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DIGITAL MANUFACTURING FOR THE DEVELOPMENT OF NEW ROLLING MILL FOR BEAMS

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The Smart Beam manufacturing (SBM) is the new rolling mill that will allow to verticalize the production in Duferco Group plant of San Zeno Naviglio: a new integrated rolling mill, downstream of the San Zeno steel mill, to allow for optimal verticalization of the steel production, with the goal of becoming the best cost producer of steel beams in Europe.

To reach optimal efficiency of integrated steel and rolling mill, digitalization of plant has been done for continuous casting machine, heating furnace and rolling mill line.

Continuous casting machine, designed for beam blank's production, has been virtualized using FEM casting simulation software ProCAST: objective of this analysis is to grant process robustness through definition of best design for equipment and process parameters to avoid crack on casted product and increasing productivity of the line.

Heating furnace and rolling line have been virtualized using FEM software DEFORM: using casted product obtained in previous continuous casting simulation with ProCAST, DEFORM digitalizes heating cycle and following roll passes. Objective of these analysis are definition of optimal heating cycle of raw beam blanks to reduce gas consumption, definition of optimal roll pass design for correct shape obtainment, avoiding cracks on product and overloads on rolls, and predictive maintenance for rolling line.

Casting, heating and rolling simulations are fully integrated in ProCAST-DEFORM platform, allowing to perform off-line all trials to reproduce digital twin of Smart Beam Manufacturing rolling mill.

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