



Nosov Magnitogorsk State Technical University

The 5th International
Youth Scientific and Technical Conference

FUNDED BY
RUSSIAN
FOUNDATION
FOR BASIC
RESEARCH



MAGNITOGORSK ROLLING PRACTICE 2020



November 24-27, 2020

PROGRAM BOOK

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Conference organized by



Nosov Magnitogorsk State Technical
University, Magnitogorsk



RUSSIAN
FOUNDATION
FOR BASIC
RESEARCH

Russian Foundation for Basic Research



South Ural State University,
Chelyabinsk



Ural Federal University named after the First
President of Russia B.N. Yeltsin,
Ekaterinburg



Siberian Federal University,
Krasnoyarsk



Perm National Research Polytechnic
University, Perm



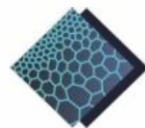
Institute for Metals Superplasticity
Problems of RAS, Ufa



University of Padua, Italy



Indian Institute of Information Technology,
Design and Manufacturing Jabalpur,
India



Mechanics of Gradient Nanomaterials
laboratory, Magnitogorsk



PJSC Magnitogorsk Iron & Steel Works,
Magnitogorsk



Rudny Industrial Institute,
Rudny, Kazakhstan

Dear colleagues!

Dear colleagues!

On behalf of Nosov Magnitogorsk State Technical University we are delighted to welcome you to the 5th International Youth Scientific Conference «Magnitogorsk Rolling Practice 2020».

Magnitogorsk is one of the centers of global metallurgy, combining considerable scientific and industrial resources and knowledge. Therefore, it has become a tradition to organize the Magnitogorsk youth forum devoted to metal forming technologies.

Main Objective of the Conference is to give floor to young researchers to discuss new trends, developments and innovations in metal forming processes. This year our Conference was recognized a winner of the competition for the best scientific events in Russia, which was organized by the Russian Foundation for Basic Research.

Unfortunately, in view of the current epidemic situation, the Conference will be held online. It will be a new experience for us.

Nevertheless, the Organizing Committee has no doubt that the online format of the Conference will be useful for young experts in metal forming. The agenda of the Conference includes reports of young researchers in subject-specific sessions, the workshop on «Basics of finite element modelling in Abaqus» and personal consultations on the subject of your scientific research.

Following a good tradition, the Organizing Committee will award authors of the best reports and announce winners in specific nominations. The best papers will be published in leading journals, partners of our Conference. The conference proceedings will be published in English and uploaded to the Russian Science Citation Index and Google Scholar.

We are sure that the Conference will give an impetus to a wider collaboration between young researchers dealing with metal forming and promote building new international research teams. The Organizing Committee would like to greatly thank all the participants for their contribution to the aim of the conference.

We hope you will have a fruitful time during the conference and we are always glad to see you in the steel heart of Russia, the guest-friendly city of Magnitogorsk.

Chairperson
of the Organizing
Committee

Alexey Korchunov

Tuesday, 24th November 2020

**WORKSHOP: Cross-Disciplinary Solutions in Modern Materials Engineering
(iSmart-Metal Forming)**

(10:00-18:00 (MOSCOW TIME), Zoom)

Reports language: English

Moderator: Marina Polyakova, Alexey Korchunov,
Denis Pustovoitov, Alexander Pesin, Dmitrii Konstantinov

