ADVANCED MACHINING OF TITANIUM ALLOYS

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ABSTRACT

In less than fifty years, Titanium has become a leading industrial metal. Titanium based alloys are advanced materials used in wide range of engineering applications. The utilization of these alloys comprises of multi-disciplinary fields such as aerospace, space crafts, marine, automobile, gas-turbine engine, military ballistic armor, nuclear, chemical vessels, sports and medical applications. During conventional machining of these materials, higher tool wear and lower surface quality are the commonly observed phenomena, due to their higher strain hardening effect, pseudo elastic behavior and high toughness. To overcome these problems, they can be effectively machined by non-conventional machining processes.

In this book different types of titanium alloys have been described. Furthermore, the principles of main advance machining methods which are widely used for machining of this material including laser machining, Water Jet Machining (WJM), Electro Discharge Machining (EDM) and Wire-EDM (WEDM) are briefly discussed. In addition, significant industrial and academic researches contributing to the performance measurements in machining of titanium, such as material removal rate, cutting speed, surface roughness, tool wear ratio and surface integrity characteristics are discussed. Moreover, especial techniques for cutting improvement of titanium in conventional machining are discussed.

Finally, since titanium is an expensive and widely used material, this book provides useful information to find optimal machine settings which play a crucial role in order to increase economic efficiency.