

1. Record Nr.	UNINA9910522998403321
Autore	Golenkov Vyacheslav Aleksandrovich
Titolo	Theory and technology of roll stamping / / Vyacheslav Aleksandrovich Golenkov, Sergey Yuryevich Radchenko, Daniil Olegovich Dorokhov
Pubbl/distr/stampa	Cham, Switzerland : , : Springer, , [2022] ©2022
ISBN	3-030-91817-3
Edizione	[1st edition.]
Descrizione fisica	1 online resource (308 pages)
Disciplina	671.33
Soggetti	Metal stamping
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di bibliografia	Includes bibliographical references.
Nota di contenuto	<p>Intro -- Introduction -- Contents -- 1 Analysis of Methods for the Production of Axisymmetric Parts with Given Specifications -- 1.1 Workpiece Forming Methods and Their Effects on the Mechanical and Physical Properties of Metals -- 1.2 Classification of Roll Stamping Processes -- 1.3 Hardening by Metal Forming Methods -- References -- 2 Development of the Calculation Procedure for Production Processes of Metal Forming -- 2.1 Traditional Methods of Metal Forming Process Calculation -- 2.2 Mathematical Problem Definition for Metal Forming -- 2.3 Solving Problems of Elastoplastic Deformation by the Finite Element Method -- 2.3.1 Calculation of Temperature Fields -- 2.3.2 Calculation of Displacements, Deformations and Stresses -- 2.4 Accuracy Estimation Algorithms -- 2.4.1 Results Accuracy Estimation -- 2.4.2 Posterior Estimates Based on the Duality Method -- 2.4.3 Posterior Estimates Based on Calculations Using Grids of Different Densities -- 2.5 Defining a Finite Element Grid -- 2.6 Main Aspects of the Numerical Solution of MF Problems -- 2.7 Analysis of Elastoplastic Models Using Dedicated Software Packages -- References -- 3 Roll Stamping of Long Bar Stock -- 3.1 Analysis of the Stress-Strain State During Roll Stamping of a Strand-Shaped Workpiece -- 3.2 Experimental Studies of Roll Stamping of Long Bar Stock -- 3.3 Long Bar Stock Roll Stamping Process Refinement -- References -- 4 Roll Stamping of Piece Blanks -- 4.1 Metal Flow Specifics During Roll Stamping -- 4.2 Neutral Cross-sectional Angle</p>

and Roll Stamping Process Kinematics -- 4.3 Conditions and Specifics of Workpiece Axial Tightening During Roll Stamping -- References -- 5 Force Parameters of Roll Stamping -- 5.1 Roll Stamping Stages, Analysis of Changes in Working load, and Factors Affecting the Force Parameters of the Deformation Process.

5.2 Influence of the Relative Deformation Rate on the Workpiece Rotation Condition -- References -- 6 Mathematical Modeling of Roll Stamping -- 6.1 Main Objectives and Solution Methods -- 6.2 The Procedure for Calculating Tool Loads During Roll Stamping -- 6.3 Calculation of Roll Stamping Process Parameters During the Piercing Stage -- 6.4 Calculation of Roll Stamping Process Parameters at Roll Burnishing Stage -- 6.5 Stress and Deformation Distribution in the Workpiece Cross Section at the Roll Burnishing Stage -- 6.6 Calculation of the Roller Force and Contact Stress, Punch Force, Required and Created Moments -- 6.7 Methodology for Calculating the Maximum Permissible Relative Workpiece Deformation Rate -- 6.8 Distribution of Normal Stresses on the Tool During Roll Stamping -- References -- 7 Main Production Processes of Roll Stamping -- Reference -- 8 Local Strain Hardening -- 8.1 Problem Definition -- 8.2 Calculation of Kinematic and Force Parameters of Roll Burnishing -- 8.3 Mathematical Modeling of Roll Burnishing -- 8.4 Experimental Studies of Roll Burnishing -- References -- 9 Hardening by Complex Local Deformation -- 9.1 Roll Burnishing with Braking Torque -- 9.1.1 The Effect of the Braking Force Applied to the Roller on the Deformation Rate -- 9.1.2 Multi-cycle Roll Burnishing -- 9.2 Roll Burnishing with Forming and Smoothing Tools -- 9.3 Analysis of the Results of Study of the Forming Tool Shape and Geometry for Hardening by Complex Local Loading of the Deformation Zone -- 9.4 Mathematical Modeling of Complex Local Deformation -- 9.5 Justification of Odqvist Parameter as the Generic Criterion for Comparing Physical and Mathematical Modeling Results -- 9.6 Influence of the Forming Tool Geometry and Its Indentation Depth on the Stress-Strain State of the Workpiece in a Single Act of Deformation.

9.7 Influence of Axial Compression on the Stress-Strain State of the Workpiece During Hardening by Complex Local Loading of the Deformation Zone -- 9.8 Study of the Influence of Process Conditions on the Processes of Hardening by Complex Local Loading of the Deformation Zone -- References -- 10 Complex Local Deformation Processes and Methods of Their Design -- 10.1 Classification of Complex Local Deformation Processes -- 10.2 Workflow Processes of Complex Local Deformation by Roll Burnishing -- 10.3 Methodology for Designing MF Methods Based on Complex Local Loading of the Deformation Zone -- 10.3.1 Determining Parameters of Roll Burnishing with Braking Torque -- 10.4 Methodology for Designing Roll Burnishing Processes with Forming and Smoothing Tools Using the Odqvist Parameter -- 10.4.1 Problem Definition for Design of Metal Forming Processes with Complex Local Loading of the Deformation Zone, Allowing Formation of Gradient-Hardened Structures in Metals and Alloys in a Controlled Manner -- 10.4.2 Recommendations for the Selection of Process Parameters in the Design of Metal Forming Methods with Complex Local Loading of the Deformation Zone, Allowing Forming Gradient-Hardened Structures in Metals and Alloys in a Controlled Manner -- 10.5 New Processes of Hardening by Complex Local Loading of the Deformation Zone -- 10.5.1 The Process of Hardening by Complex Loading of the Deformation Zone to Obtain Various Mechanical Properties Along the Workpiece Length -- 10.5.2 The Process of Hardening by Complex

Loading of the Deformation Zone for Forming Using Various Tools
in a Single Processing Cycle -- References.