Welcome Speech Alexey Korchunov, Nosov Magnitogorsk State Technical University, Magnitogorsk, Russia Puneet Tandon, Indian Institute of Information Technology, Design and Manufacturing, Jabalpur, India Megumi Kawasaki, Oregon State University, USA	10:00-10:15
Features of rolling hard-to-deform steels and alloys in a shell from a soft material Denis Salikhyanov, Ural Federal University named after the first President of Russia B.N.Yeltsin, Ekaterinburg, Russia	10:15-10:25
Research of the heating temperature influence on technological plasticity of the steel grade 15KH13N2 (AISI 414) applicable to the screw rolling process Nikita Zavartsev, Ural Research Institute of the Tube & Pipe Industries, Chelyabinsk, Russia	10:30-10:40
Investigation of asymmetric rolling in the relief rolls Alexandra Tymchenko, Karaganda Industrial University, Karaganda, Kazakhstan	10:45-10:55
Cold hydrostatic extrusion method for making magnesium rods and fine wires Daria Komkova, M.N. Mikheev Institute of Metal Physics of the Ural Branch of the Russian Academy of Sciences, Ekaterinburg, Russia	11:00-11:10
Development and testing of new steel grades by modeling the complex dynamic processes of their production and operation Evgeniya Pozhidaeva, Nosov Magnitogorsk State Technical University, Magnitogorsk, Russia	11:15-11:25
Features of the calculation strain at rolling zirconium alloy Dmitry Abashev, Ural Federal University named after the first President of Russia B.N.Yeltsin, Ekaterinburg, Russia	11:30-11:40
The influence of technological parameters on the properties formation of continuously extruded copper buses Alexander Koshmin, National University of Science and Technology MISiS, Moscow, Russia	11:45-11:55
Simulation of details for nuclear industry with ufg properties Daniyar Zhumagaliyev, Rudny Industrial Institute, Rudny, Kazakhstan	12:00-12:10
Modeling of a new method of rolling channels in the DEFORM software package Ekaterina Ustinova, Ural Federal University named after the first President of Russia B.N.Yeltsin, Ekaterinburg, Russia	12:15-12:25
Research of the influence of reduction modes on the degree of the unevenness of deformation of a tube wall Yaroslav Radkin, Sukhoi State Technical University of Gomel, Gomel, Republic of Belarus	12:30-12:40

Verification with the spherical boundaries hypotises of the deformation zone at drawing Nataly Bushueva, Ural Federal University named after the first President of Russia B.N.Yeltsin, Ekaterinburg, Russia	12:45-12:55
Potential biomedical applications of az61 magnesium alloy after large strain extrusion machining (LSEM) Luca Pezzato, University of Padua, Padua, Italy	13:00-13:10
Features of steel wire drawing in double dies Ilya Tsyrganovich, Sukhoi State Technical University of Gomel, Gomel, Republic of Belarus	13:15-13:25
Development of the asymmetric rolling technology for aluminum alloys Olesya Biryukova, Nosov Magnitogorsk State Technical University, Magnitogorsk, Russia	13:30-13:40
Increasing steel wire rope service life by applying a color coating Gallyamov Denis, JSC BMK, Beloretsk, Russia	13:45-13:55
New physical simulation approach for asymmetric rolling Pesin Alexander, Nosov Magnitogorsk State Technical University, Magnitogorsk, Russia	14:00-14:10
Influence of punch design on the quality of upset pipe ends Erpalov Mikhail, Ural Federal University named after the first President of Russia B.N.Yeltsin, Ekaterinburg, Russia	14:15-14:25
Research of mechanical properties of prestressing strands under thermo-mechanical treatment Emaleeva Dinara, Nosov Magnitogorsk State Technical University, Magnitogorsk, Russia	14:30-14:40
Processing of the titanium alloy Ti6AL7NB as a medical application material Toyusheva Dasha, Ural Federal University named after the first President of Russia B.N.Yeltsin, Ekaterinburg, Russia	14:45-14:55
Friction nanostructuring treatment of metallic surfaces by flexible tool Belevskaya Irina, Nosov Magnitogorsk State Technical University, Magnitogorsk, Russia	15:00-15:10
Effect of the Ti6AL4V alloy track arrangement on mechanical properties in direct metal deposition Glebov Lev, South Ural State University (National Research Institute), Chelyabinsk, Russia	15:15-15:25
Ways to expand the use of magnesium Zamaraeva Yulia, Ural Federal University named after the first President of Russia B.N. Yeltsin, Yekaterinburg, Russia	15:30-15:40
Understanding the effect of friction conditions on the parameters of inner tie rod pressing Stolyarov Fedor, Nosov Magnitogorsk State Technical University, Magnitogorsk, Russia	15:45-15:55
Rolling of aluminium alloy 5083 sheets Snegiryov Ilya, Kamensk Uralsky Metallurgical Works, Kamensk Uralsky, Russia	16:00-16:10
Roughness formation in hot-rolled temper-rolled band production Medvedeva Ekaterina, Nosov Magnitogorsk State Technical University, Magnitogorsk, Russia	16:15-16:25

