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National Technical University «Kharkiv Polytechnic Institute»,
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and International Association for Technological Development and Innovations

InterPartner

Grabchenko's International Conference
on Advanced Manufacturing Processes **2022**

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**4th Grabchenko's International Conference
on Advanced Manufacturing Processes
September 6-9, 2022 | Odessa, Ukraine**

Book of Abstracts

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Advanced Manufacturing Processes: Book of Abstracts of the 4th Grabchenko's International Conference on Advanced Manufacturing Processes, Odessa, Ukraine, September 6-9, 2022 / Volodymyr Tonkonogyi, Vitalii Ivanov, Ivan Pavlenko, Justyna Trojanowska (Eds.). – Sumy: IATDI, 2022. – 104 p.

Recommended by Coordination Board of International Association for Technological Development and Innovations (Protocol No. 3, May 2, 2022)

This book offers a timely snapshot of innovative research and developments at the interface between manufacturing, materials and mechanical engineering, and quality assurance. It covers various manufacturing processes, such as grinding, boring, milling, broaching, coatings, including additive manufacturing. It focuses on cutting, abrasive, stamping-drawing processes, shot peening, and complex treatment. It describes temperature distribution, twisting deformation, defect formation process, failure analysis, as well as the convective heat exchange and non-uniform nanocapillary fluid cooling, highlighting the growing role of quality control, integrated management systems, and economic efficiency evaluation. It also covers vibration damping, dynamic behavior, failure probability, and strength performance methods for aviation, heterogeneous, permeable porous, and other types of materials. Gathering the best papers presented at the 4th Grabchenko's International Conference on Advanced Manufacturing Processes (InterPartner-2022), held in Odessa, Ukraine, on September 6–9, 2022, this book offers a timely overview and extensive information on trends and technologies in manufacturing, mechanical, and materials engineering, and quality assurance. It is also intended to facilitate communication and collaboration between different groups working on similar topics and to offer a bridge between academic and industrial researchers.

Analysis of CuZn5 Tube Buckling During Producing of the Crossover Bend for Metallurgical Unit

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Crossover bends in metallurgical units are used in pipelines for cooling systems and supplying liquids and gases under pressure. Because of the active placement environment, copper-based thick-walled tubular materials such as brass of the CuZn5 type are used. Due to the small need for crossover bends replacing, their purchase is impractical, and low-tool methods should be considered for manufacturing. The expansion of the known method for bent axis parts obtained by buckling on the CuZn5 tubular blanks for the metallurgical unit's crossover bends production is proposed in this paper. The mathematical model for the stress-strain state determination at any point of a CuZn5 tubular blank under buckling has been developed. It is revealed that a Gaussian function is suited to describe the buckled tube shape for crossover bends. Collation of calculated and experimental results showed their satisfactory convergence: for change the blank axis length – 2.08%, for the deflection along the axis line – 15%, for the blank wall thickness – 6%. Dangerous zones have been identified where pipe wall folding can occur at a high upset reduction.

Volodymyr Tonkonogyi
Vitalii Ivanov
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Justyna Trojanowska

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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.

4th Grabchenko's International Conference on Advanced Manufacturing Processes (InterPartner-2022), held in Odessa, Ukraine on September 6-9, 2022, 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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