Best Technology Solutions (BTS)

Material Science and Selection

Introduction:

This course is designed to give participants information to decide the best possible engineering materials choice for their design requirements like principles and practice of materials selection in mechanical design, effect of shape on selection, economic aspects, use of data sources, material indices, generation and use of material selection charts, election of fabrication method, concurrent and compound objectives

Who Should Attend?

- Service personnel
- Mechanical technicians
- Engineers
- Welding & Fabrications Engineers

Course Objectives:

- Understanding the whole materials selection process
- Discovering the engineering materials classification
- Exploring the engineering materials properties
- Understanding the using of material's standards and codes
- Learnigg about the materials behaviour in engineering application

Course Outline:

Day 1

- Importance material selection
- General step in material selection
- Analyze of material performance requirement
- The Important of material and component standards; ASTM; ASME; API
- Material availability and properties

Day 2

- Stationary equipment; rotating equipment; piping and tubing
- Mechanical loads: static; dynamic ; and impact loads
- Service temperature : high ; near room ; cryogenic temperature
- Degree of corrosiveness : CO2 ;H2S ;H2SO4 and other corrosion factors
- Operation condition
- Fabrication requirement
- Other requirement
- Case Study of Some Material Selections in Oil and Gas& other industries

Day 3

- Selection of materials for oxidation resistance,Corrosion and degradation of materials
- Electrical conduction,Semiconductivity,Electrical conduction in Ionic Ceramics and in Polymers
- Thermal properties
- Magnetic properties
- Optical properties of metals and non-metals,Application of optical Phenomena

Day 4

- VMSE Software for Sources of materials property data and information
- Metallic ,Ceramic and Polymer Crystal Structures,Tensile tests,Dislocations
- Phase Diagrams
- Failure
- Fracture Fundamentals Ductile and Brittle fracture
- Fatigue, cycle stresses,The S-N Curve
- Creep, Stress and Temperature effects

Day 5

- Computer aided in materials selection
- Value analysis in materials selection
- Use of failure analysis in materials selection
- Effects of composition processing and structure in materials
- Effects of surface treatments on materials