

***Title:***

**Property evolution of thermo-mechanically treated reinforcement bar**

***Abstract:***

Property evolution of microstructure of reinforcement bar (rebar) depends on how well the steel is treated during and after the thermomechanical treatment (TMT) box. Rebars are hot rolled - from low carbon steel through Tempcore technology. In order to achieve optimal properties, typical evolving mechanical properties of the rebar such as ultimate tensile strength (UTS), yield stress (YS) and the percentage elongation (%El) were conducted. This is necessary to control the tempering and cooling process. In this study, a simulation of the cooling rebar was investigated using finite element modelling (FEM). The material used for the model and production of the rebar was equivalent to AISI 1016 carbon steel and was produced from scrap supplemented with direct reduced iron (DRI). The raw materials were melted in an electric arc furnace (EAF) prior to hot rolling through a billet caster. The rod mill tensile test report showed that UTS and YS values ranged between 482 MPa for the YS and 650 MPa for UTS on an average. The average percentage elongation was found to be 23 % well above the 14 % threshold according to the standard. The pearlite-ferrite microstructure and the martensite developed is in agreement with the standard microstructure found in the literature.