

One-day Course

Laser Welding - Large Scale

Course Contents

1. Light and Lasers
2. Laser Cavity
3. Types of Lasers
4. Beam Characteristics and Propagation
5. Laser-Material Interaction
 - melting and solidification
6. Welding Metallurgy
 - melt solidification
 - phase diagrams
 - dissimilar metal welding
7. Laser Welding
 - pulsed and CW
 - shielding gases
 - weld configurations
 - weld parameters
 - process control
 - process monitoring
8. Laser Safety and System Selection
9. Laser Process Development
10. Case Study

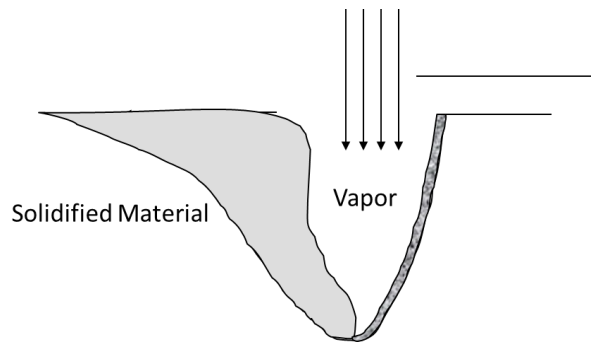
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This one-day course is designed for engineers to get a broad understanding of laser welding for large-scale application such as those in automotive and aerospace industries. We start with an introduction to basic concepts of light followed by a discussion on the “insides” of a laser cavity and how Light is Amplified by Stimulated Emission of Radiation. In the third section, we review the different types of lasers commercially available and how they can be used for different material processes. The fourth section deals with propagation of laser light as it exits the laser cavity and navigates through laser fibers, mirrors, beam splitter, and focus heads. The fifth section explains physical phenomenon involved with interaction of lasers with materials followed by introduction to weld metallurgy and solidification. In the next section, we focus on welding related issues such as pulsed/CW welding, shielding gases, weld configurations, weld parameters, process control, and process monitoring followed by a review of laser safety and laser systems. The section on laser process development brings together all aspects of laser welding discussed during the course and is designed to help attendees conduct a thorough design review on any welding project. A case study is presented at the end of the course using real world problem. Attendees are encouraged to bring their own case studies for discussion.