Precision Engineering By R L Murthy | 65813d775cbced45589afba0a00dc9a6

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Technology, Second Edition, covers the major topics of micro-manufacturing. The book not only covers theory and manufacturing processes, but it uniquely focuses on a broad range of practical aspects of micro-manufacturing engineering and utilization by also covering materials, tools and equipment, manufacturing system issues, control aspects and case studies. By explaining material selection, design considerations and economic aspects, the book empowers engineers in choosing among competing technologies. With a focus on low-cost and high-volume micro-manufacturing processes, the updated title covers technologies such as micro-mechanical cutting, laser-machining, micro-forming, micro-EDM, micro-ECM, hot-embossing, micro-injection molding, laser micro-sintering, thin film fabrication, inkjet technology, micro joining, multiple processes machines, and more. Edited by one of the few world-experts in this relatively new, but rapidly-expanding area and presenting chapters written by a 40-strong team of leading industry specialists, this book is an invaluable source of information for engineers, R&D researchers and academics. Covers key micro-manufacturing technologies, processes and equipment with high-volume production capabilities, enabling large companies as well as SMEs to introduce these technologies in production and business and reduce production costs Outlines micro-manufacturing system engineering and practical issues pertaining to material, design, handling, metrology, inspection, testing, sensors, control, system integration and software, and micro-factories Enables manufacturing practitioners to choose the right technology suitable for a particular product-manufacture This book presents an in-depth study and elucidation on the mechanisms of the micro-cutting process, with particular emphasis and a novel viewpoint on materials characterization and its influence on ultra precision machining. This book is a key technology in the manufacture of mechanical, optical and opto-electronics components with a surface roughness of a few nanometers and form accuracy in the sub-micrometric range. In the context of subtractive manufacturing, ultra-precision diamond turning is based on the pillars of materials science, machine tools, modeling and simulation technologies, etc., making the study of such machining processes intrinsically interdisciplinary. However, in contrast to the substantial advances that have been achieved in machine design, laser metrology and control systems, relatively little research has been conducted on the material behavior and its effects on surface finish, such as the material anisotropy of crystalline materials. The feature of the significantly reduced depth of cut on the order of a few micrometers or less, which is much smaller than the average grain size of work-piece materials, unavoidably means that conventional metal cutting theories can only be of limited value in the investigation of the mechanisms at work in micro-cutting processes in ultra-precision diamond turning International Progress in Precision Engineering documents the proceedings of the 7th International Precision Engineering Seminar held in Kobe, Japan, May 1993. The seminar brought together the world's leading precision engineering practitioners from areas of application as diverse as actuators, sensors, scanning tip microscopy, micro and nano manufacturing (including bio-manufacturing), ultra precision measuring machines, machine tools, and large optics for space technology. The seminar included 16 oral sessions that dealt with the following topics: (i) Metrology - The Science Base For Precision Engineering; (ii) Sensors and Actuators in Precision Engineering and Nanotechnology; (iii) New Materials - Applications and Ultra Precision Energy Beam Processing; (iv) Nanotechnology Machining Processes; (v) New Developments In Ultra Precision Machines; (vi) Ultra Precision, Servo, and Control Technology; (vii) Precision Engineering in Space Technology; (viii) X-Ray Technologies and Their Applications; (ix) Micromechanics and Micrometallurgy; and (x) New Developments in Precision Engineering. There were also poster sessions and an introductory keynote speech by Dr. H. Mizuno, Executive Vice- President of Matsushita/Panasonic who talks on the symbiotic relationship between electronics and precision engineering. This book is devoted to a thorough investigation of the physics and applications of the vacuum arc – a highly-ionized metallic plasma source used in a number of applications – with emphasis on cathode spot phenomena and plasma formation. The goal is to understand the origins and behavior of the various complex and sometimes mysterious phenomena involved in arc formation, such as cathode spots, electrode vaporization, and near-electrode plasma formation. The book takes the reader from a model of dense cathode plasma based on charge exchange ion-atom collisions through a kinetic approach to cathode vaporization and on to molten thermophysical properties of cathodes. This picture is further enhanced by an in-depth study of cathode jets and plasma