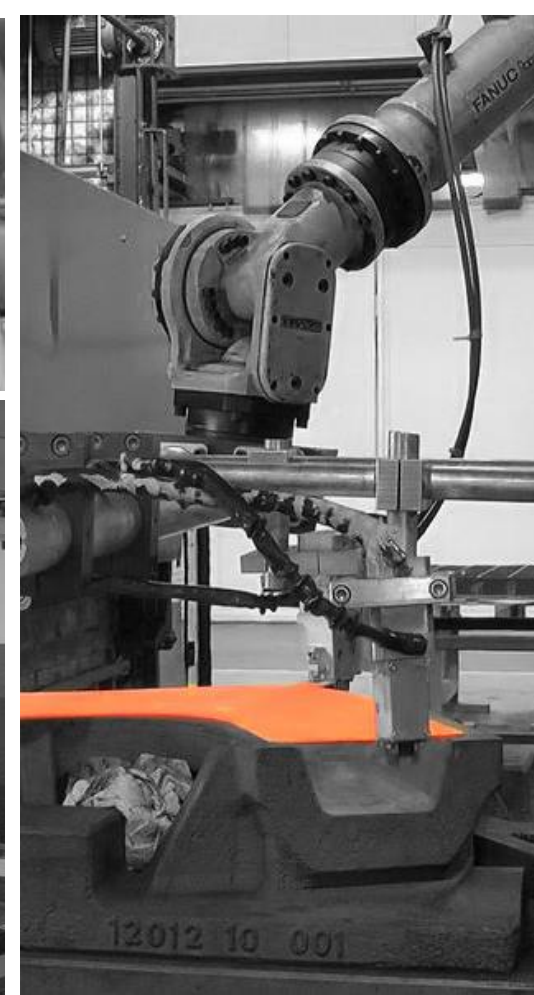
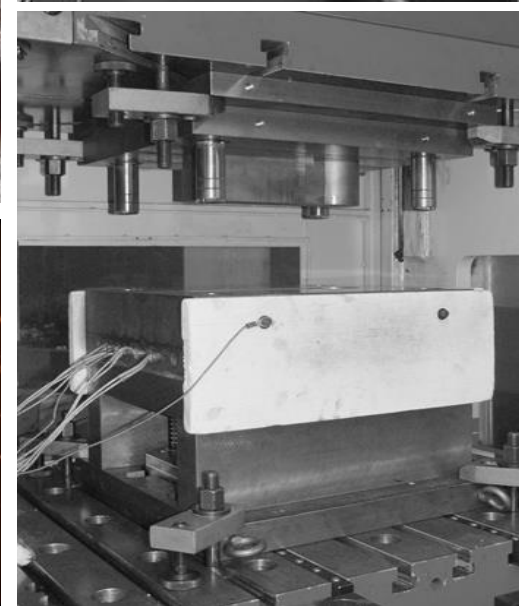


ADVANCED MATERIAL FORMING PROCESSES



GOI ESKOLA
POLITEKNIKOA
FACULTY OF
ENGINEERING



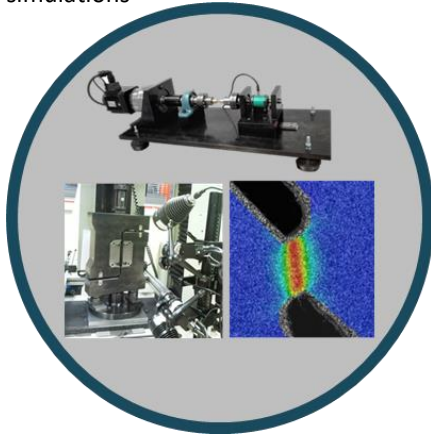
The aim of the research group is the development of innovative forming processes able to produce high added value components and goods. The main activities are the casting, forging and sheet metal forming of in-house developed alloys as well as in market available ingots, billets and coils.

Typical projects cover material, microstructural and tribological characterization activities, process optimization using advanced FEM simulation, tool and mold design-manufacturing and final prototyping using available industrial facilities.

RESEARCH TOPICS

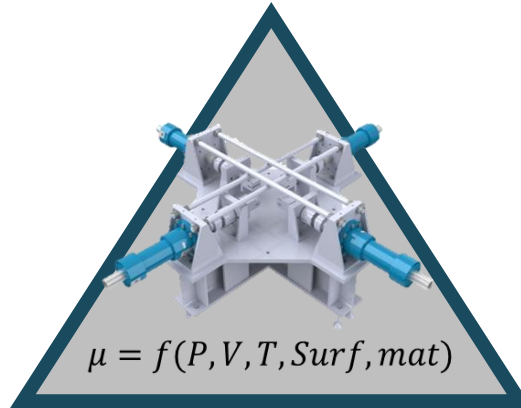
MATERIAL CHARACTERISATION

- Mechanical and thermo-physical properties characterisation for metal casting, forging and forming simulations



