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InterPartner

Grabchenko's International Conference on Advanced Manufacturing Processes 2023

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5th Grabchenko's International Conference on Advanced Manufacturing Processes

September 5-8, 2023 | Odessa, Ukraine

Book of Abstracts

Science unites people together.

International Association for Technological Development and Innovations

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2023

Editors:
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Advanced Manufacturing Processes: Book of Abstracts of the 5th Grabchenko's International Conference on Advanced Manufacturing Processes, Odessa, Ukraine, September 5-8, 2023 / Volodymyr Tonkonogyi, Vitalii Ivanov, Ivan Pavlenko, Justyna Trojanowska (Eds.). – Sumy: IATDI, 2023. – 94 p.

Recommended by Coordination Board of International Association for Technological Development and Innovations (Protocol No. 5, February 1, 2023)

This book offers a timely snapshot of innovative research and developments at the interface between design, manufacturing, materials, mechanical and process engineering, and quality assurance. It covers various manufacturing processes, such as grinding, milling, broaching, and gear machining, including additive manufacturing, vibrational-centrifugal strengthening, laser-ultrasonic surface hardening, and antifriction coatings. It focuses on computer and numerical simulation, mathematical and integrated process modeling, parametric synthesis, virtual prototyping, automatic control, design of manufacturing, mechanical and mechatronics systems. It describes innovative cutting and abrasive processes and combined technologies. It also covers the formation, strengthening, and thermomechanical rolling. It also investigates the temperature field behavior, thermal stability, wear resistance, and other processes of various materials. Gathering the best papers presented at the 5th Grabchenko's International Conference on Advanced Manufacturing Processes (InterPartner-2023), held in Odessa, Ukraine, on September 5–8, 2023, this book provides a comprehensive and up-to-date examination of design, manufacturing, mechanical, materials, and process engineering, as well as quality assurance trends and technologies. Yet, it also aims at fostering international and interdisciplinary communication and collaborations, offering a bridge between the academic and industrial sector.

Temperature Field Behavior on Plate Width at Thermomechanical Rolling of Low Carbon Microalloyed Steel at the Steckel Mill

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The metal temperature before the reduction in rolls and before controlled cooling is the most significant factor influencing the formation of rolled products' mechanical properties. The wide sheet chilling of edges effect leads to the appearance of a temperature crown and, accordingly, to an uneven distribution of mechanical properties across the finished product width. Steckel mills (with furnace coilers) can reheat the coils, significantly eliminating the presence of a temperature gradient. However, implementing a thermomechanical controlled process (TMCP) at Steckel mills, which is highly sensitive to uneven temperature distribution, requires forecasting temperature fields to correct thermal conditions. This paper presents the results of developing and implementing a finite-difference mathematical model for calculating the temperature field for flat products concerning the mills with furnace coilers conditions. It is shown that a temperature drop occurs during the passing of the rolled metal from the furnace coiler to the mill stand, which must be compensated to ensure an ordered temperature gradient across the width.

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Ivan Pavlenko
Justyna Trojanowska

5th Grabchenko's International Conference on Advanced Manufacturing Processes (InterPartner-2023)

Book of Abstracts

Cover page design: Andrey Pavlyshko
Copyediting: Vitalii Ivanov, Andrey Pavlyshko
Proof-reading: IATDI

Accepted for print by Editorial Board: August 28, 2023
The print run is 200 copies.

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InterPartner is an annual scientific conference for manufacturing and mechanical engineers. The history of this event started in 1991 as a scientific seminar «Problems of Materials Cutting in Modern Manufacturing Processes». It was initiated by Prof. Anatolii Grabchenko. During 1991-2018 the seminar has transformed into International Conference «Advanced Technologies in Machine Building» and changed the venue from Alushta (1991-2013) to Odessa (2014-present).

Grabchenko's International Conference on Advanced Manufacturing Processes (InterPartner Conference Series) is a scientific event founded in 2019 by Odessa National Polytechnic University, National Technical University «Kharkiv Polytechnic Institute», Sumy State University, and International Association for Technological Development and Innovations. It combines a well-known title «InterPartner», adds Prof. Grabchenko's name for his significant contribution to the science of materials' cutting, and meets current scientific and industrial challenges.

InterPartner Conference Series promotes research and developmental activities, intensifying scientific information interchange between researchers, developers, and engineers.

5th Grabchenko's International Conference on Advanced Manufacturing Processes (InterPartner-2023), held in Odessa, Ukraine on September 5-8, 2023, was organized by the Odessa Polytechnic State University, National Technical University "Kharkiv Polytechnic Institute», Sumy State University, and International Association for Technological Development and Innovations in partnership with Poznan University of Technology.

InterPartner Conference Series chairs by Prof. Volodymyr Tonkonogyi and under the patronage of the honorary chair of Conference Prof. Anatolii Grabchenko, Rector of Odessa Polytechnic State University Prof. Gennadii Oborskyi, Rector of National Technical University «Kharkiv Polytechnic Institute» Prof. Yevhen Sokol, Rector of Sumy State University Prof. Vasyl Karpusha, and President of International Association for Technological Development and Innovations Prof. Vitalii Ivanov.

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