MUSP
Macchine Utensili e Sistemi di Produzione

Un anno al MUSP

Tecnopolo di Piacenza Sede Casino Mandelli

RETE ALTA TECNOLOGIA EMILIA-ROMAGNA HIGH TECHNOLOGY NETWORK
TECNOPOLO PIACENZA

Taha Gokulu

12 gennaio 2024

Taha Gokulu – Researcher at Consorzio MUSP | CAE Simulation Engineer

Profile

- Born in Istanbul.
- 29 years old.
- Mechanical Engineer

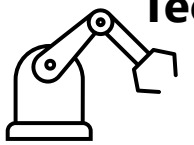
Expertise

- Machine tools & Machining Dynamics
- FEA Simulations
- Structural Optimization
- Advanced and Composite Materials

Hobbies

- Bibliophage
- Judoka Green Belt
- Classical Guitar

Education



Technical High School

Mechatronics

- Hydraulic & Pneumatics
- Basic Electronics
- Machining Classes
- PLC Programming

2012

FEYZİYE MEKTEPLERİ VAKFI
IŞIK ÜNİVERSİTESİ

- BSc. Mechatronics Engineering
- Minor Degree in Electronics

2017

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- MSc. Mechanical Engineering
- Machine Tools and Production Systems

2022

MUSP
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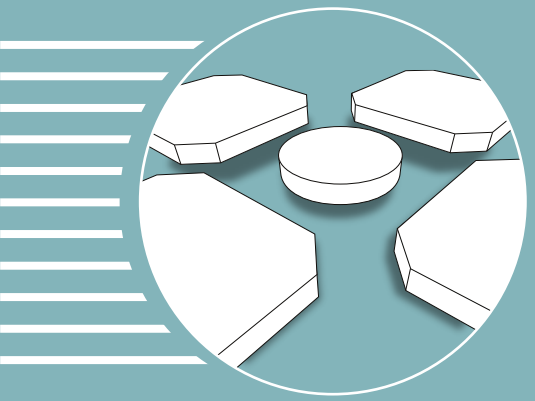
- Researcher
- CAE Simulation Engineer

2023



University Projects

PROJECT: Exoskeleton : Assistive Human-Robot Interaction *(Degree Final Project)*

- **What?**

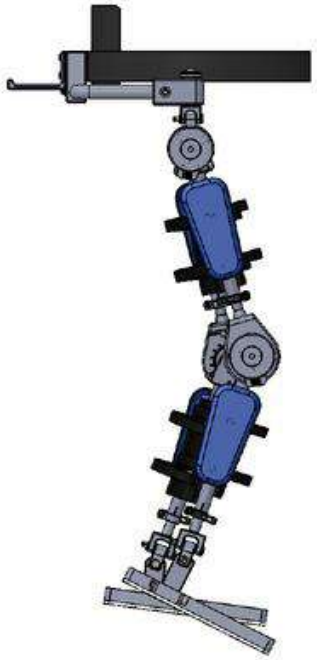
Wearable Mobile Machine that allows for limb movement with increased strength and endurance.

- **How?**

Measurements of human joint torques in a walking pattern.

- **Result**

Leading to a 50% enhancement in walking functions and support.



PROJECT: Master Thesis : Stability Analysis of Multi-Insert Rotating Boring Bar with Stiffness Variation

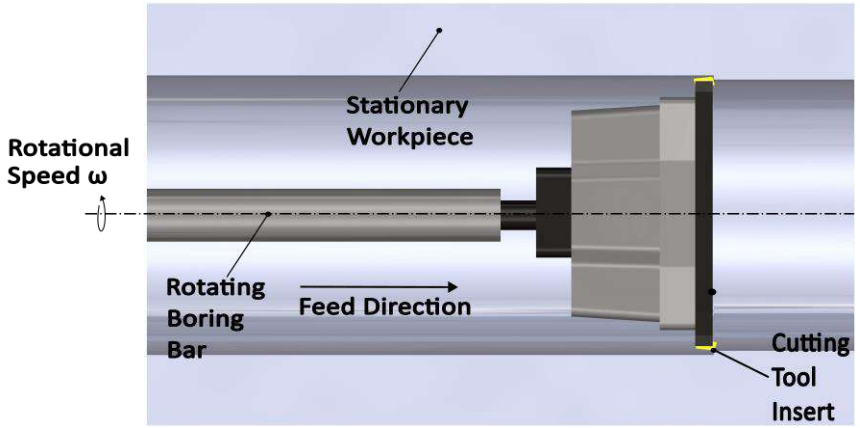
POLITECNICO MILANO 1863

- **What?**

Long and slender boring bars are prone to chatter vibration and static deflection.