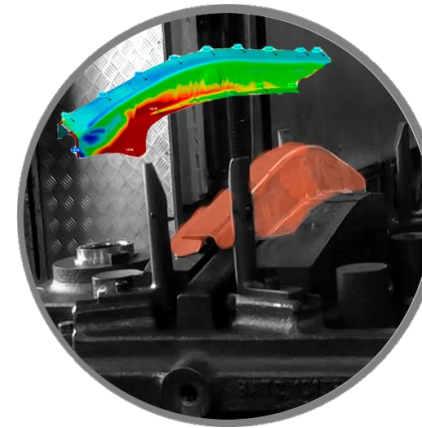
TRIBOLOGICAL CHARACTERISATION

- Tribological study of materials close to process condition
- Surface texturing for process optimization



SHEET METAL FORMING AND HOT STAMPING

- Process development for new alloys (3rd generation, AHSS, aluminium and superalloys) based on FEM
- Tool design and set-up, prototyping and final testing of components



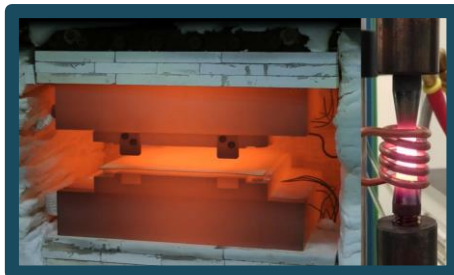
FORGING AND THIXOFORMING

- Optimization of open and closed die hot forging
- Cold forging modelling and fracture detection
- Microstructural evolution prediction, die wear prediction and enhancement based on process modelling
- Thixoforging of light alloys and steel real components



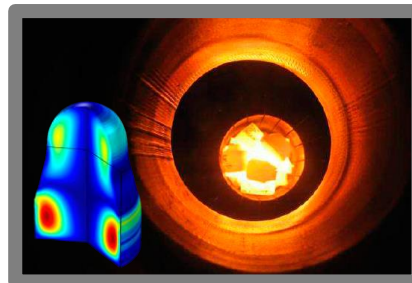
HYDROFORMING AND GAS MEDIA FORMING

- Sheet and tube hydroforming of AHSS, Stainless steels and superalloys
- Super Plastic Forming of new aluminium and titanium alloys



METAL CASTING

- Sand and gravity die casting of components
- Pressure die casting of light alloys
- Investment casting of light and titanium alloys
- Vacuum Cold Crucible Melting of novel alloys for aeronautical and health applications



ROLLING AND ROLL LEVELLING

- Novel design of roll levelling machines
- Rolling and tempering of aluminium and steels
- Process chain simulation and study of rolling and levelling influence in subsequent forming processes



2017
2018

11 PhD
Students

4
European
Projects

7 PhD

More than
20 industrial
contracts

2 Engineers

1 Technician

1.5 M€
budget

5 JRC
papers

FACILITIES

SHEET METAL FORMING FACILITIES

FAGOR 4000 kN servo-press
GAMEI 1500 kN hydraulic press
GAMEI 1500 kN mechanical press
SCHMIDT 40 kN servo press
Sheet and Tube Hydroforming (4000 bar)
100 kN punching machine
250 kN Biaxial testing machine
Strip Drawing Test tribometer
Duncal Shabel Test tribometer
Nakajima ISO standard tester
Hole Expansion ISO standard tester

GENERAL

CHARMILLES Wire EDM machine
ONA Electrode EDM machine
MITUTOYO 3D measurement machine
PLM and ALICONA Confocal profilometers
ANTON PAAR MCR501 high temperature rheometer
LINSEIS LFA 1000 Laser Flash thermal analyser
LINSEIS L75VS1600C dilatometer
NETZSCH high temperature DSC
FEI (FE-SEM) Nova NanoSEM 450 microscope

FORGING AND THIXOFORGING FACILITIES

150 Kw EFD Induction Heating Furnace for
billets
KUKA KCR1 robot for parts handling
CASTING FACILITIES
GAMEI 3000 kN HP die casting machine
NABERTHERM 11KW melting furnace
NABERTHERM furnaces for heat treatment
EFD induction furnace for Fe
EFD induction furnace for Al and Mg
SECO/WARWICK Vacuum Cold Crucible
Melting machine
TM SD-3000 3D printer for rapid
prototyping of moulds



PROJECTS

The research group **projects are normally industry driven** and aim at developing new goods and processes ready to be used in real industrial applications including basic research tasks. Signed **long term research agreements** with industrial partners (e.g. Fagor Arrasate, Batz, Matrici, Alfa) allow the recruitment of students and providing turnkey solutions and PhDs to the near companies increasing their technological knowledge.



Shaping the
future



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