



University of Novi Sad
FACULTY OF TECHNICAL SCIENCES
DEPARTMENT OF PRODUCTION ENGINEERING
21000 NOVI SAD, Trg Dositeja Obradovica 6, SERBIA



UDK 621

ISSN 1821-4932

JOURNAL OF
PRODUCTION ENGINEERING

Volume 25

Number 2

Novi Sad, December 2022

Publisher: FACULTY OF TECHNICAL SCIENCES
DEPARTMENT OF PRODUCTION ENGINEERING
21000 NOVI SAD, Trg Dositeja Obradovica 6
SERBIA

Editor-in-chief: Dr. Pavel Kovač, *Professor, Serbia*

Technical treatment and design: Dr. Borislav Savković, *Associate Professor*

Manuscript submitted for publication: December 01, 2022.

Printing: 1st

Circulation: 100 copies

CIP classification:

*Printing by: FTN, Graphic Center
GRID, Novi Sad*

ISSN: 1821-4932

CIP – Kataholizacija u publikaciji
Biblioteka Matice srpske, Novi Sad

621

JOURNAL of Production Engineering / editor in chief
Pavel Kovač. – Vol. 12, No. 1 (2009)- . – Novi Sad :
Faculty of Technical Sciences, Department for Production
Engineering, 2009-. – 30 cm

Dva puta godišnje (2012-). Je nastavak: Časopis proizvodno
mašinstvo = ISSN
0354-6446
ISSN 1821-4932

INTERNATIONAL EDITORIAL BOARD

Dr. Aco ANTIĆ, Professor, Serbia
Dr. Joze BALIĆ, Professor, Slovenia
Dr. Sebastian BALOŠ, Professor, Serbia
Dr. Marian BORZAN, Professor, Romania
Dr. Konstantin BOUZAKIS, Professor, Greece
Dr. Miran BREZOČNIK, Professor, Slovenia
Dr. Igor BUDAK, Professor, Serbia
Dr. Ilija ČOSIĆ, Professor, Serbia
Dr. Numan DURAKBASA, Professor, Austria
Dr. Lepasava ŠIDANIN, Professor emeritus, Serbia
Dr. Dušan GOLUBOVIĆ, Professor, Bosnia and Herzegovina
Dr. Marin GOSTIMIROVIĆ, Professor, Serbia
Dr. Miodrag HADŽISTEVIĆ, Professor, Serbia
Dr. František HOLEŠOVSKY, Professor, Czech Republic
Dr. Juliana JAVOROVA, Professor, Bulgaria
Dr. Janez KOPAČ, Professor, Slovenia
Dr. Borut KOSEC, Professor, Slovenia
Dr. Leon KUKIELKA, Professor, Poland
Dr. Janos KUNDRAK, Professor, Hungary
Dr. Stanislaw LEGUTKO, Professor, Poland
Dr. Chusak LIMSAKUL, Professor, Thailand
Dr. Ognjan LUŽANIN, Professor, Serbia
Dr. Vidosav MAJSTOROVIĆ, Professor, Serbia
Dr. Ildiko MANKOVA, Professor, Slovak Republic
Dr. Mijodrag MILOŠEVIĆ, Professor, Serbia
Dr. Mladomir MILUTINOVIĆ, Professor, Serbia
Dr. Bogdan NEDIĆ, Professor, Serbia
Dr. Mircea RISTEIU, Professor, Romania
Dr. Milenko SEKULIĆ, Professor, Serbia
Dr. Mirko SOKOVIĆ, Professor, Slovenia
Dr. Antun STOIĆ, Professor, Croatia
Dr. Peter SUGAR, Professor, Slovak Republic
Dr. Katica ŠIMUNOVIĆ, Professor, Croatia
Dr. Branko ŠKORIĆ, Professor, Serbia
Dr. Ljubomir ŠOOŠ, Professor, Slovak Republic
Dr. Slobodan TABAKOVIĆ, Professor, Serbia
Dr. Branko TADIĆ, Professor, Serbia
Dr. Ljubodrag TANOVIĆ, Professor, Serbia
Dr. Marian TOLNAY, Professor, Slovak Republic
Dr. Gyula VARGA, Professor, Hungary
Dr. Đorđe VUKELIĆ, Professor, Serbia
Dr. Wojciech ZEBALA, Professor, Poland
Dr. Milan ZELJKOVIĆ, Professor, Serbia
Dr. Arkadiusz GOLA, Assoc. Professor, Poland
Dr. Simon KLANČNIK, Assoc. Professor, Slovenia
Dr. Dejan LUKIĆ, Assoc. Professor, Serbia
Dr. Arpad NYERS, Assoc. Professor, Hungary
Dr. Dragan RAJNOVIĆ, Assoc. Professor, Serbia
Dr. Borislav SAVKOVIĆ, Assoc. Professor, Serbia
Dr. Tatjana STANIVUK, Assoc. Professor, Croatia
Dr. Branko ŠTRBAC, Assoc. Professor, Serbia
Dr. Aleksandar ŽIVKOVIĆ, Assoc. Professor, Serbia
Dr. Liska KATALIN, Assist. Professor, Hungary