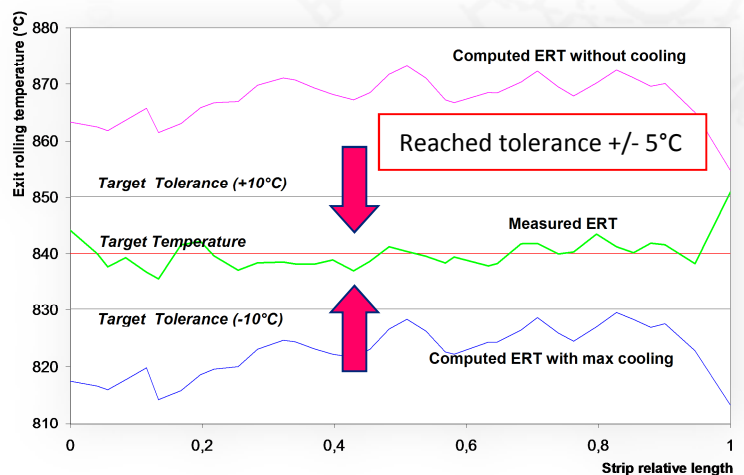
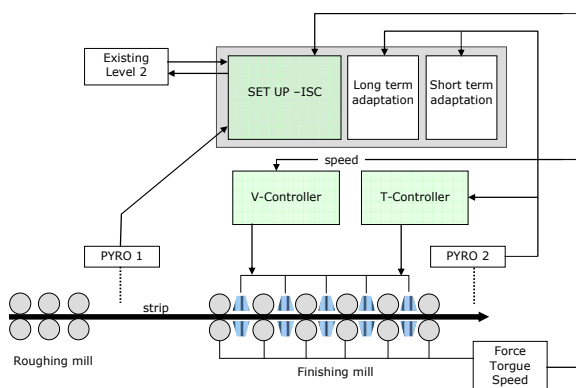


# Cooling Strategies and Temperature Control

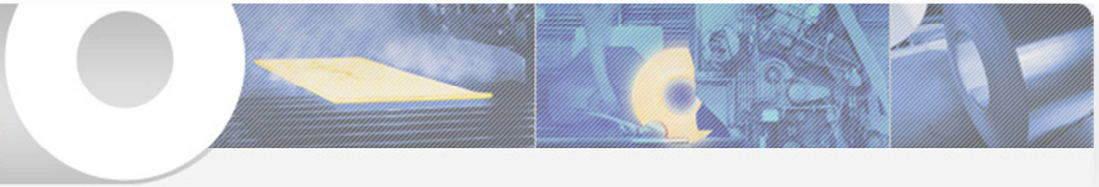
Computer simulations and software solutions for temperature control of hot rolled flat and long products and rolls.

Hot strip mill Level 2 subsystem for on-line prediction of cooling strategies and control of the Inter Stand Cooling to reach target exit temperature as uniform as possible along strip length.