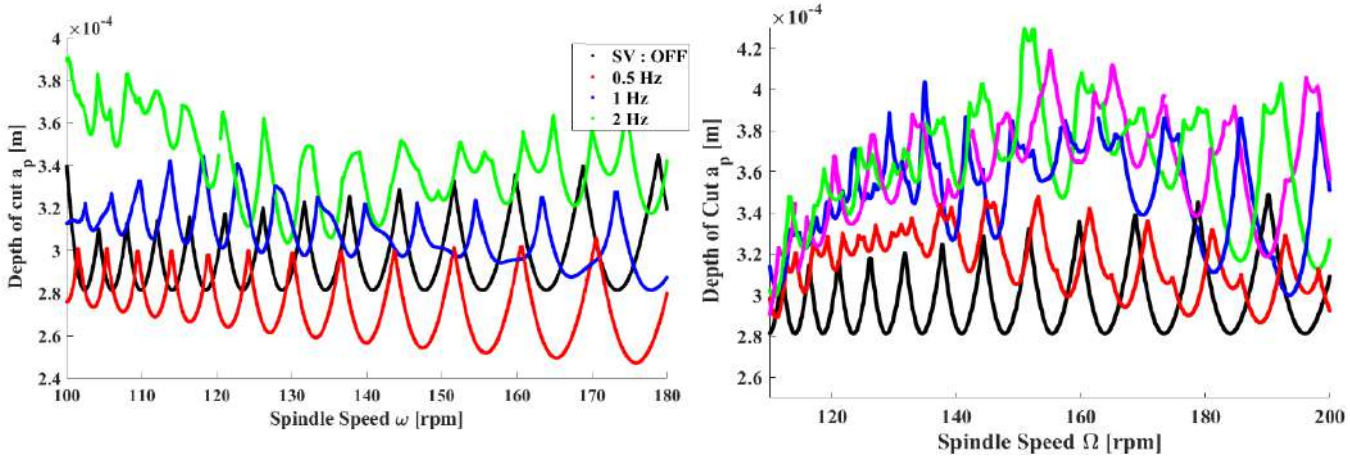
- **How?**

1. Multi-inserted rotating boring bars
2. Periodically Varying stiffness of the boring bar effectively reduces chatter in boring by disturbing the regeneration mechanism.

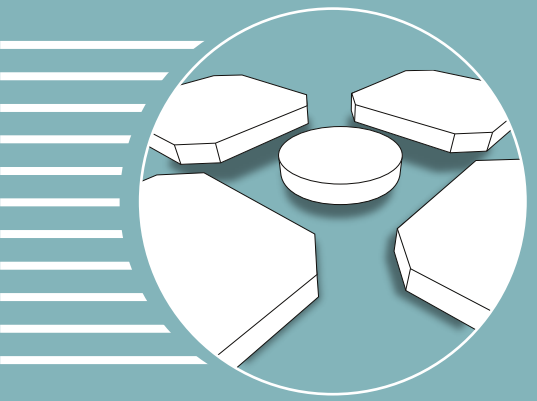


- **Result**

Effective chatter suppression with high precision of the final workpiece.



*Academic Publication



MUSP Projects

PROJECT: Development of Structural Simulation Models for Machine Tools

- **What?**

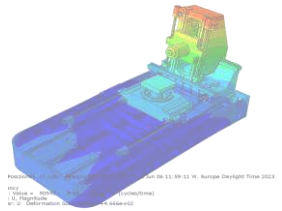
1. Increase stiffness of the structure
2. Increase stability limit in SLD.
3. Tune natural frequency of the structure.

