



WELDING OF ADVANCED HIGH STRENGTH STEELS FOR AUTOMOTIVE APPLICATIONS

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INTENDED AUDIENCE : Final year bachelors and masters students in Metallurgy, Mechanical, Automobile and Production Engineering. Industrial personnel working in automotive and steel making industries.

PRE-REQUISITES : Final year B.E/B.Tech students or Graduates of Metallurgical/Mechanical/Automobile/Production Engineering, Basic knowledge of steel physical metallurgy and welding processes.

INDUSTRIES APPLICABLE TO : All automotive manufacturers and their OEMs and Steel plants.

COURSE OUTLINE :

The use of advanced high strength steels (AHSS) is increasingly preferred in automotive applications due to improved crash energy management and enhanced strength-ductility combinations, resulting in greener and safer vehicles. The weldability of AHSS is generally poorer than conventional steels due to the high alloying contents required to obtain multi-phase microstructure. This course is aimed to discuss the (i) role of alloying elements in stabilizing multi-phase microstructures of AHSS, (ii) effect of weld thermal cycles on the evolution of microstructures and (iii) weldability of AHSS.

ABOUT INSTRUCTOR :

Prof. Murugaiyan Amirthalingam is currently working as an Assistant Professor in IIT-Madras. His research interests include welding metallurgy, welding processes development, steel product development and additive manufacturing

COURSE PLAN :

Week 01 : Introduction to physical metallurgy of advanced high strength steels

Week 02 : Introduction to welding processes in automotive industries (Advanced Gas Metal Arc, Resistance Spot and Laser Welding Processes).

Week 03 : Welding metallurgy of advanced high strength steels – Effect of weld thermal cycles on the stability of phases, solidification behaviour, segregation and hot cracking susceptibility.

Week 04 : Mechanical properties of advanced high strength steel weldments – Tensile shear testing, HAZ softening characteristics, role of modified weld thermal cycles (post pulsing and post weld heat treatments) to improve the mechanical properties.