

Table of Contents

Preface

Chapter 1: Steel, Alloys, Metal Composites and Metallurgical Technologies

Electron-Microscopic Examination of the Surface Layer of Titanium Alloys OT4 after Ion Implantation V.V. Ovchinnikov, N.V. Uchevatkina, E.V. Lukianenko, I.A. Kurbatova and S.V. Yakutina	3
Determination of the Thermal Conductivity of Metal-Polymers M.S. Chepchurov, N.S. Lubimyi, V.P. Voronenko and D.R. Adeniyi	9
Production of High-Quality Castings from Gray Iron by Differentiated Cooling in Iron Mould N.I. Gabelchenko, A. Belov and O.N. Meshcheryakova	15
Analyzing the Features of Non-Metallic Inclusion Distribution in Ø410 mm Continuously Cast Billets of Low Carbon Steel Grades M.Y. Chubukov, D.V. Rutskiy and D.P. Uskov	21
Effect of Temperature Calcinations of Clay on Strength of Moulding Mixture N.A. Kidalov, A.S. Adamova and V.V. Smirnova	26
Investigation of the Influence of the Deformation Rate on the Structure of the Blank at the Upsetting M.A. Serezhkin, R.N. Zadorozhniy, A.S. Kalinin and L.K. Minyazeva	30
An Investigation of Ingots Teemed under Different Thermal and Physical Solidification Conditions and the Analysis of Metal Quality of the Hollow Forgings Produced S.B. Gamanyuk, D.V. Rutskiy and N.A. Zyuban	36
Briquettes Made from the Chips after Abrasive Grinding of Rolled High-Alloy Steels as an Advanced Charge Material Solution I.L. Gonik, L.V. Palatkina, D.N. Gurulev and D.M. Shilikhin	41

Chapter 2: Metalworking Technologies and Abrasive Tools Manufacturing

Structuring Control of Facial Layer during Edge Cutting Machining D.V. Kraynev, A.S. Sergeev and Z.S. Tikhonova	51
Formation of the Surface Layer Properties in Edge Cutting Machining of Stainless and Heat-Resistant Steels D.V. Kraynev, E.M. Frolov and P.A. Norchenko	56
The Modeling of Combined Stress State of the Drilling Bit Body during the Selective Press Fitting of Picks in it N.V. Polezhaev, M.D. Khoroshevskiy, M.G. Kristal and V.V. Preis	61
Formation of Residual Stresses in the Internal Combustion Engine Sleeves after Abrasive Processing and Operation M.Y. Polyanchikova, Y.N. Polyanchikov and O.A. Kursin	65
Physical Principles for Forming the Microgeometry of the Surface Layer in the Steel Edge Cutting Machining A.S. Sergeev, Z.S. Tikhonova and T.V. Uvarova	69
The Quality of a Surface Received by Processing the End of a Large Diameter Pipe with the Use of a Single-Row Cylindrical Brush A.I. Bannikov, V.I. Alekseychuk, O.A. Makarova and N.A. Dyatlov	75
Investigation of the Influence of the Thermal Conductivity of the Buildup on Tool Durability A.I. Bannikov, D.V. Pronichev, O.A. Makarova and N.A. Dyatlov	80
The Method of Reducing of Springback Effect during Impact Bending of Sheet Steel Blanks V.Y. Lavrinenko and R.R. Shagaleev	85

Influence of Cutting Speed on Interaction Type and Temperature during Turning of α-Titanium Alloy V.A. Solodkov, S.I. Kormilitsin and A.I. Kurchenko	90
Influence of Solid Lubricants on the Working Efficiency of a Coated-Carbide Cutting Tool under Interrupted Cutting Conditions V.A. Solodkov, S.I. Kormilitsin and A.I. Kurchenko	96
Influence of the Properties of Hydraulic-Cylinder Barrels Materials on the Formation of Errors during Deep Borehole Drilling A.Y. Gorelova and M.G. Kristal	101
Optimization of Cutting Conditions for Turning of Ductile Materials to Achieve Favourable Ship Form S.V. Mikhailov, N.Y. Kovenov and S.N. Danilov	107
Formation of the Properties of the Surface Layer during Multi-Stage Milling J.L. Tchigirinsky, N.Q. Trong and I.V. Firsov	115
Analyzing the Mechanisms of Cutting Tool Wear during the Machining of Corrosion-Resistant Steels P.H. Trung and J.L. Tchigirinsky	120
The Study of the Processing Accuracy after the Grinding of the Inner Ring Raceway with the Abrasive Tool without a Sheaf A.I. Bannikov, N.A. Dyatlov, O.A. Makarova and A. Serov	125
The Peculiar Properties of Obtaining the Abrasive Tool without a Sheaf A.I. Bannikov, N.A. Dyatlov, J.L. Tchigirinsky and O.A. Makarova	129
Mechanical Strength of Abrasive Segment Formed by the High-Frequency Discretization of Grinding Wheel A.V. Morozov and V.G. Gusev	134
Hobbing of Cylindrical Wheels without Coolants A.S. Kalashnikov, Y.A. Morgunov and P.A. Kalashnikov	139

Chapter 3: Ultrasonic and Electrophysical Machining Technologies

The Study of the Influence of Ultrasonic Vibrations on Structural Changes of Steel A.V. Korolev, A.F. Balayev and A.N. Vasin	147
Increasing Innovation Capacity of the Methods of Ultrasonic Machining of Ceramics and Composites with a Diamond-Impregnated Tool Y.A. Morgunov, A.I. Opalnitkiy and B.P. Saushkin	152
Removal of Defective Layer after Electrical Discharge Machining S.A. Mozgov, Y.A. Morgunov and B.P. Saushkin	157
The Influence of Ultrasonic Impact Treatment on Steel Corrosion Resistance M.M. Ganiev and I.M. Ganiev	161
Studying the Impact of the Roughness of the Tool Surface Formed by Ultrasonic Exposure on the Roughness of the Holes being Machined S.I. Agapov, Y.I. Sidyakin and O.F. Korpelyanskiy	166
Calculation of Roughness Parameters during Ultrasonic Hobbing from the Viewpoint of the Theory of Elastic-Plastic Contact S.I. Agapov, Y.I. Sidyakin and O.F. Korpelyanskiy	170
The Features of Nanocomposite Structure Formation on the Surface of Metal Products under the Influence of Low-Temperature Plasma B.M. Brzhozovsky, E.P. Zinina and V.V. Martynov	174

Chapter 4: Assembly Technologies and Quality Checking

Relaxation of Residual Stresses in Bearing Rings Based on the Optimal Geometric Setup of Equipment for Centerless Running A.V. Korolev, A.F. Balayev and B.M. Iznairov	183
Technological Quality Assurance of Assembly Units Based on Functional Changes of Dimensional Relations with the Use of CALS Technologies E.A. Polsky and S.V. Sorokin	189

The Influence of Wedge Body Surface Relief on Quality Indicators of Pulse Variable Transmission V.G. Karaban	195
The Development of Informational-Executive Cyber-Physical Systems in Materials Production and Metalworking A.R. Ingemansson	200
Contactless Evaluation of the Microgeometry of the Machined Surface J.L. Tchigirinsky and A.P. Gontar	206
Inspecting the Quality of a Surface Layer in Non-Rigid Shafts Turning by Adaptive Control over the Process of Cutting J.L. Tchigirinsky, P.S. Nesterenko and E.N. Smirnova	212