INTERNATIONAL SCIENTIFIC JOURNAL

INDUSTRY 4.0

ISSN (PRINT) 2534-8582
ISSN (WEB) 2534-997X

YEAR VIII ISSUE 4/2023



PUBLISHED BY
SCIENTIFIC TECHNICAL UNION OF MECHANICAL ENGINEERING
"INDUSTRY 4.0", BULGARIA

INTERNATIONAL SCIENTIFIC JOURNAL

INDUSTRY 4.0

YEAR VIII, ISSUE 4 / 2023

ISSN (PRINT) 2534-8582, ISSN (WEB) 2534-997X

PUBLISHER

SCIENTIFIC TECHNICAL UNION OF MECHANICAL ENGINEERING "INDUSTRY 4.0"

108, Rakovski Str., 1000 Sofia, Bulgaria
tel. (+359 2) 987 72 90,
tel./fax (+359 2) 986 22 40,
office@stumejournals.com
WWW.STUMEJOURNALS.COM

EDITOR IN CHIEF

Prof. D.Sc. Georgi Popov, DHC, Technical University of Sofia, BG

EDITORIAL BOARD

Members:
Acad. Igor Bychkov, RU
Cor. member Alexey Beliy, BY
Cor. member Svetozar Margenov, BG
Prof. Alexander Afanasyev, RU
Prof. Alexander Guts, RU
Prof. Andrzej Golabczak, PL
Prof. Bobek Shuklev, MK
Prof. Boris Gordon, EE
Prof. Branko Sirok, SI
Prof. Claudio Melchiorri, IT
Prof. Cveta Martinovska, MK
Prof. Dale Dzemydiene, LT
Prof. Dimitar Yonchev, BG
Prof. Dimitrios Vlachos, GR
Prof. Dobre Runchev, NM
Prof. Dragan Perakovic, HR
Prof. Galina Nikolcheva, BG
Prof. Galina Zhavoronkova, UA
Prof. Gerard Lyons, IE
Dr. Giovanni Pappalettera, IT
Prof. Henrik Carlsen, DK
Prof. Idilia Bachkova, BG
Prof. Idit Avrahami, IL
Prof. Inocentiu Maniu, RO
Prof. Iurii Bazhal, UA
Prof. Jürgen Köbler, DE
Prof. Jiri Maryska, CZ
Prof. Katia Vutova, BG
Prof. Lappalainen Kauko, FI
Dr. Liviu Jalba, RO
Prof. Luigi del Re, AT
Prof. Majid Zamani, DE
Dipl.-Kfm. Michael Grethler, DE
Prof. Michael Valasek, CZ
Prof. Milija Suknovic, RS
Prof. Miodrag Dashic, RS
Prof. Mohammed Taleb Obaidat, JO
Prof. Murat Alanyali, TR
Prof. Nadežda Jankelová, SK
Prof. Nafisa Yusupova, RU
Prof. Nina Bijedic, BA
Prof. Ninoslav Marina, MK
Prof. Olga Zaborovskaia, RU
Prof. Pavel Kovach, RS
Prof. Petar Kolev, BG
Prof. Peter Korondi, HU
Prof. Peter Sincak, SK
Prof. Petra Bittrich, DE
Prof. Predrag Dasic, RS
Prof. Radu Dogaru, RO
Prof. Raul Turmanidze, GE
Prof. René Beigang, DE
Prof. Rozeta Miho, AL
Prof. Salloom A. Al-Jaboori, JO
Prof. Seniye Ümit Oktay Firat, TR
Prof. Sreten Savicevic, ME
Prof. Sveto Svetkovski, MK
Prof. Tomislav Šarić, HR
Prof. Vasile Cartofeanu, MD
Prof. Vjaceslavs Bobrovs, LV
Prof. Vladyslav Alieksieiev, UA

TECHNICAL EDITORS:
M. Sc. eng. Radoslav Daskalov, Bulgaria
M. Sc. eng. Oleg Mihailov, Bulgaria

C O N T E N T S

TECHNOLOGICAL BASIS OF "INDUSTRY 4.0"

Highway monitoring using an unmanned aerial vehicle with machine vision.
Tavo Kangru, Vello Vainola, Aleksander Jänes, Nikita Pikkas 108

Industry 4.0 assembly line using mixed reality and data lake systems.
Michał Pietrzak , Jan Przepióra , Paweł Pasławski 113

Simulation Modeling for Mass Customization Furniture Production: Investigating Production Volume and Machine Load in scope of Industry 4.0 standard
Krzysztof Lalik, Rafał Rumin, G. Pawłowski, Krzysztof Jurczyk, Łukasz Gieracki, Szymon Jędrzychowski 116

DOMINANT TECHNOLOGIES IN "INDUSTRY 4.0"

Preliminary use of hydrogen for ozone concentration control
Satoru Tada, Takeshi Tanaka, Masayuki Yamauchi, Koji Kakugawa, Katia Vutova 123

Analysis of interference fit joints formed by thermal drilling technology with CNC process control
Erik Janoško, Anna Guzanová, Nikita Veligotskyi 126

Application of innovative procedures for modification of surface topography
Janette Brezinová, Miroslav Džupon, Marek Vojtko, Ján Hašuľ, Jakub Brezina 130

BUSINESS & "INDUSTRY 4.0"

The impact of the crisis as an accelerator of changes in managerial decision-making on corporate culture in the era of Industry 4.0
Nadezda Jankelova , Norbert Súkeník 135

SOCIETY & "INDUSTRY 4.0"

Identification of possible cheating on computer-based exams.
Hakik Paci, Nelda Kote 140

The impact of interactive software on teaching
Michal Bartošovič, Viola Tamášová 144

The education system in Romania and France. Comparative analysis
Monica Moraru 146