Advances in Materials Science Research



ADVANCES IN MATERIALS SCIENCE RESEARCH

ADVANCES IN MATERIALS SCIENCE RESEARCH VOLUME 30

No part of this digital document may be reproduced, stored in a retrieval system or transmitted in any form or by any means. The publisher has taken reasonable care in the preparation of this digital document, but makes no expressed or implied warranty of any kind and assumes no responsibility for any errors or omissions. No liability is assumed for incidental or consequential damages in connection with or arising out of information contained herein. This digital document is sold with the clear understanding that the publisher is not engaged in rendering legal, medioch or any other professional services on tributor Copy

ADVANCES IN MATERIALS SCIENCE RESEARCH

Additional books in this series can be found on Nova's website under the Series tab.

Additional e-books in this series can be found on Nova's website under the eBooks tab.

ADVANCES IN MATERIALS SCIENCE RESEARCH

ADVANCES IN MATERIALS SCIENCE RESEARCH

VOLUME 30

MARYANN C. WYTHERS EDITOR



Copyright © 2017 by Nova Science Publishers, Inc.

All rights reserved. No part of this book may be reproduced, stored in a retrieval system or transmitted in any form or by any means: electronic, electrostatic, magnetic, tape, mechanical photocopying, recording or otherwise without the written permission of the Publisher.

We have partnered with Copyright Clearance Center to make it easy for you to obtain permissions to reuse content from this publication. Simply navigate to this publication's page on Nova's website and locate the "Get Permission" button below the title description. This button is linked directly to the title's permission page on copyright.com. Alternatively, you can visit copyright.com and search by title. ISBN, or ISSN.

For further questions about using the service on copyright.com, please contact:

Copyright Clearance Center

Phone: +1-(978) 750-8400 Fax: +1-(978) 750-4470 E-mail: info@copyright.com.

NOTICE TO THE READER

The Publisher has taken reasonable care in the preparation of this book, but makes no expressed or implied warranty of any kind and assumes no responsibility for any errors or omissions. No liability is assumed for incidental or consequential damages in connection with or arising out of information contained in this book. The Publisher shall not be liable for any special, consequential, or exemplary damages resulting, in whole or in part, from the readers' use of, or reliance upon, this material. Any parts of this book based on government reports are so indicated and copyright is claimed for those parts to the extent applicable to compilations of such works.

Independent verification should be sought for any data, advice or recommendations contained in this book. In addition, no responsibility is assumed by the publisher for any injury and/or damage to persons or property arising from any methods, products, instructions, ideas or otherwise contained in this publication.

This publication is designed to provide accurate and authoritative information with regard to the subject matter covered herein. It is sold with the clear understanding that the Publisher is not engaged in rendering legal or any other professional services. If legal or any other expert assistance is required, the services of a competent person should be sought. FROM A DECLARATION OF PARTICIPANTS JOINTLY ADOPTED BY A COMMITTEE OF THE AMERICAN BAR ASSOCIATION AND A COMMITTEE OF PUBLISHERS.

Additional color graphics may be available in the e-book version of this book.

Library of Congress Cataloging-in-Publication Data

ISSN: 2159-1997

ISBN: ; 9: /3/75834/747/4"*gDqqm+

Published by Nova Science Publishers, Inc. † New York

CONTENTS

Preface		vii
Chapter 1	Transfer Processes at the Manufacture of Metal Matrix Composite Materials Ioan Carcea and Raluca Maria Florea	1
Chapter 2	Characterization, Manufacturing and Application of Metal Matrix Composites Blaža Ž. Stojanović and Saša T. Milojević	83
Chapter 3	Geocells Reinforcement Pavement Samo Peter Medved, Bojan Žlender and Stanislav Lenart	135
Chapter 4	Conditions for Necking in Neat and Filled Polyolefines Maria A. Guseva, Victor A. Gerasin, Boris F. Shklyaruk and Vadim A. Dubinskiy	189

vi Contents

Chapter 5	The Application of Fibrous Ion-Exchange	
	Sorbents for Water Treatment	
	and the Purification of Gaseous Mixtures	229
	Renat Khaydarov, Rashid Khaydarov,	
	Olga Gapurova, Ilnur Garipov, Lutfi Firdaus	
	and Emiliya Nikolova	
Index		239

In: Advances in Materials Science Research ISBN: 978-1-53612-506-1 Editor: Maryann C. Wythers © 2017 Nova Science Publishers, Inc.

Chapter 2

CHARACTERIZATION, MANUFACTURING AND APPLICATION OF METAL MATRIX COMPOSITES

Blaža Ž. Stojanović* and Saša T. Milojević University of Kragujevac, Faculty of Engineering, Kragujevac, Serbia

ABSTRACT

This chapter provides the main classification and characteristics of composite materials with metal matrix. Analyzed are the composites with metal matrix, specifically regarding to the matrix type, and type, the size and shape of reinforcements. It was also performed the classification of the composites with metal matrix from the different aspects. Of all the metals, as the matrix for the composite materials are commonly used aluminum and its alloys. The chapter specifically shows the types of composites with aluminum matrix depending on the type of reinforcement. The chapter also presents in detail the procedures to obtain composites with aluminum matrix. Special part is devoted to the application of composites with metal matrix for various parts in the

^{*} Corresponding Author Email: blaza@kg.ac.rs.