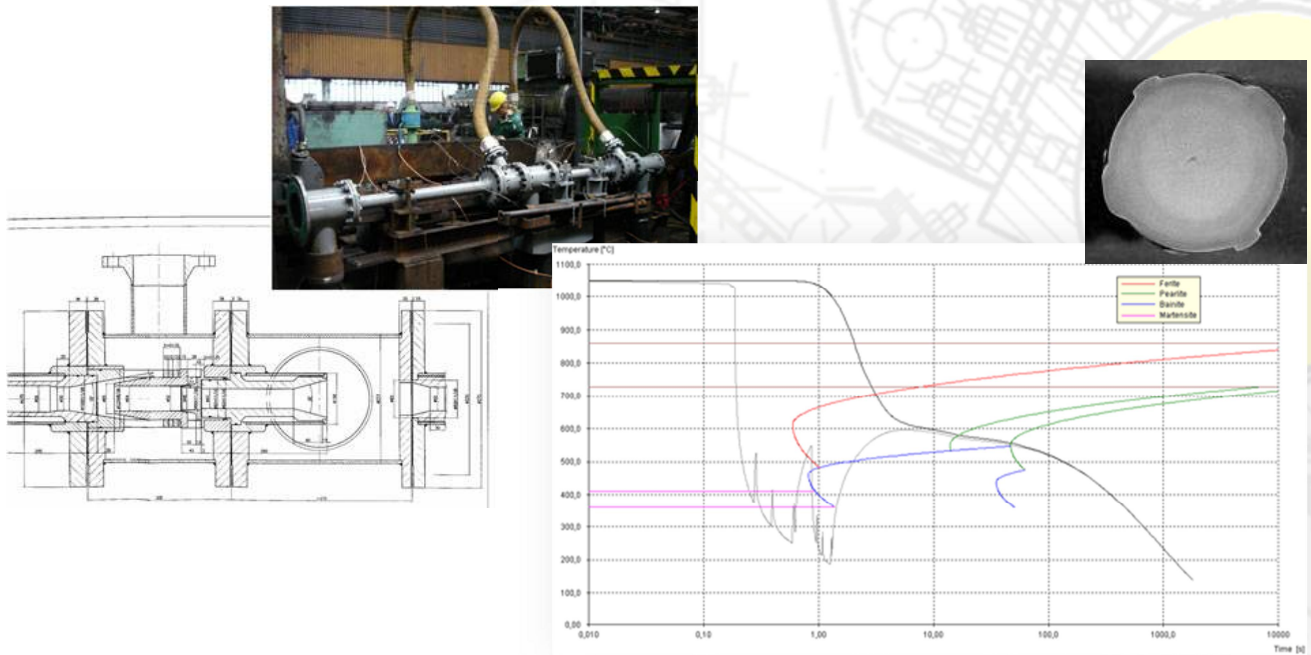


## Effects of ISC cooling (2000 mm hot strip mill)

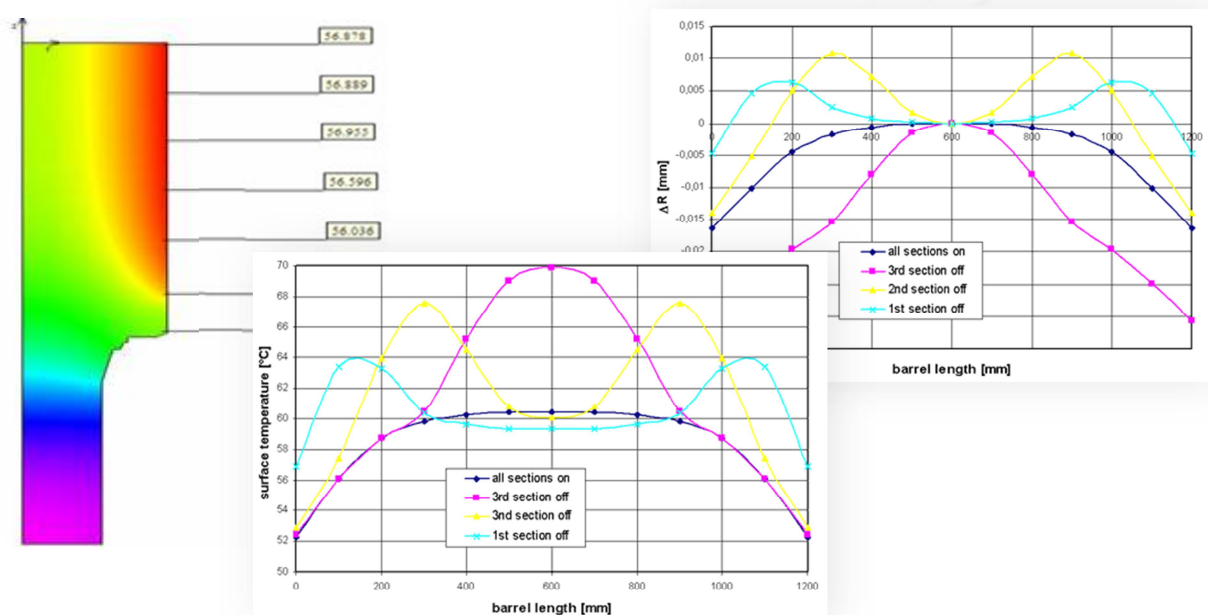
- Thin strips (< 4 mm) - deviation  $\pm 7^\circ\text{C}$
- Thick strips (> 10 mm) - deviation  $\pm 12^\circ\text{C}$
- Increase of rolling speed - cca 30 %

