

# PLASTIC DEFORMATION

In research, development and applications of hot and cold forming we mainly focus on technologies related to the production of semi-products. For both processes, the controlled modification (mechanical and/or thermomechanical) of material properties does more than just give a shape. Computed modelling based process design and the mechanical and microstructural examination of the base material/product have an important role in designing shape giving processes.

## COMPETENCIES

- Technological examination, design and process modelling of hot and cold rolling
- Designing and computed modelling of rolling technology parameters, hollowing technology of flat and profile shaped products
- Designing and modelling of brazing rolling for production of multi-layered and composite structures Laboratory production
- Designing, physical and computed process simulation, material testing of closed and open die forging
- Production and examination of ultrafine grained materials
- Designing, physical and computed process modelling of wire and cable drawing technologies
- Qualification of technological lubricants



## SERVICES

- Complex design of hot and cold forming technologies
- Computed validation of existing technologies
- Physical and virtual simulation of plastic forming technologies
- Performing mechanical and microstructural examinations related to forming processes
- Producing small series of forged, drawn and cold and/or hot rolled products



## TOOLS

- Simufact, MSC Marc and Qform3d software.
- Von Roll roll stand: rolling range: thickness: 0.2-55 mm, width: 5-200 mm, maximal rolling force: 1 MN, available modes: duo (in case of blocks), quarto (in case of sheet/coil)
- Mechanical material testing laboratory: Instron 5982 universal tester with induction furnace and climate chamber (examination temperature range: -100-1200 °C), maximal loading: 100 kN and different hardness testers
- Mechanical presses: maximal force: 200 kN, nominal stroke: 31 mm, stroke rate: 200 1/perc, maximal force: 1 MN, nominal stroke: 81,6 mm, stroke rate: 50 1/perc
- Hydraulic press: maximal force: 1 MN, nominal stroke: 450 mm, piston velocity: 60/2.1/0.7 mm/s
- Beché jackhammer, maximal stroke: 350 mm, stroke rate: 200 1/min, stroke energy: 1090 Nm
- GDOES depth profile and element analyser
- Chain rod and pipe draw bench, maximal force: 50 kN, drawing velocity: 0.5 m/s
- Single stage wire drawing machine, motor power: 10 kW, draw roll diameter: 500 mm, drawing velocity: 0-150 m/min



## REFERENCES

- Arconic-Kőfém Ltd.: ALUFORM. Metal forming simulation aided development of rolling technologies. GINOP 2.2.1-15-2016-00018
- ISD-Dunaferr Dunai Steelworks Ltd.: Loading process examination of hot-rolling roll stand from the loading of the backup roll and bearing point of view
- Güntner Tata Climate Technic Ltd.: Examination of formability and microstructure of aluminium sheets
- Mahle Compressors Hungary Ltd.: Material examination of forged steel axle and casted hub for the quality control of the joint
- Szenna Pack Trade Ltd.: Examination of surface scratches on aerosol aluminium can
- CERN (European Organization for Nuclear Research): Efficient utilization of subsurface natural resources (Material development and rolling optimization of Nb-NbTi-Cu composite structures for shielding large magnetic fields)
- ÓAM Ózdi Steelworks Ltd.: Complex examination and avoiding possibilities of surface longitudinal cracks on concrete steels manufactured by the ÓAM Ózdi Steelworks Ltd.