REFERENCES

- [1] M. Babić, S. Mitrović, *Tribological characteristics of composites* based on ZA alloy, Monograph, Faculty of Mechanical Engineering, Kragujevac, 2007.
- [2] A. Vencl, *Tribology of the Al-Si alloy based MMCs and their application in automotive industry*, In: L. Magagnin (ed.), Engineered Metal Matrix Composites: Forming Methods, Material Properties and Industrial Applications, Nova Science Publishers, Inc., New York, USA, (2012), 127–166.
- [3] B. Stojanović, *Tribological Behaviour of Hybrid Composites with A356 Matrix*, PhD Thesis, Faculty of Engineering, University of Kragujevac, Kragujevac, 2013.
- [4] B. Stojanovic and J. Glisovic, *Automotive Engine Materials*, In: S. Hashmi (Ed.), Reference Module in Materials Science and Materials Engineering, Elsevier, Oxford, (2016), 1–9.
- [5] A. Vencl, A. Rac and I. Bobić, *Tribology in industry*, 26, 31 (2004).
- [6] M. K. Surappa, *Sādhanā*, 28, 319 (2003).
- [7] N. Chawla and K. K. Chawla, *Metal Matrix Composites*, New York, Springer, (2006), 402.
- [8] K. U. Kainer, Metal Matrix Composites. Custom-made Materials for Automotive and Aerospace Engineering, Wiley-VCH Verlag GmbH & Co. KGa, (2006).
- [9] A. Evans, C. S. Marchi and A. Mortensen, *Metal Matrix Composites* in *Industry*, Dordrecht, the Netherlands, Kluwer Academic Publishers, (2003).
- [10] S. Veličković, S. Garić, B. Stojanović and A. Vencl, *Applied Engineering Letters*, 1, 72 (2016).
- [11] A. V. Muley, S. Aravindan and I. P. Sing, *Manufacturing Review*, 2, 1 (2015).
- [12] Vencl and A. Rac, MVM—International Journal for Vehicle Mechanics, Engines and Transportation System, 30, 115 (2004).

- [13] D. S. Prasad and C. Shoba, *Journal of Materials Research and Technology*, 3, 172 (2014).
- [14] K. A. Schwetz, *Silicon Carbide Based Hard Material*, Handbook of Ceramic Hard Materials, Riedel, R. (ed.), Wiley-VCH, Weinheim, (2000), 683.
- [15] J. P. Davim, (Ed.), *Machining of Metal Matrix Composites*, Springer, London, 2011.
- [16] T. Filetin, *Advanced materials and technologies*, Croatian Society for materials and tribology, Zagreb, 2005.
- [17] P. Rohatgi, Defence Science Journal, 43, 323 (1993).
- [18] D. J. Lloyd, International materials reviews, 39, 1 (1999).
- [19] B. Stojanović and L. Ivanović, *Technical Gazzete*, 22, 247 (2015).
- [20] S. V. Prasad and R. Asthana, Tribology Letters, 17, 445 (2004).
- [21] B. Miracle, Composites Science and Technology, 65, 2526 (2005).
- [22] N. Chawla and K. K. Chawla, JOM, 58, 67 (2007).
- [23] S. Milojević, R. Pešić and D. Taranović, *Tribology in Industry*, 37, 13 (2015).
- [24] S. Milojevic, R. Pesic and D. Taranovic, *Journal of the Balkan Tribological Association*, 21, 690 (2015).
- [25] H. Fuchs and M. Wappelhorst, *MTZ Motortechnische Zeitschrift*, 64, 868, (2003).
- [26] M. Schwaderlapp, W. Bick, M. Duesmann and J. Kauth, *MTZ Motortechnische Zeitschrift*, 65, 84 (2004).
- [27] P. Ernst and K. Fletcher, *SUMEBore thermally sprayed protective coatings for cylinder liner surfaces*, Proceedings of the 6th International MTZ Conference on Heavy-Duty On- and Off-Highway Engines, November 15-16, 2011, Kiel, Germany.
- [28] S. Milojevic and R. Pesic, *International Journal of Automotive Technology*, 13, 497 (2012).
- [29] S. Milojević, Applied Engineering Letters, 1, 16 (2016).

BIOGRAPHICAL SKETCHES



Blaža Ž. Stojanović, PhD

Affiliation: Tribology, Aluminum metal matrix composites, Tribology in machine design, Mechanical transmitters

Education: University of Kragujevac, Faculty of Engineering, Kragujevac, Serbia. Address correspondence to: blaza@kg.ac.rs

Research and Professional Experience:

M.Sc. Thesis, Faculty of Mechanical Engineering Kragujevac, Serbia (2007)

PhD Thesis:, Faculty of Engineering Kragujevac, Serbia (2013)

Member of the Organizational Board of series of international conferences in the area of tribology

Member of the Scientific Board of international conference SERBIATRIB '15, IRMES 2017

Member of the Executive Board of Serbian Tribology Society

Secretary of Serbian Tribology Society

Editor in chief of the journal "Applied Engineering Letters," ISSN: 2466- 4677, e-ISSN 2466-4847.