acceleration, the effects of magnetic fields on cathode spot behavior, and electrical characteristics of arcs and cathode spot dynamics. The book also describes applications to space propulsion, thin film deposition, laser plasma generation, and magnetohydrodynamics, making this comprehensive and up-to-date volume a valuable resource for researchers in academia and industry.Ultra-precision machining is a promising solution for achieving excellent machined surface quality and sophisticated micro-nano-structures that influence the applications of components and devices. Further, given the ultra-thin layer of material removed, it is a highly coupled process between cutting tool and material. In this book, scientists in the fields of mechanical engineering and materials science from China, Ukraine, Japan, Singapore present their latest research findings regarding the simulation and experiment of material-oriented ultra-precision machining. Covering various machining methods (cutting, grinding, polishing, ion beam and laser machining) and materials (metal, semiconductor and hard-brittle ceramics), it mainly focuses on the evaluation of the fundamental mechanisms and their implementation in processing optimization for different materials. It is of significant theoretical and practical value for guiding the fabrication of ultra-smooth and functional surfaces using ultra-precision machining by Professor Pat McKoneh Cranfield Precision Engineering, UK Member of Joint Organising Committee IPSES/UMEIC PROGRESS IN PRECISION ENGINEERING Metal working companies in tool making, prototype manufacturer subcontract machining often use the label "precision engineering" to indicate that they are accustomed to working to finer tolerances than is normally expected in series production. But what are we concerned with in this and our preceding international conferences is much wider and deeper than this. Precision engineering is a grouping of multidisciplinary scientific and engineering skills and techniques, firmly based on dimensional metrology, by which a wide range of new advanced technology products is made possible. In the last 5 - 10 years we have witnessed dramatic progress in precision engineering, particularly by the rapid development of its important sub-sets, micro-engineering and nanotechnology. It is a fact of particular importance for me and my colleagues on the Organising Committee to welcome you to Braunschweig on the occasion of this the first joint international meeting in high precision manufacturing/precision engineering to be held in Germany. Our aim is to bring together the world's leading precision engineering practitioners from areas of application as diverse as optics for astronomical, micro and nano machining process research, design and development of ultra precision machine tools and metrology equipment, advanced materials, bio medical research and new sensor/transducer systems Explaining principles underlying the micro-manufacturing practices currently being used and developed in industrial countries around the world. Micromachining of Engineering Materials outlines advances in material removal that have led to micromachining, discusses procedures for precise measurement, includes bonding and joining processes, describes vapoThe use of the wavelet transform to analyze the behavior of the complex systems from various branches of science and engineering. The content of the book is accessible to a large number of readers. This well-established and widely adopted text, now in its Sixth Edition, continues to provide a comprehensive coverage of the morphology of the design process. It gives a holistic view of product design, which has inputs from diverse fields such as aesthetics, strength analysis, production design, ergonomics, reliability and quality. Taguchi methods and quality with six sigma, and computer applications. The text discusses the importance and objectives of design for environment and describes the various approaches by which a modern, environment-conscious designer goes about the task of design for environment. Many examples have been provided to illustrate the concepts discussed. In this sixth edition, three appendices have been added. Appendix A deals with limits, fits and tolerance along with their applications. Appendix B discusses the use of G and M codes for part programming with illustrative examples. Appendix C explains advanced concepts of aesthetics. The book is primarily intended as a text for courses in mechanical engineering, production engineering, and industrial design and management. It will also prove handy for practising engineers. Key Features • Provides concepts from material science, which include inputs on ceramics, rubber, polymers and other materials to make the design idea physically realizable. • Uses the modern Concurrent Design concept to satisfy diverse groups/areas such as marketing, vendors, production and quality assurance. • Considers the use of computers while analyzing modern techniques of prototyping, simulation of product and its use. Introduces AI, robots, AGV, PLC and AS/RS in manufacturing automation. The current focus of manufacturing is towards flexible automation and miniaturization. Copyright code: