



MODELING OF TUNDISH STEELMAKING PROCESS IN CONTINUOUS CASTING

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TYPE OF COURSE : New | Elective | UG/PG

COURSE DURATION : 8 weeks (27 Jan' 20 - 20 Mar' 20)

EXAM DATE : 29 Mar 2020

INTENDED AUDIENCE : Mechanical/Metallurgical/Production Students

PREREQUISITES : Fluid Mechanics, Heat Transfer, Numerical Methods, Manufacturing Processes

INDUSTRY SUPPORT : Steel Industries like SAIL, Tata Steel, Jindal Steel etc.

COURSE OUTLINE :

The course focuses on understanding the tundish operations during continuous casting steelmaking process. Tundish is the last metallurgical vessel through which molten metal flows before solidifying in the continuous casting mold. During the transfer of metal through the tundish, molten steel interacts with refractories, slag, and atmosphere. Thus, understanding about the operations inside the tundish and the methods to model these operations help in making effort towards increasing the productivity in terms of good quality end product and decrease in rejection of the products due to different defects.

ABOUT INSTRUCTOR :

Prof. Pradeep K. Jha is presently working as Associate Professor in the Department of Mechanical & Industrial Engineering at IIT Roorkee. He has been teaching the courses related to manufacturing technology and theory of production processes to undergraduate and postgraduate students for more than 12 years. He is actively involved in research work related to production processes, tundish steelmaking process, mold solidification in continuous casting, etc.

COURSE PLAN :

Week 1 : Introduction to continuous casting tundish, Types of tundish, tundish metallurgy

Week 2 : Concept of physical modeling, Similarity and dimensional analysis

Week 3 : Stimulus response techniques, Residence time distribution curves

Week 4 : Fluid flow fundamentals, Navier stokes equations

Week 5 : Modeling turbulent flow, Turbulence models

Week 6 : Review of heat and mass transfer models, Numerical methods for solving governing equations

Week 7 : Modeling study of fluid flow and mixing inside tundish

Week 8 : Modeling study of Grade intermixing and inclusion floatation behavior in tundish