Member of the Editorial board of the Journal "Acta Technica Corviniensis – Bulletin of Engineering" e-ISSN: 2067-3809

Member of the Editorial board of the Journal "Annals of Faculty Engineering Hunedoara – International Journal of Engineering" ISSN: 1584-2665 (printed), e-ISSN: 1584-2673, 2466-4847 (Online)

Member of the Editorial board of the Journal "Technical diagnostics"

Journal papers:

- L. Ivanovic, S. Velickovic, B. Stojanovic, M. Kandeva, K. Jakimovska, The Selection of Optimal Parameters of Gerotor Pump by Application of Factorial Experimental Design, *FME Transactions*, Vol. 45, No.1, pp. 159-164, ISSN 1454-2092, Doi 10.5937/fmet1701159I, 2017
- 2. S. Veličković, B. Stojanović, M. Babić, I. Bobić, Optimization of tribological properties of aluminum hybrid composites using Taguchi design, *Journal of composite materials*, Vol. 0, No. 0, pp. 1-11, ISSN 0021-9983, Doi 10.1177/0021998316672294, 2016
- B. Stojanović, M. Babić, S. Veličković, J. Blagojević, Tribological behavior of aluminum hybrid composites studied by application of factorial techniques, *Tribology Transactions*, Vol. 59, No. 3, pp. 522-529, ISSN 1040-2004, Doi 10.1080/10402004.2015.1091535, 2016
- 4. B. Stojanović, M. Babić, L. Ivanović, Taguchi optimization of tribological properties of Al/SiC/graphite composite, *Journal of the Balkan tribological association*, Vol. 22, No. 3, pp. 2582-2595, ISSN 1310-4772, 2016
- 5. D. Jovanović, B. Stojanović, R. Janjić, Capacity for improving tribological characteristics of barrel interior line on a gun, *Journal of the Balkan Tribological Association*, Vol. 22, No. 1, pp. 17-27, ISSN 1310-4772, 2016
- L. Ivanović, T. Mačkić, B. Stojanović, Analysis of the instantaneous friction coefficient of the trochoidal gear pair, *Journal of the Balkan Tribological Association*, Vol. 22, No. 1, pp. 281-293, ISSN 1310-4772, 2016

- 7. M. Novaković, B. Stojanović, M. Milosavljević, S. Miladinović, The kinematic analysis of Ravigneaux planetary gear set, *Technical Diagnostics*, Vol. 15, No. 1, pp. 7-12, ISSN 1451-1975, 2016
- 8. B. Stojanović, L. Ivanović, Application of aluminium hybrid composites in automotive industry, *Tehnički vjesnik*, Vol. 22, No.1, pp. 247-251, ISSN 1330-3651, Doi DOI: 10.17559/TV-20130905094303, 2015.
- 9. B. Stojanović, M. Babić, N. Miloradović, S. Mitrović, Tribological behaviour of A356/10SiC/3Gr hybrid composite in dry-sliding conditions, Materiali in tehnologije / *Materials and technology*, Vol. 49, No. 1, pp. 117-121, ISSN 1580-2949, 2015.
- 10. B. Stojanovic, S. Velickovic, J. Blagojevic, D. Catic, Statistical analysis of roughness timing belt in operation using full factorial methods, *Journal of the Balkan Tribological Association*, Vol. 21, No. 3, pp. 514-524, ISSN 1310-4772, 2015
- 11. E. Desnica, A. Asonja, D. Mikic, B. Stojanovic, Reliability model of bearing assembly on an agricultural cardan shaft, *Journal of the Balkan Tribological Association*, Vol. 21, No. 1, pp. 38-48, ISSN 1310-4772, 2015.
- 12. N. Janjic, Z. Adamovic, D. Nikolic, A. Asonja, B. Stojanovic, Impact of diagnostics state model to the reliability of motor vehicles, *Journal of the Balkan Tribological Association*, Vol. 21, No. 2, pp. 452–463, ISSN 1310-4772, 2015
- S. Ilić, B. Stojanović, Systematization of planetary gear set configurations which are implemented in automatic transmissions, *Technical Diagnostics*, Vol. 14, No. 4, pp. 21-26, ISSN 1451-1975, 2015
- A. Vencl, I. Bobic, B. Stojanovic, Tribological properties of A356 Al-Si alloy composites under dry sliding conditions, *Industrial Lubrication and Tribology*, Vol. 66, No. 1, pp. 66-74, ISSN 0036-8792, DOI 10.1108/ILT-06-2011-0047, 2014

