Abstract:

Despite the extensive research and development work done in the field of high strength thin sheet multiphase steel grades, in the past, there are still two main challenges to be tackled, particularly for steel grades with tensile strength levels above 780 MPa. First a challenging optimisation and improvement of the overall processing in the steel plant is still necessary. This includes modified and improved layouts of processing lines. Further, due to the limited application and lacking feedback an overall customer oriented development and optimization is still necessary. Therefore, in a first step, this work reports on the alloy concepts and phase transformations in the annealing lines required for the adjustment of the microstructure of DP and TRIP grades. Then, the most critical processing steps are mentioned and in particular the demanded processing parameters in the annealing lines and the resulting layouts are highlighted. In a further part, three selected items of a customer oriented development and optimisation of DP and TRIP steel grades are discussed. These include the improvement of the flangeability and bendability and efforts oriented towards the reduction of the banded structure in DP and TRIP steel grades. Finally, the improvement of the fracture appearance of spot welded joints of TRIP steels is highlighted and alloy concepts with a balance between weldability and formability are introduced.