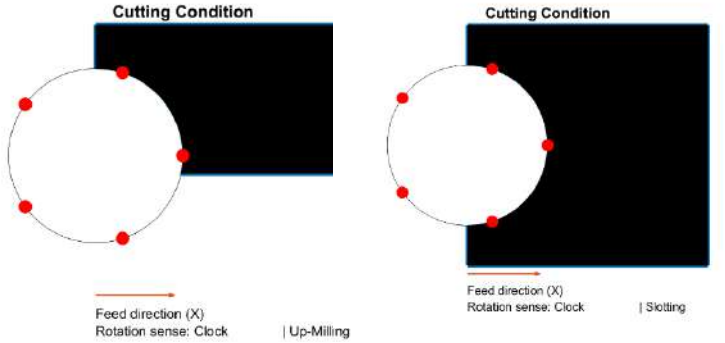
- **How?**

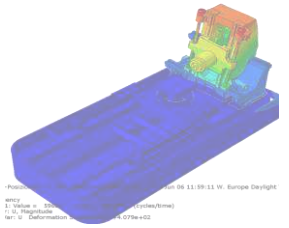
1. Structural optimization of machine tool structure
2. FRF identification through simulation and experimental tests to validate FEA results
3. Stability Lobe Diagram Estimation for different cutting conditions

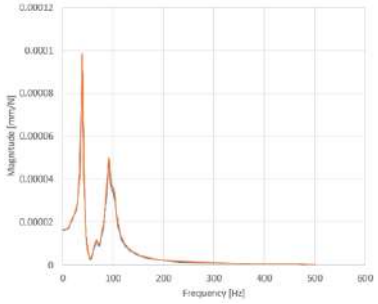
- **Result**

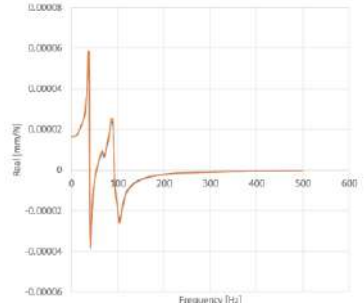
1. Lower static compliance of the machine tool axes
2. Tuned Natural Frequency according to customer needs.
3. Higher stability limit in SLD to increase the material removal rate

