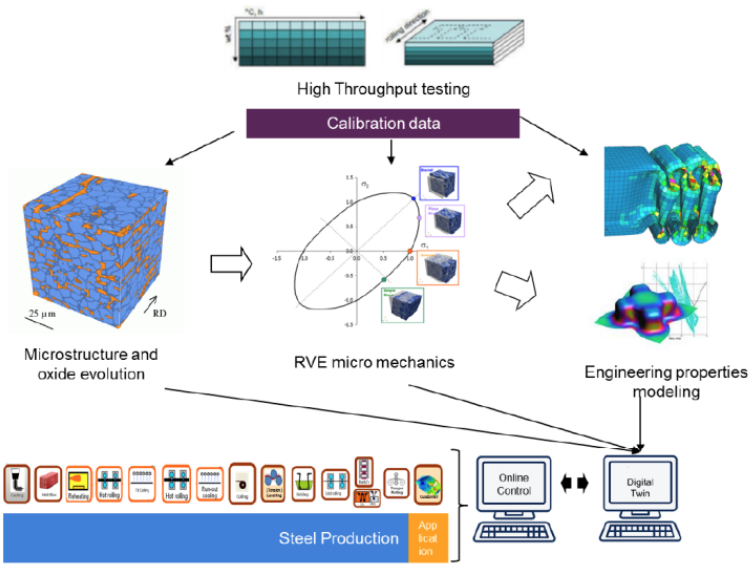
Revolutionizing research program on Advanced High Strength Steel Production

HIGHLIGHTS

- Unique knowledge exchange between TATA steel Europe (Netherlands) and academic institutions
- In-house working experience at TATA steel Europe (70% of working time)
- State of the art computational models and experimental equipment
- Development of knowledge and skills across the steel process chain at multiple length scale
- Great career opportunities for top positions in the steel industry

AIM

The scientific and industrial aim of the project is to develop a suite of microstructural models that simulate the microstructure development throughout the Tata Steel production process and the mechanical behavior of the eventual material on the basis of its microstructure. Currently available state-of-the-art sub models will be connected in one through process model framework to create simplified models, suitable for online control. The through process modelling chain will be calibrated by high throughput laboratory experiments at the production site, making it directly suitable for production.



IMPACT

The drive for lighter cars and less material in construction calls for the development of stronger steels. Complex, multi-phase, advanced high strength steels are exemplary for such purposes, however still require improvements in application performance and production yield. These modern steels require tighter control over micro- and nanoscale to achieve their properties. Consequently, such steels are less easy to produce demanding more knowledge and control over the production processes such as rolling and annealing. This initiated the Digitally Enhanced New Steel Product Development (DENS) program, where fundamental science will directly benefit industrial application.

PROJECTS

16 PhD students will work closely together 70% of their time as a group at Tata Steel R&D in Ijmuiden (Netherlands). 9 PhD projects are situated at TU Delft in the **Department of Materials Science and Engineering**.

The topics and promoters for these nine positions are:

- ~~Continuum modelling of recrystallization textures during continuous annealing (Prof. Leo Kestens, L.A.I.Kestens@tudelft.nl)~~
- Integration of Weldability in Through-Process Modelling (Professor. Ian Richardson, I.M.Richardson@tudelft.nl)
- Austenite formation in steel: modelling and experimental validation (Dr. Erik Offerman, S.E.Offerman@tudelft.nl)
- Modelling austenite decomposition: bainite, acicular ferrite, heat of transformation and effect of deformation (Professor Maria Santofimia, M.J.SantofimiaNavarro@tudelft.nl)
- ~~Development of a robust 3D model for the formation of martensite and associated stresses with a focus on dual-phase steels (Professor Maria Santofimia, M.J.SantofimiaNavarro@tudelft.nl)~~
- Intragranular and interphase precipitation modelling (Dr. Marcel Sluiter, M.H.F.Sluiter@tudelft.nl)
- Model development for softening in steel on a microstructural scale (Professor Jilt Sietsma, J.Sietsma@tudelft.nl)
- Model development for work hardening in steel on a microstructural scale (Professor Jilt Sietsma, J.Sietsma@tudelft.nl)
- Through-Process Modelling for Steel Product Development (Dr. Amarante Böttger, A.J.Bottger@tudelft.nl)

APPLICATION

Ideal candidates have a MSc degree in Materials Science and Engineering or Physics, a solid background in physical metallurgy and talent for model development in combination with experimental research. More information on the specific positions can be obtained by contacting the promoters. General information on the program can be obtained by contacting prof. Jilt Sietsma, J.Sietsma@tudelft.nl. Interested candidates can find more information and apply via the link by clicking on the project of interest. For questions on the recruitment process contact Ms. Jolanda de Roo, jolanda.deroo@mindsforinnovation.nl.