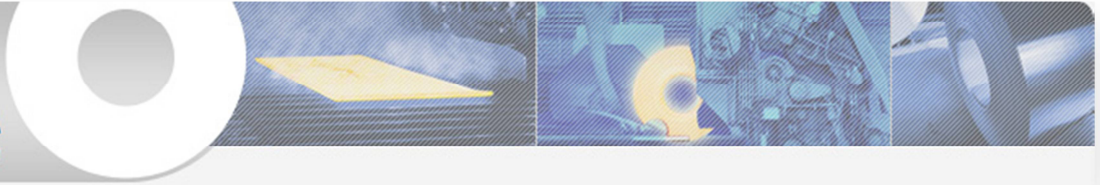


**Design of technology of final cooling of hot rolled reinforcing bars**

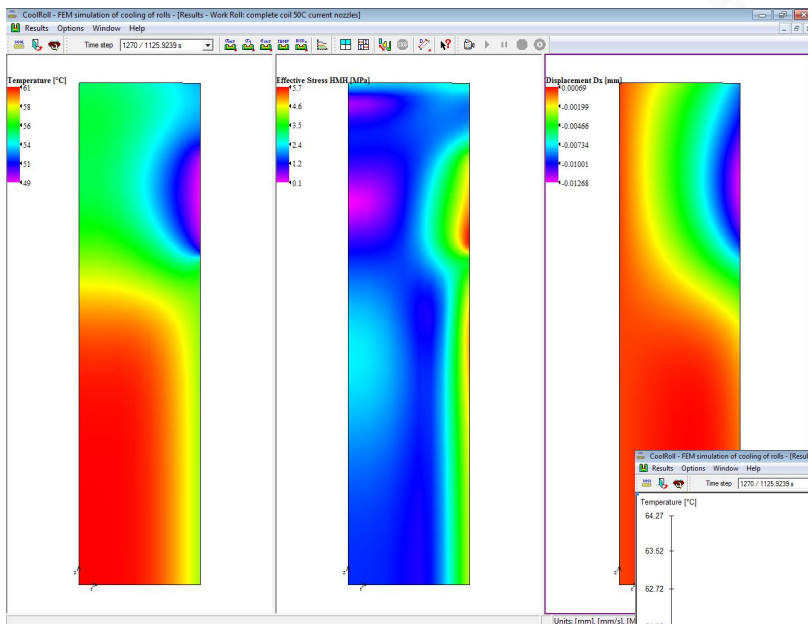
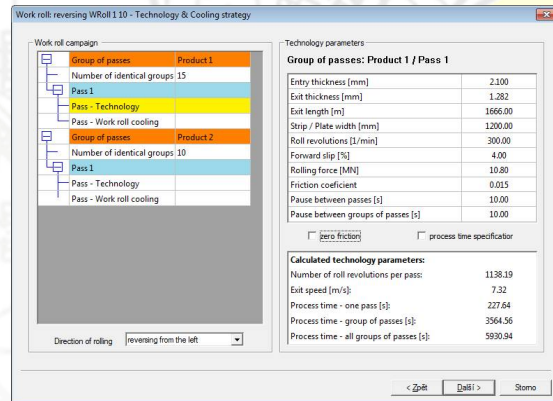
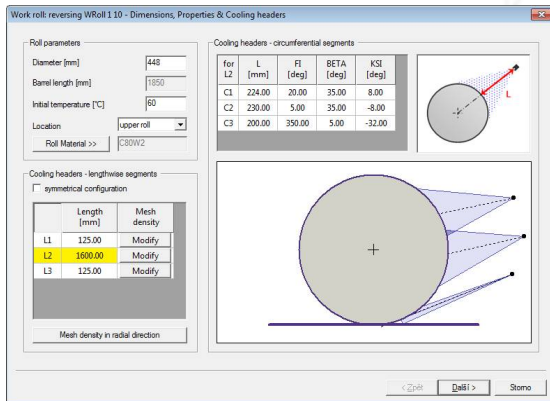


**Design of sectional cooling of work rolls to reach target strip profile**





## CoolRoll – FEM based off-line software for computer simulation of cooling of work rolls



### CoolRoll model features

- ➔ fully automatic creation of the FEM model
- ➔ roll is divided into lengthwise segments
- ➔ each lengthwise segment has its own circumferential distribution of nozzles
- ➔ editor of the roll campaign

### Results of computer simulation

- ➔ temperature profiles across the roll in specified times
- ➔ time - temperature curves in specified points of the roll
- ➔ thermal camber of the roll
- ➔ thermal elastic stresses and strains