- 15. M. Blagojevic, N. Marjanovic, Z. Djordjevic, B. Stojanovic, V. Marjanovic, R. Vujanac, A. Disic, Numerical and experimental analysis of the cycloid disc stress state, *Technical Gazette*, Vol. 21, No. 2, pp. 377-382, ISSN 1330-3651, 2014
- B. Stojanovic, L. Ivanovic, Tribomechanical systems in design, Journal of the Balkan Tribological Association, Vol. 20, No. 1, pp. 25-34, ISSN 1310-4772, 2014
- S. Mitrovic, M. Babic, N. Miloradovic, I. Bobic, B. Stojanovic, D. Dzunic, M. Pantic, Wear Characteristics of Hybrid Composites Based on Za27 Alloy Reinforced With Silicon Carbide and Graphite Particles, *Tribology in Industry*, Vol. 36, No. 2, pp. 204-210, ISSN 0354-8996, 2014
- 18. B. Stojanovic, L. Ivanovic, A. Ilic, Experimental determination of timing belt height at inter-teeth, *Technical diagnostics*, Vol. 13, No. 1, pp. 5-10, ISSN 1451-1975, 2014
- B. Stojanović, I. Milanović, S. Milojević, A. Skulić, R. Janjić, The impact of the pre-tensioning on the load distribution of timing belt drives, *Technical diagnostics*, Vol. 13, No. 4, pp. 7-14, ISSN 1451-1975, 2014
- N. Miloradovic, B. Stojanovic, Tribological behaviour of ZA27/10SiC/1Gr hybrid composite, *Journal of the Balkan Tribological Association*, Vol. 19, No. 1, pp. 97-105, ISSN 1310-4772, 2013
- B. Stojanovic, M. Babic, S. Mitrovic, A. Vencl, N. Miloradovic, M. Pantic, Tribological characteristics of aluminium hybrid composites reinforced with silicon carbide and graphite. a review, *Journal of the Balkan Tribological Association*, Vol.19, No.1, pp. 83-96, ISSN 1310-4772, 2013
- A. Asonja, D. Mikic, B. Stojanovic, R. Gligoric, L. Savin, M. Tomic, Examination of motor oils in exploitation of agricultural tractors in process of basic treatment of plot, *Journal of the Balkan Tribological Association*, Vol. 19, No 2, 314–322 (2013), Vol. 19, No. 2, pp. 314–322, ISSN 1310-4772, 2013

- 23. L. Ivanovic, D. Josifovic, A. Ilic, B. Stojanovic, Analytical model of the pressure variation in the gerotor pump chambers, *Technics Technologies Education Management / TTEM*, Vol.8, No.1, pp. 323-331, ISSN 1840-1503, 2013
- 24. M. Babić, B. Stojanović, S. Mitrović, I. Bobić, N. Miloradović, M. Pantić, D. Džunić, Wear Properties of A356/10SiC/1Gr Hybrid Composites in Lubricated Sliding Conditions, *Tribology in Industry*, Vol.35, No.2, pp. 148-154, ISSN 0354-8996, 2013
- 25. B. Rakic, L. Ivanovic, D. Josifovic, B. Stojanovic, A. Ilic, The influence of variation in position of output shaft to load on the cardan joint cross shaft, *Mobility & Vehicle Mechanics*, Vol.39, No.1, pp. 51-64, ISSN 1450-5304, 2013
- M. Babić, B. Stojanović, S. Mitrović, I. Bobić, N. Miloradović, M. Pantić, The influence of lubricant on friction coefficient of hybrid Al-SiC-Gr composites, *Tribological Journal BULTRIB*, Vol.3, No.1, pp. 148-154, ISSN 1313-9878, 2013
- 27. S. Mitrović, N. Miloradović, M. Babić, I. Bobić, B. Stojanović, D. Džunić, Wear behaviour of hybrid ZA27/SiC/Grafhite composites under dry sliding conditions, *Tribological Journal BULTRIB*, Vol. 3, No. 1, pp. 142-147, ISSN 1313-9878, 2013
- S. Mitrović, M. Babić, B. Stojanović, N. Miloradović, M. Pantić, D. Džunić, Tribological Potential of Hybrid Composites Based on Zinc and Aluminium Alloys Reinforced with SiC and Graphite Particles, *Tribology in industry*, Vol.34, No.4, pp. 177-185, ISSN 0354-8996, 2012
- M. Blagojevic, M. Kocic, N. Marjanovic, B. Stojanovic, Z. Djordjevic, L. Ivanovic, V. Marjanovic, Influence of the Friction on the Cycloidal Speed Reducer Efficiency, *Journal of the Balkan Tribological Association*, Vol.18, No.2, pp. 217-227, ISSN 1310-4772, 2012
- B. Stojanovic, M. Babic, N. Marjanovic, L. Ivanovic, A. Ilic, Tribomechanical Systems in Mechanical Power Transmitters, *Journal of the Balkan Tribological Association*, Vol.18, No.4, pp. 497-506, ISSN 1310-4772, 2012

- 31. M. Blagojevic, N. Marjanovic, Z. Djordjevic, B. Stojanovic, A. Disic, A new design of a two-stage cycloidal speed reducer, *Journal of Mechanical Design (ASME)*, Vol.133, No.8, pp. 085001-1-085001-7, ISSN 1050-0472, http://dx.doi.org/10.1115/1.4004540, 2011
- 32. L. Ivanović, D. Josifović, A. Ilić, B. Stojanović, Tribological aspect of the kinematical analysis at trochoidal gearing in contact, *Journal of the Balkan Tribological Association*, Vol.17, No.1, pp. 37-47, ISSN 1310-4772, 2011
- 33. B. Stojanović, N. Miloradović, N. Marjanović, M. Blagojević, L. Ivanović, Length Variation of Toothed Belt during Exploitation, *Strojniški vestnik*, Vol.57, No.9, pp. 648-654, ISSN 0039-2480, Doi DOI:10.5545/sv-jme.2010.062, 2011
- B. Stojanovic, N. Miloradovic, N. Marjanovic, M. Blagojevic, A. Marinkovic, Wear of Timing Belt Drives, *Journal of the Balkan Tribological Association*, Vol.17, No.2, pp. 206-214, ISSN 1310-4772, 2011
- 35. B. Stojanovic, S. Tanasijevic, N. Marjanovic, L. Ivanovic, M. Blagojevic, Wear as the Criterion of Mechanical Transmitters Working Life, *Journal of the Balkan Tribological Association*, Vol.17, No.2, pp. 215-222, ISSN 1310-4772, 2011
- 36. L. Ivanovic, M. Eric, B. Stojanovic, A. Ilic, Determination of Tooth Clearances at Trochoidal Pump, *FME Transaction*, Vol.39, No.3, pp. 117-126, ISSN 1451-2092, 2011
- 37. L. Ivanovic, D. Josifovic, K. Zivkovic, B. Stojanovic, Cross shaft design from the aspect of capacity, *Scientific Technical Review*, Vol.61, No.1, pp. 48-53, ISSN 1820-0206, 2011
- 38. L. Ivanovic, B. Stojanovic, A. Ilic, I. Miletic, Modeling of the functional characteristics of planetary gerotor pumps, *IMK -14*, Vol.41, No.4, pp. 77-83, ISSN 0354-6829, 2011
- 39. N. Marjanovic, B. Ivkovic, M. Blagojevic, B. Stojanovic, Experimental Determination of Friction Coefficient at Gear Drives, *Journal of the Balkan Tribological Association*, Vol.16, No.4, pp. 517-526, ISSN 1310-4772, 2010

- 40. S. Tanasijevic, B. Stojanovic, N. Miloradovic, Eco-Tribological Correct Design: New Demands of Contemporary Design, *Journal of the Balkan Tribological Association*, Vol.16, No.4, pp. 608-616, ISSN 1310-4772, 2010
- 41. N. Marjanović, B. Ivković, B. Stojanović, M. Blagojević, Disk on Disk Test of Gear Pair Power Losses, *Tribology in Industry*, Vol.32, No.4, pp. 10-16, ISSN 0354-8996, 2010
- 42. B. Stojanović, L. Ivanović, M. Blagojević, Friction and Wear in Timing Belt Drives, *Tribology in Industry*, Vol.32, No.3, pp. 33-40, ISSN 0354-8996, 2010
- 43. B. Stojanović, L. Ivanović, N. Miloradović, Testing of timing belts, *IMK-14*, Vol.37, No.4, pp. 77-80, ISSN 0354-6829, 2010
- 44. B. Stojanovic, S. Tanasijevic, N. Miloradovic, Tribomechanical systems in timing belt drives, *Journal of the Balkan Tribological Association*, Vol.15, No.4, pp. 465-473, ISSN 1310-4772, 2009
- 45. N. Miloradović, B. Stojanović, D. Ćatić, Application of planetary reduction gear in operation of the two rope grab, *FME Transactions*, 2009, Vol.37, No.iss. 3, pp. 137-141, ISSN 1451-2092, 2009
- B. Stojanović, N. Miloradović, Development of timing belt drives, *Mobility & Vehicle Mechanics*, Vol.35, No.2, pp. 31-36, ISSN 1450-5304, 2009
- 47. B. Stojanović, N. Miloradović, M. Blagojević, Analysis of Tribological Processes at Timing Belt's Tooth Flank, *Tribology in Industry*, Vol.31, No. 3-4, pp. 53-58, ISSN 0354-8996, 2009
- 48. B. Stojanovic, S. Tanasijevic, N. Miloradovic, Tribomechanical systems in timing belt drives, *Journal of the Balkan Tribological Association*, Vol.15, No.4, pp. 465-473, ISSN 1310-4772, 2009

Book (Chapter):

1. B.Stojanovic, J.Glisovic, Automotive Engine Materials. In: Saleem Hashmi (editor-in-chief), Reference Module in Materials Science and Materials Engineering. Oxford: Elsevier; ISBN: 978-0-12-803581-8, 2016. pp. 1-9.

Conference papers

- 1. M.Bukvić, Ž.Petrović, B.Stojanović, S.Milojević, Models and simulations of transmission of hybrid and electric velicles, International Congress Motor Vehicles & Motors 2016, Kragujevac, 2016, 6th-8th Oktober, pp. 149-155, ISBN 978-86-6335-037-3
- L.Ivanović, S.Miladinović, B.Stojanović, M.Matejić, Application of magnetic transmission in automotive industry, International Congress Motor Vehicles & Motors 2016, Kragujevac, 2016, 6th-8th October, pp. 289-297, ISBN 978-86-6335-037-3
- R.Janjić, R.Makljenović, Z.Ilić, N.Brkljač, B.Stojanović, M.Bukvić, S.Mališić, Diagnosis of diesel vehicles using modern diagnostic software, 7th DQM International Conference ICDQM-2016, Life cycle engineering and management, prijevor, 2016, 29-30 June, pp. 407-413, ISBN 978-86-86355-32-4
- R.Janjić, B.Stojanović, M.Bukvić, S.Mališić, Impact on people in microclimate body of motor vehicles, 1st International conference on Quality of Life, Kragujevac, 2016, 9-10 June, pp. 311-315, ISBN 978-86-6335-033-5
- R.Janjić, B.Stojanović, M.Bukvić, S.Mališić, Management activities during testing vehicles with upgrades, XVIII YUCORR International Conference, Tara Mountain, Serbia, 2016, 12-15 April, pp. 398-400, ISBN 978-86-82343-24-0
- R.Janjić, M.Bukvić, B.Stojanović, Problems of production, use and recycling of motor vehicles, XVIII YUCORR International Conference, Tara Mountain, Serbia, 2016, 12-15 April, pp. 405-411, ISBN 978-86-82343-24-0
- 7. R.Janjić, M.Bukvić, B.Stojanović, S.Mališić, Impact of noise and vibrations in the people in the car with upgrades, 1st International conference on Quality of Life, Kragujevac, 2016, 9-10 June, pp. 305-309, ISBN 978-86-6335-033-5

- 8. R.Janjić, N.Brkljač, B.Stojanović, M.Bukvić, Management documented informations during testing vehicles with upgrades, XVIII YUCORR International Conference, Tara Mountain, Serbia, 2016, 12-15 April, pp. 401-404, ISBN 978-86-82343-24-0
- 9. B. Stojanović, M.Babić, S.Veličković, J.Blagojević, Optimization of wear behaviour in aluminium hybrid composites using Taguchi method, 14th international conference on tribology Serbiatrib '15, Belgrade, Serbia, 2015, 13 15 May, pp. 81-86
- N.Miloradović, S.Mitrović, B.Stojanović, Wear of ZA27/10SIC/1GR hybrid composite, DEMI 2015 12. International Conference on Accomplishments in Electrical and Mechanical Engineering and Information Technology, Banja Luka, 2015, 29th-30th May, pp. 287-292, ISBN 978-99938-39-53-8.
- 11. R.Janjić, B.Stojanović, N.Brkljač, Procedure for assessment of quality vehicles with upgrade, 42.National Conference on Quality, Kragujevac, 2015, 04-06, June, pp. A-83 -A-87, ISBN 978 86 6335 016 8.
- 12. M.Babic, S.Mitrovic, B.Stojanovic, N.Miloradovic, Tribological potential of particulate composites with ZA-27 alloy matrix, 8th International conference on tribology, Sinaia, Romania, 2014, 30thOct.-1stNov, pp. 27-37, ISBN 978-973-919-570-8.
- 13. L.Ivanovic, D.Josifovic, A.Ilic, B.Stojanovic, K.Zivkovic, Optimization of cardan joint design from load capasity aspect, International Congress Motor Vehicles & Motors 2014, Kragujevac, 2014, 9th-10th Oktober, pp. 396-404, ISBN 978-86-6335-010-6.
- L.Ivanovic, D.Josifovic, A.Ilic, B.Stojanovic, B.Rakic, Noise as aspect of life quality at urban areas, 8th International Quality Conference, Kragujevac, 2014, 23 May, pp. 175-181, ISBN 978 86 6335 004 5
- 15. B.Stojanović, M.Babić, Optimization of A356/10SiC/3Gr Hybrid Composite Wear Using Taguchi Method, 8th International conference on tribology, Sinaia, Romania, 2014, 30thOct.-1stNov., pp. 708-715, ISBN 978-973-919-570-8

- M.Babić, B.Stojanović, S.Mitrović, I.Bobić, N.Miloradović, M.Pantić, D.Džunić, Wear properties of A356/10SiC/1Gr hybrid composites in lubricated sliding conditions, 13th International Conference on Tribology, SERBIATRIB `13, Kragujevac, 2013, 15 – 17 May, pp. 129-134, ISBN 978-86-86663-98-6
- 17. B.Stojanović, L.Ivanović, A.Ilić, I.Miletić, Experimental analysis of tooth height changing at timing belts, 13th International Conference on Tribology, SERBIATRIB `13, Kragujevac, 2013, 15 17 May, pp. 226-229, ISBN 978-86-86663-98-6
- L.Ivanovic, A.Ilic, B.Stojanovic, K.Zivkovic, The influence of design modifications of cardan shaft driven fork on its stress distribution, 7th International Quality Conference, Kragujevac, 2013, 23-25 May, pp. 441-446, ISBN 978-86-86663-94-8
- N.Miloradović, R.Vujanac, D.Miloradović, B.Stojanović, Use of working platforms on forklift trucks, 11th International Conference on Accomplishments in Electrical and Mechanical Engineering and Information Technology DEMI 2013, Banja Luka, 2013, May, 30th -June, 1st, pp. 1177-1182, ISBN 978-99938-39-46-0
- S.Mitrović, M.Babić, N.Miloradović, I.Bobić, B.Stojanović, D.Džunić, Wear characteristics of hybrid composites based on ZA27 alloy reinforced with silicon carbide and graphite particles, 13th International Conference on Tribology, SERBIATRIB `13, Kragujevac, 2013, 15 – 17 May, pp. 141-146, ISBN 978-86-86663-98-6
- M.Blagojevic, Z.Djordjevic, V.Marjanovic, N.Marjanovic, B.Stojanovic, R.Vujanac, Stress and strain state of cycloid disc, COMETa 2012, Jahorina B&H, 2012, 28-30 November, pp. 367-374, ISBN 978-99938-655-5-1
- L.Ivanovic, D.Josifovic, B.Rakic, B.Stojanovic, A.Ilic Shape variations influence on load capacity of cardan joint cross shaft, The 7th International Symposium KOD 2012, Balatonfured, Hungary, 2012, 24-26 may, pp. 205-210, ISBN 978-86-7892-399-9

- 23. L.Ivanovic, D.Josifovic, B.Rakic, B.Stojanovic, A.Ilic, The influence of variation in position of output shaft to load on the cardan joint cross shaft, International Congress Motor Vehicles & Motors 2012, Kragujevac, 2012, 3-5.10, pp. 227-236, ISBN 978-86-86663-90-0
- L.Ivanovic, D.Josifovic, M.Blagojevic, B.Stojanovic, A.Ilic, Determination of gerotor pump theoretical flow, COMETa 2012, Jahorina, B&H, 2012, 28-30 November, pp. 243-250, ISBN 978-99938-655-5-1
- 25. L.Ivanovic, D.Josifović, B.Stojanović, A.Ilić, Design improvements of equipment for electornic waste recycling 39. National Conference on Quality, Kragujevac, 2012, 7-9.6.2012, pp. A275 A281, ISBN 978-86-86663-83-2.
- M.Blagojević, N.Marjanović N., Z.Đorđević, B.Stojanović, Stress and strain state of single stage cycloidal speed reducer, The 7th International scientific conference IRMES 2011, Zlatibor, Serbia, 2011, 27 i 28 april, pp. 553-558, ISBN 978-86-6055-012-7
- M.Blagojević, N.Marjanović, B.Stojanović, Z.Đorđević, M.Kočić, Influence of friction on the force distribution at cycloidal speed reducer, 12th International conference on Tribology SERBIATRIB'11, Kragujevac, Serbia, 2011, 11-13 maj, pp. 226-229, ISBN 978-86-86663-74-0
- 28. L.Ivanović, D.Josifović, A.Ilić, B.Stojanović, Specific sliding of the trochoidal gearing at the gerotor pump, 12th International conference on Tribology SERBIATRIB'11, Kragujevac, Serbia, 2011, 11-13 maj, pp. 250-256, ISBN 978-86-86663-74-0
- N.Marjanović, B.Isailović, B.Stojanović, Z.Đorđević, Integration of topology and shape optimization into the process of the design of mechanical structures elements, The 7th International scientific conference IRMES 2011, Zlatibor, Serbia, 2011, 27 i 28 april, pp. 49-56, ISBN 978-86-6055-012-7
- 30. I.Milanović, B.Stojanović, M.Blagojević, N.Marjanović, Influence of torque variation on timing belt drive's load distribution, The 7th International scientific conference IRMES 2011, Zlatibor, Serbia, 2011, 559-562, pp. 559-562, ISBN 978-86-6055-012-7

- 31. N.Miloradović, R.Vujanac, B.Stojanović, Stacking aisle width for forklift trucks in palletized storage and handling systems, 10th Anniversary International Conference on Accomplishments in Electrical and Mechanical Engineering and Information TechnologyDEMI 2011, Banja Luka, 2011, 26th 28th May 2011, pp. 899-904, ISBN 978-99938-39-36-1
- 32. S.Mitrović, M.Babić, B.Stojanović, N.Miloradović, Tribological potencial of hybrid composites based on zinc and aluminium alloys reinforced with sic and graphite particles, 12th International conference on Tribology SERBIATRIB'11, Kragujevac, Serbia, 2011, 11-13 maj, pp. 138-145, ISBN 978-86-86663-74-0
- 33. B.Stojanović, S.Tanasijević, N.Marjanović, M.Blagojević, Failure analysis of the timing belt drives, 12th International conference on Tribology SERBIATRIB'11, Kragujevac, Serbia, 2011, 11-13 maj, pp. 210-215, ISBN 978-86-86663-74-0
- 34. K.Živković, L.Ivanović, B.Stojanović, The effect of geometry on the stress distribution of cross shaft, The 7th International scientific conference IRMES 2011, Zlatibor, Serbia, 2011, 27 i 28 april, pp. 245-252, ISBN 978-86-6055-012-7
- 35. L.Ivanović, K.Živković, B.Stojanović, Design of cross shaft from the aspect of capacity, 38. National Conference on Quality, Kragujevac, 2011, 19-21.5.2011, pp. A97-A102, ISBN 978-86-8663-69-6



Saša T. Milojević, PhD

Affiliation: Motor Vehicles and IC Engines, Alternative fuels and alternative drive systems, Tribology, Mechanical engineering.

Education: University of Kragujevac, Faculty of Engineering, Kragujevac, Serbia. Address correspondence to: sasa.milojevic@kg.ac.rs

Research and Professional Experience:

MSc Thesis, University of Kragujevac, Faculty of Mechanical Engineering, Kragujevac, Serbia (2005)

PhD Thesis, University of Kragujevac, Faculty of Engineering, Kragujevac, Serbia (2014)

Member and secretary of the Organizational and Scientific Board of series of international conferences in the area of Motor Vehicles and Engines

Associate technical Editor of the journal "Applied Engineering Letters," ISSN: 2466- 4677, e-ISSN: 2466-4847

Journal papers

1. Radivoje B. Pešić, Saša t. Milojević, and Stevan P. Veinović. (2010). Benefits and challenges of variable compression ratio at diesel engines. *Thermal Science*, 14, 4, 1063-1073. DOI 10.2298/TSCI10041063P, ISSN 0354-9836.