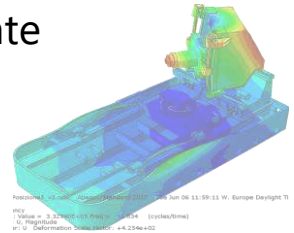


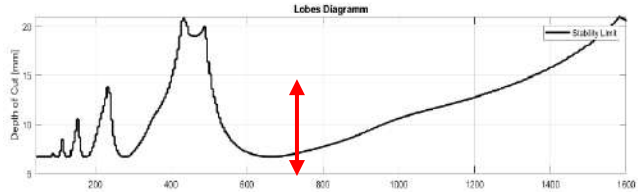


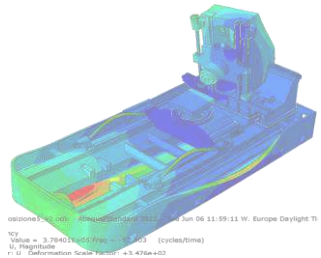


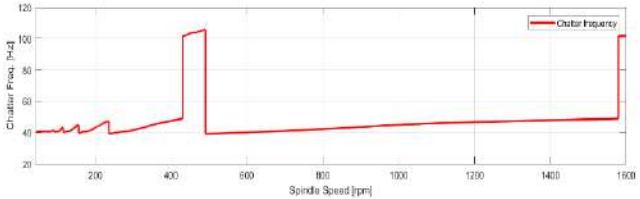












PROJECT: Endurance Test Bench for Ball Screws

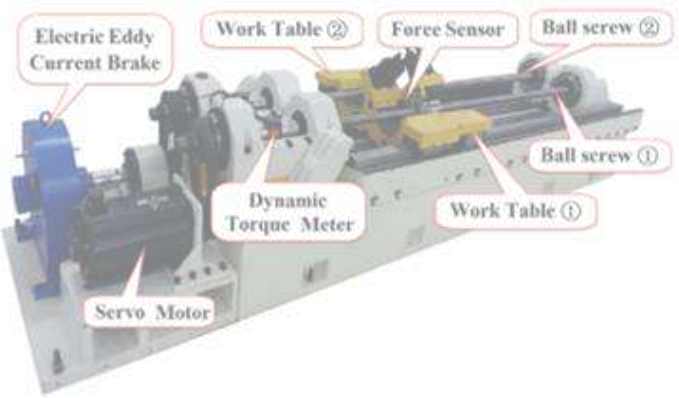
- **What?**

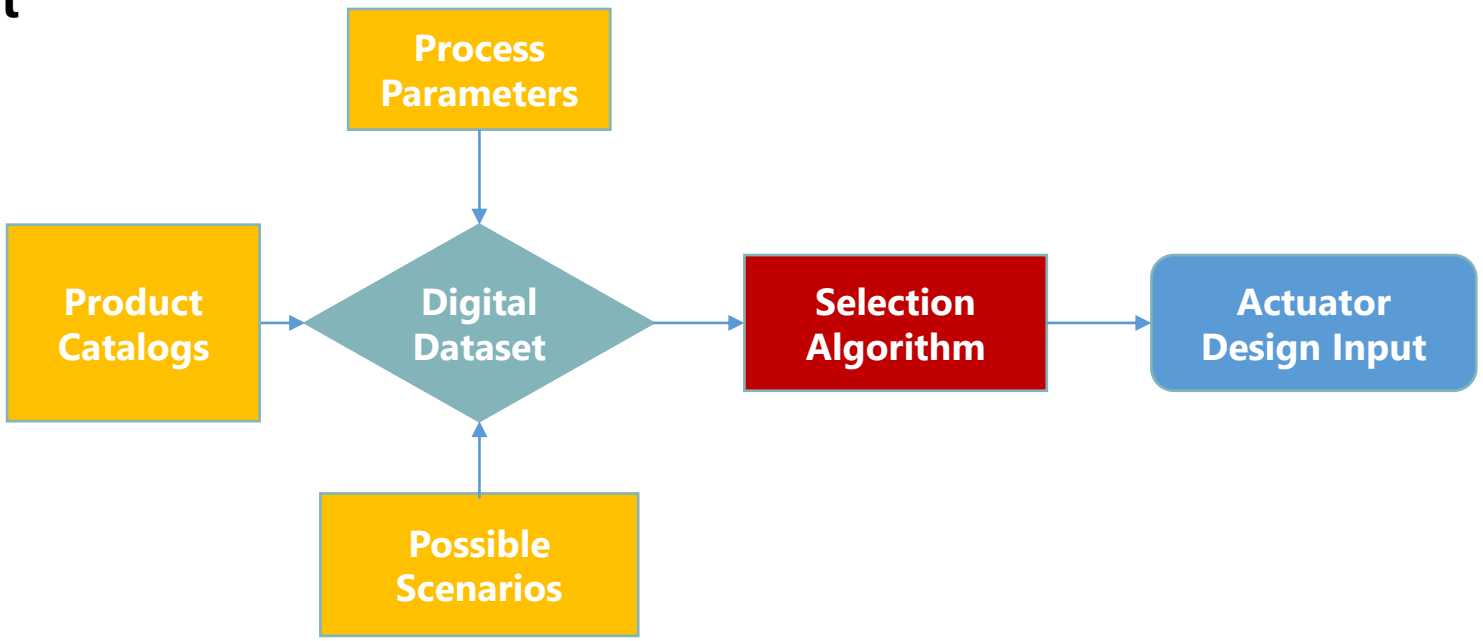
Engineering design of the Endurance Test Bench for Ball Screws and verify the life of the ball screws in different conditions such as high speed, and high load in aggressive environments.

- **How?**

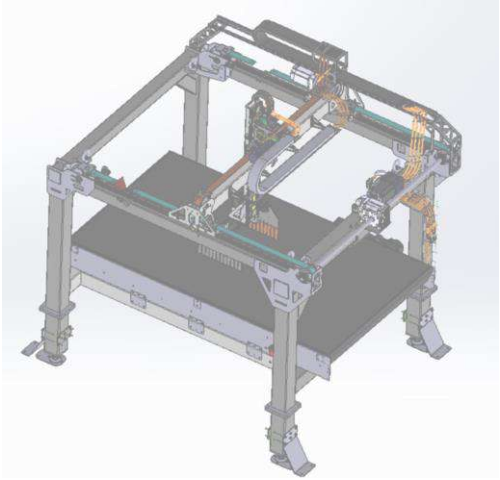
Development of a selection algorithm for the automatization of actuator selections & and critical parameters calculation etc.

