Abstract to Plenary Talk

STEELSIM 2021 Inteco melting and casting technologies GmbH, Austria

1. Title:

"Simulation and process modelling along the production route of high performance steels and high value added material"

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4. Keywords:

Process simulation, primary and secondary metallurgy of steelmaking, refining, casting, solidification, remelting, electrochemistry, powder metallurgy

5. Abstract:

INTECO is a privately owned Austrian engineering and consultancy company founded in 1973 being specialized in metallurgical process technology and the related equipment for melting, refining, casting, atomization and solidification of high-performance steels, superalloys and titanium.
Over the past decades the product portfolio has been consistently grown ranging nowadays from primary melting in Electric Arc Furnaces, refining in secondary metallurgy and casting technologies up to remelting and atomization processes to produce high value added materials such as superalloys and titanium.
During product development the importance of simulation and process modelling combined with broad metallurgical process know-how has been recognized as essential tools to pursue our strategy of improving existing processes and developing new technologies and products.
Various projects and the cooperation with scientific institutes will be presented to illustrate our strategical approach and use modelling as a key tool to gain better insights into fundamental metallurgical processes which are currently impossible to be experimentally investigated. Results of modelling approaches to predict thermal and solidification characteristics will be highlighted. In addition examples in the field of Magneto-Hydrodynamics dedicated to the arcing in the electric arc furnace and the remelting behaviour in the VAR will be discussed. From a technology and equipment supplier´s perspective, simulation tools aiming for an optimized process control and providing valuable input to certain design issues such as structural mechanics and heat transfer simulations will be explained. In order to provide tools for INTECO's clients in the steel plant operation, process models have been developed such as temperature prediction modelling in the ladle furnace, degassing models in vacuum metallurgy or on-line solidification models to control the continuous casting process. Simulations related to steel plant logistics aiming for an optimization of the complex material flow within the steel mill and identification of potential bottlenecks will be revealed.

Finally possible ways of combining scientific modelling with validation in industrial operation to optimize operational parameters and to ensure a safe and repeatable production of high-quality material are demonstrated.

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