Finite element modeling of the sleeper screw head hot stamping process accounting for dynamic recrystallization <i>Ishimov Alexey, PJSC NLMK, Lipetsk, Russia</i>	16:30-16:40
Investigation of the state of CU59ZNPB1 after hot extrusion <i>Shimov Georgii, Ural Federal University named after the first President of Russia B.N. Yeltsin Yekaterinburg, Russia</i>	16:45-16:55
Standardization system management model <i>Kazantseva Tatyana, Ural Federal University named after the first President of Russia B.N. Yeltsin, Yekaterinburg, Russia</i>	17:00-17:10
Application of severe plastic deformation for forging cylindrical billets <i>Andreyashchenko Vitalina, Satpaev Ekibastuz Technical and Engineering Institute, Ekibastuz, Kazakhstan</i>	17:15-17:25
Behavior of fine pearlite plates in the deformation of high-carbon steel <i>Narasimhan Khabib, Indian Institute of Technology Bombay, Mumbai, India</i>	17:30-17:40

Wednesday, 25th November 2020

**WORKSHOP: Fundamental Challenges of Metal Forming in the Scope of Current Demands of the Global Industry
(10:00-17:00 (MOSCOW TIME), Zoom)**

Reports language: Russian

Moderator: Denis Chikishev, Alexey Korchunov,
Ksenia Pivovarova, Dmitrii Konstantinov

Assessment of the structure and modification ability of the experimental Al-3Ti-1B bar ligature obtained by method of ingotless rolling-extruding <i>Denis Voroshilov, Siberian Federal University, Krasnoyarsk, Russia</i>	10:00-10:10
Features of structure and properties formation of CuNiCrSi alloy after radial-shear rolling <i>Nikita Bunits, National University of Science and Technology MISiS, Moscow, Russia</i>	10:15-10:25
Simulation of contact between rollers of rolling mill at equal acceleration with slipping and lubrication <i>Maxim Kharchenko, Nosov Magnitogorsk State Technical University, Magnitogorsk, Russia</i>	10:30-10:40
Mathematical modeling of metal temperature during hot sheet rolling <i>Alexander Grigorenko, South Ural State University, Chelyabinsk, Russia</i>	10:45-10:55
Theoretical and experimental analysis of a neck profile of cylindrical specimens <i>Mikhail Erpalov, Ural Federal University named after the first President of Russia B.N.Yeltsin, Ekaterinburg, Russia</i>	11:00-11:10
Peculiarities of contact interactions between carbon steel wire and die in drawing with torsion <i>Alexander Gulin, Nosov Magnitogorsk State Technical University, Magnitogorsk, Russia</i>	11:15-11:25
Comparative analysis of structure and properties of rolled sheet from aluminum-magnesium alloys with different scandium content <i>Olga Yakiviyuk, Siberian Federal University, Krasnoyarsk, Russia</i>	11:30-11:40