- **Result**





PROJECT: Structural Optimization and Response Spectrum Analysis



- **What?**

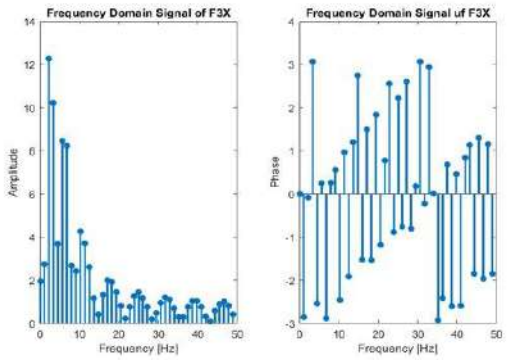
Vibration attenuation in the operation of Pick and Place Robotic Arm and Support Structure.

- **How?**

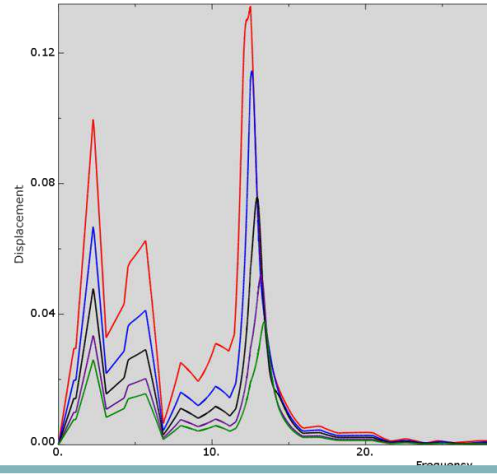
1. Structural optimization of the structure.
2. Validation of the results with Response Spectrum Analysis (RSA).

- **Result :** Optimal Solution with the maximum utilization of the material and attenuation of vibration amplitudes.

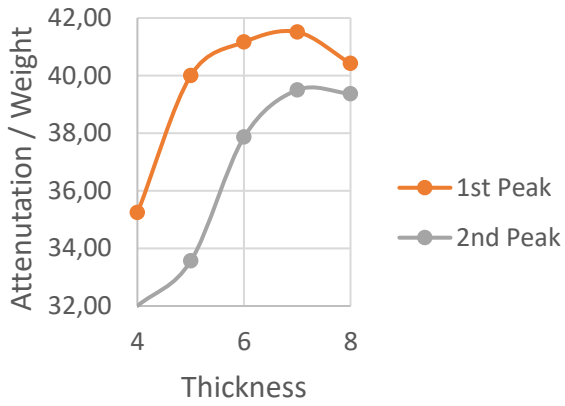
Forcing Spectrum
(Robot Kinematics)



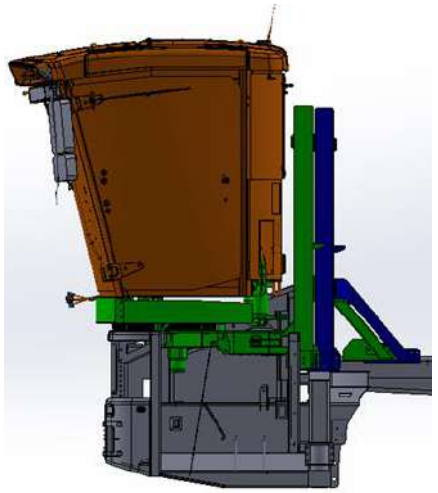
Response Spectrum



Optimum Solution



PROJECT: Dynamic Simulation of Cabin Protective Structure for Vehicle Safety



- **What?**

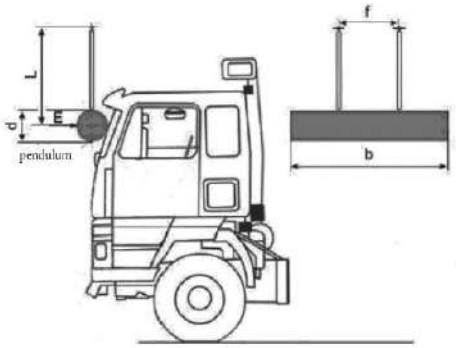
Verification of Cabin Protective Structure to satisfy the energy and force absorption requirements, ensure passenger safety and verify structural integrity.

