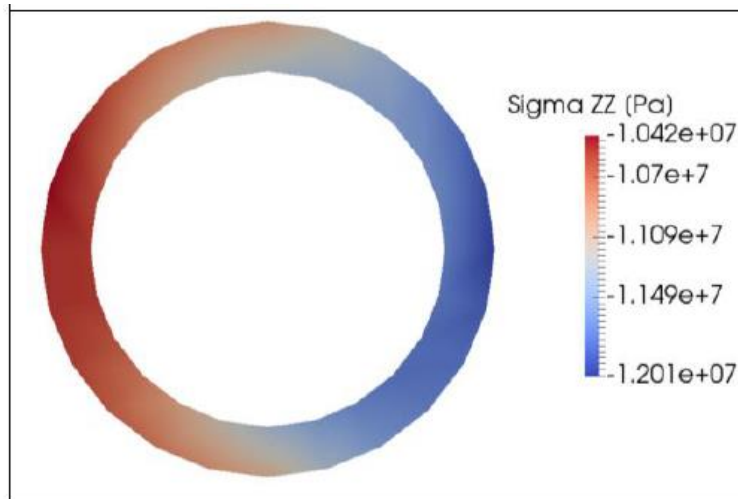


Fluid Velocities

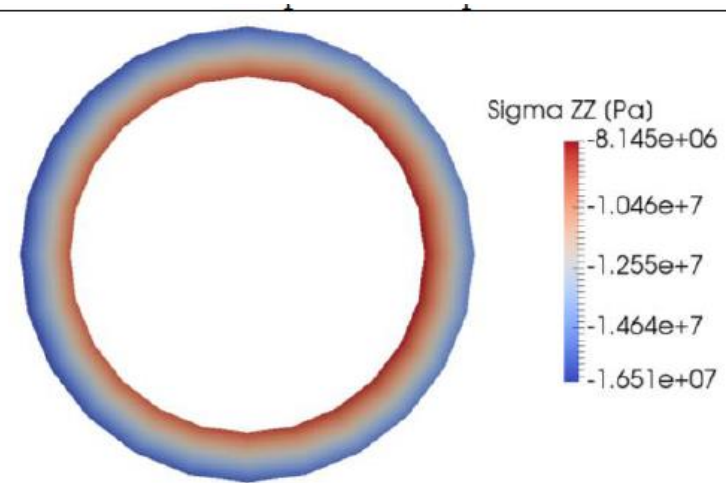


Solid Stresses

Central Section



Near first baffle Section





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