The development of control program for hot torsion test setup <i>Mikhail Erpalov, Ural Federal University named after the first President of Russia B.N.Yeltsin, Ekaterinburg, Russia</i>	11:45-11:55
Development of the asymmetric rolling technology as a severe plastic deformation method for aluminum narrow strips with a gradient structure showing higher strength and ductility <i>Anna Kozhemyakina, Nosov Magnitogorsk State Technical University, Magnitogorsk, Russia</i>	12:00-12:10
Roller die wire drawing of small diameters from titanium alloys <i>Dmitry Gromov, South Ural State University, Chelyabinsk, Russia</i>	12:15-12:25
Stress state of dies for hexagonal rods production <i>Malakanov Sergey, Nosov Magnitogorsk State Technical University, Magnitogorsk, Russia</i>	12:30-12:40
Effect of combined bending & twisting during steel wire drawing on the development of microstructure & properties <i>Deepak Kumar Singh, Indian Institute of Technology Bombay, Mumbai, India</i>	12:45-12:55
Approaches to classification of combined and integrated processes in metal forming <i>Lopatina Ekaterina, Nosov Magnitogorsk State Technical University, Magnitogorsk, Russia</i>	13:00-13:10
Understanding the forming mechanism of mechanical properties in new cold-resistant high-strength steel <i>Kuznetsova Alla, Nosov Magnitogorsk State Technical University, Magnitogorsk, Russia</i>	13:15-13:25
Hybrid processing as an effective way to improve physical and mechanical properties of magnesium alloys <i>Merson Danil, Togliatti State University, Togliatti, Russia</i>	13:30-13:40
FEM modeling of the tube workpiece hot guillotining process <i>Malanov Artem, Ural Federal University named after the first President of Russia B.N.Yeltsin, Yekaterinburg, Russia</i>	13:45-13:55
Method for calculating the temperature of the deformation cone cross-sections in a cold pilger rolling mill <i>Pilipenko Stanislav, Polotsk State University, Novopolotsk, Republic of Belarus</i>	14:00-14:10
Understanding the effect of multi-stage heat treatment schedules on the microstructure and properties of cryogenic steel <i>Nikitenko Olga, Nosov Magnitogorsk State Technical University, Magnitogorsk, Russia</i>	14:15-14:25
Surface modification by plastic deformation and functional coatings <i>Gubarev Evgeniy, Nosov Magnitogorsk State Technical University, Magnitogorsk, Russia</i>	14:30-14:40
Microstructural anisotropy on the wire surface during drawing <i>Kamalova Gusel, OJSC "MMK-METIZ", Magnitogorsk, Russia</i>	14:45-14:55
Workshop "Basics of finite element modelling in Abaqus" Dmitrii Konstantinov, Nosov Magnitogorsk State Technical University, Magnitogorsk, Russia	15:00-17:00

Thursday, 26th November 2020

WORKSHOP: Innovative Technology and Materials in Metal Forming
(10:00-17:00 (MOSCOW TIME), Zoom)