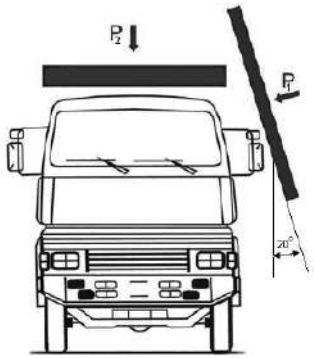
- **How?**

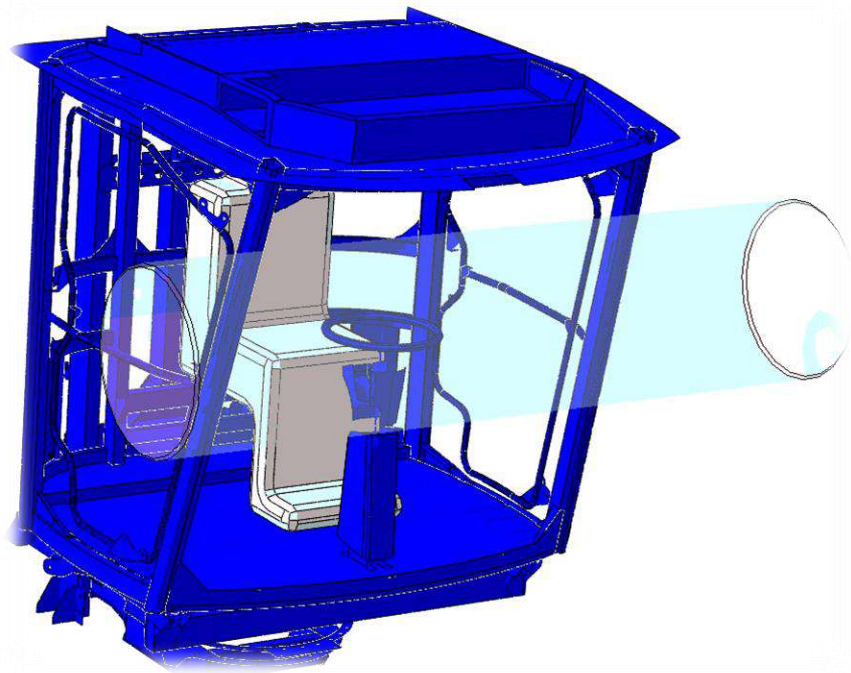
Dynamic Explicit Analysis to simulate high-velocity impact tests.

- **Result**

The requirements have been satisfied according to the international standards.







PROJECT: Crashworthiness Evaluation of EV Battery Composite Impact Absorber

- **What?**

Development of an Impact absorber to protect electric vehicle's battery module from side impacts.

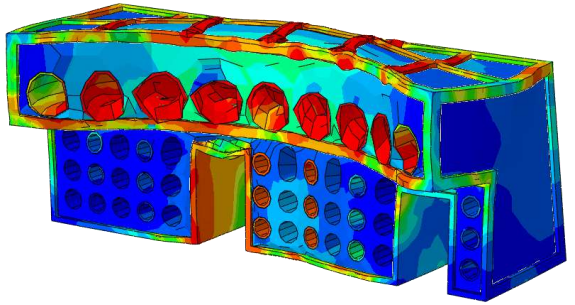
- **How?**

The absorber is constructed using a 3D-printed polymer with aluminum foam filling due to its appropriate mechanical characteristics.

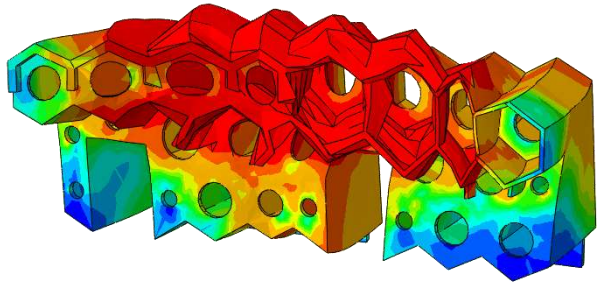
- **Result**

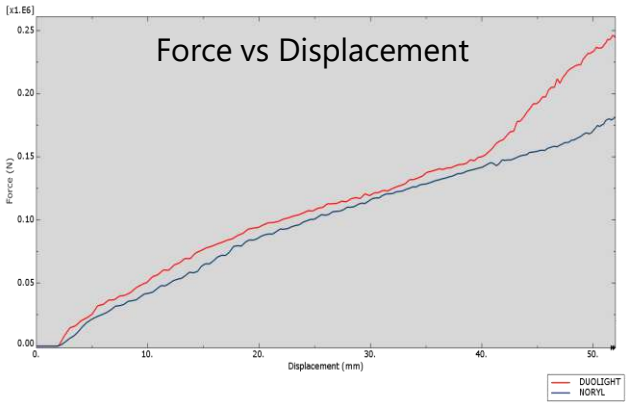
1. High energy-absorbing capacity
2. Lightweight

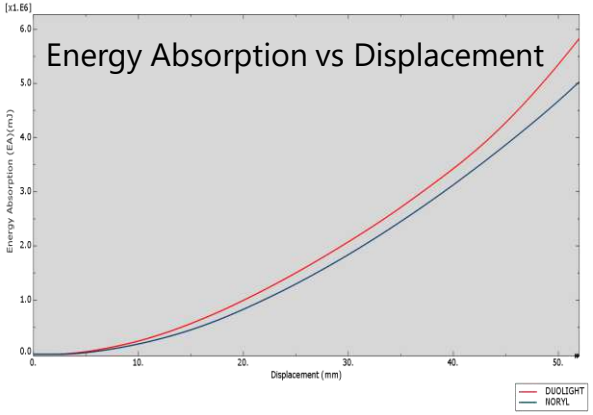
Composite Impact Absorber



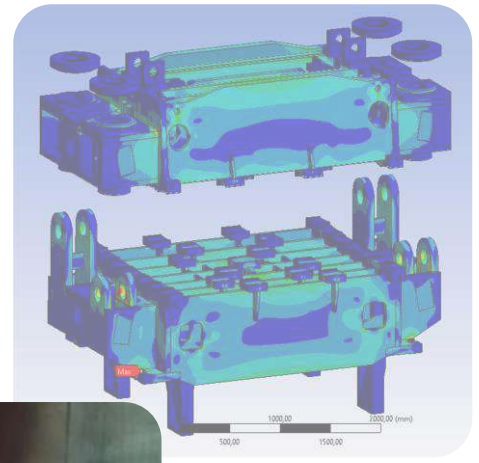
Competitor from market







PROJECT: Structural Design Assessment for Hot Rolling Mill Machine



- **What?**

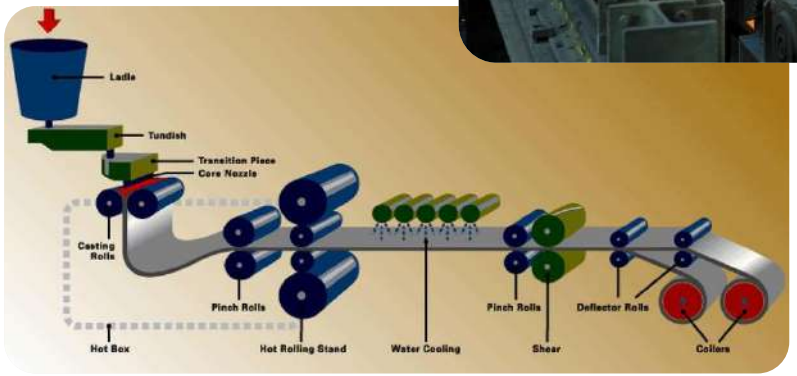
Validation of structural integrity of the hot rolling mill machine by EUROCODE standards.

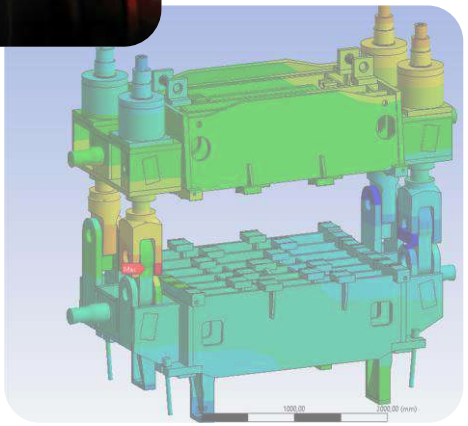
- **How?**

Static structural analysis of the structure.

- **Result**

Ensured compliance with EUROCODE standards.





Lifelong Learning…

R&D and **Consultancy** mainly in;

- Machine Tools and Machining Dynamics
- Static, Dynamic and Transient Analysis in FEA
- Structural Optimization
- Composite Materials and other Innovative Materials
- Advanced Manufacturing Processes
- But also, other engineering projects…

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Grazie per l'attenzione

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