Reports language: English

Moderator: Denis Chikishev, Alexey Korchunov, Polyakova Marina

Hardned tape substrates made on (CU-NI-ME) - alloys for 2d generation high-temperature superconductor wire <i>Suaridze Teona, M.N. Mikheev Institute of Metal Physics of the Ural Branch of the Russian Academy of Sciences, Yekaterinburg, Russia</i>	10:00-10:10
FEM simulation of temperature changes during asymmetric cryorolling of aluminum <i>Pustovoitov Denis, Nosov Magnitogorsk State Technical University, Magnitogorsk, Russia</i>	10:15-10:25
Restoration of the steel billet continuous casting machine roller face by direct laser fusion <i>Bykov Vitaliy, South Ural State University (National Research Institute), Chelyabinsk, Russia</i>	10:30-10:40
Technological heredity and the quality of parts made by sheet stamping of titanium alloys <i>Adyev Eldar, Ural Federal University named after the first President of Russia B.N.Yeltsin, Yekaterinburg, Russia</i>	10:45-10:55
Application of SSRVE conception for modeling of ferritic-pearlitic steel wire drawing <i>Konstantinov Dmitrii, Nosov Magnitogorsk State Technical University, Magnitogorsk, Russia</i>	11:00-11:10
Treatment of multicomponent AL-SI-FE alloys <i>Ivasik Vladimir, Satpaev Ekibastuz Technical and Engineering Institute, Ekibastuz, Kazakhstan</i>	11:15-11:25
Application of radial-shear strain in the production of long components with ultrafine-grained structure <i>Usanov Mikhail, Nosov Magnitogorsk State Technical University, Beloretsk Branch, Beloretsk, Russia</i>	11:30-11:40
FEM simulation of strain gradient in low-carbon steel sheets after asymmetric cold rolling <i>Pustovoitov Denis, Nosov Magnitogorsk State Technical University, Magnitogorsk, Russia</i>	11:45-11:55
New technique of metal surface restoration and reinforcement <i>Efimova Yulia, Nosov Magnitogorsk State Technical University, Magnitogorsk, Russia</i>	12:00-12:10
The metal-saving technology of pipe rolling in a reducing mill <i>Orlov Alexey, Ural Federal University named after the first President of Russia B.N.Yeltsin, Yekaterinburg, Russia</i>	12:15-12:25
The effect of high strain-rate deformation and annealing on the evolution of the structure and properties of CU-CR-ZR alloys <i>Abdullina Dinara, M.N. Mikheev Institute of Metal Physics of the Ural Branch of the Russian Academy of Sciences, Yekaterinburg, Russia</i>	12:30-12:40
Simulated production of semi-finished rolled stock for coiled tubing <i>Alekseev Danil, Nosov Magnitogorsk State Technical University, Magnitogorsk, Russia</i>	12:45-12:55

Understanding the relationship between tension and energy costs in a quarto reversing mill rolling operation <i>Strashkova Nataly, Ural Federal University named after the first President of Russia B.N.Yeltsin, Yekaterinburg, Russia</i>	13:00-13:10
Effect of various process parameters on the bake hardening effect in continuous hot-dip galvanizing line <i>Fomin Mikhail, Nosov Magnitogorsk State Technical University, Magnitogorsk, Russia</i>	13:15-13:25
Micromechanics simulation of cold rod drawing <i>Konstantinov Dmitrii, Nosov Magnitogorsk State Technical University, Magnitogorsk, Russia</i>	13:30-13:40
Effect of thermomechanical treatment on the structure and physical and mechanical properties of Al-7%REM and Al-0.6%Zr conductor alloys produced by electromagnetic casting <i>Belov Nikolay, National University of Science and Technology MISiS, Moscow, Russia</i>	13:45-13:55
Understanding the influence of speed correction modes on the pipe surface quality during continuous rolling <i>Toporov Viktor, Seversky Pipe Plant Industrial Joint Stock Company, Polevskoy, Russia</i>	14:00-14:10
Simulation of white layer thickness in combined wire drawing <i>Stolyarov Alexey, OJSC "MMK-METIZ", Magnitogorsk, Russia</i>	14:15-14:25
Numerical modeling of combined asymmetric rolling and bending process <i>Abhay Kumar Dubey, PDPM Indian Institute of Information Technology, Design and Manufacturing, Jabalpur, Madhya Pradesh, India</i>	14:30-14:40
Simulation of a new method of accumulated deformation <i>Khamatov Danis, Ural Federal University named after the first President of Russia B.N.Yeltsin, Yekaterinburg, Russia</i>	14:45-14:55
Control of magnesium alloy properties using methods of severe plastic deformation <i>Zasyarkin Sergey, Togliatti State University, Togliatti, Russia</i>	15:00-15:10
Internal stress evolution in the prestressing strand production <i>Ivekeeva Polina, Nosov Magnitogorsk State Technical University, Magnitogorsk, Russia</i>	15:15-15:25
Application of thermal analysis method for structural transformation of hot-rolled carbon billets for highstrength ropes <i>Pivovarov Ksenia, Nosov Magnitogorsk State Technical University, Magnitogorsk, Russia</i>	15:30-15:40
Individual consultations on the difficulties of research for young researchers	16:00 – 17:00

Friday, 27th November 2020

Closing Plenary and Award Giving	11:00 – 11:30
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