- 2. S. Milojevic and R. Pesic. (2012). Theoretical and experimental analysis of a CNG cylinder rack connection to a bus roof. International Journal of Automotive Technology, 13, 3, 497-503. DOI 10.1007/s12239-012-0047-y, eISSN 1976-3832.
- 3. R. Pesic and S. Milojevic. (2013). Efficiency and ecological characteristics of a VCR diesel engine. *International Journal of Automotive Technology*, 14, 5, 675-681. DOI 10.1007/s12239-013-0073-4, e-ISSN 1976-3832.
- 4. S. Milojevic, R. Pesic, D. Taranovic. (2015). Tribological optimisation of reciprocating machines according to improving performance. *Journal of the Balkan Tribological Association*, 21, 3, 690-699. ISSN 1310-4772, SciBulCom Ltd.
- 5. S. Milojević, R. Pešić, D. Taranović, Tribological Principles of Constructing the Reciprocating Machines, *Tribology in Industry*, Vol.37, No.1, pp. 13-19, ISSN 0354-8996, 2015.
- Branimir LJ. Milosavljević, Radivoje B. Pešić, Dragan S. Taranović, Aleksandar LJ. Davinić and Saša T. Milojević, Measurements and modeling pollution from traffic in a street canyon: Assessing and Ranking the Influences, *Thermal Science*, Vol.19, No.6, pp. 2093-2104, ISSN 0354-9836, Doi 10.2298/TSCI150402111M, 2015.
- 7. Saša Milojević, Dobrosav Gročić, Dragić Dragojlović. (2016). CNG propulsion system for reducing noise of existing city buses. *Journal of Applied Engineering Science*, 14, 3, 377-382, doi: 10.5937/jaes14-10991. ISSN 1451-4117. UDC: 33.
- 8. Milojević Saša, Pešić radivoje, Davinić Aleksandar, Veinović Stevan. (2006). Influence of variable compression ratio on characteristics of diesel engine. University of Pitesti, Faculty of Mechanics and Technology, *Scientific Bulletin Automotive Series*, 12, 16, 193-203. ISSN 1453-1100.
- 9. Saša Milojević, Radivoje Pešić. (2011). CNG buses for clean and economical city transport. Mobility & Vehicle Mechanics, *International Journal for Vehicle Mechanics, Engines and Transportation Systems*, 37, 4, 57-71. ISSN 1450-5304.

- 10. Milojević S., Pešić R. (2011). Logistics of natural application gas as engine fuel. Jumto, *Journal Tractors and Power Machines*, Novi Sad, ISSN 0354-9496(2011) 16: 2, p. 68-74, UDK 621.43; 629.1, COBISS.SR-ID 140062983 (In Serbian).
- 11. Milojević S., Pešić R., Taranović D. (2012). Reciprocating compressor valve designs and conditions of modeling, *Journal Tractors and Power Machines*, Novi Sad, ISSN 0354-9496(2012) 17: 2/3, p. 71-77, UDK 621.629 (In Serbian).
- 12. Saša Milojević, Radivoje Pešić, Dušan Gordić. (2013). Natural gas as a safe technology for clean urban vehicles. Mobility & Vehicle Mechanics, International *Journal for Vehicle Mechanics, Engines and Transportation Systems*, 39, 1, 7-24. ISSN 1450-5304. UDC: 629.1.07.
- 13. Milojević S., Filipović N., Pešić R. (2013). Heat exchange between the gas and cylinder in reciprocating compressor, *Journal Tractors and Power Machines*, Novi Sad, Biblied: 0354-9496(2013) 18: 3, p. 12-18. UDK: 621.797:629.114.41 (In Serbian).
- 14. Milojević S., Pešić R., Taranović D., Davinić A. (2013). The valve plate lift measurement in the experimental reciprocating compressor, *Journal Tractors and Power Machines*, Novi Sad, Biblied: 0354-9496(2013) 18: 3, p. 19-25. UDK: 621.797:629.114.41 (In Serbian).
- 15. Dobrivoje Ninković, Dragan Taranović, Saša Milojević, Radivoje Pešić. (2013). Modelling valve dynamics and flow in reciprocating compressors. Mobility & Vehicle Mechanics, *International Journal for Vehicle Mechanics, Engines and Transportation Systems*, 39, 3, 46-63. ISSN 1450-5304. UDC: 629.3.018.2.
- Saša Milojević, Nenad Ilić, Radivoje Pešić. (2014). Application of hydrogen as alternative fuel for propulsion systems in city buses overview. Mobility & Vehicle Mechanics, *International Journal for Vehicle Mechanics, Engines and Transportation Systems*, 40, 3, 69-84. ISSN 1450-5304. UDC: 629.341; 621.6.028.

- Blaža Stojanović, Ivan Milanović, Saša Milojević, Aleksandar Skulić, Radomir Janjić. (2014). The impact of the pre-tensioning on the load distribution of timing belt drives. *The Journal of Technical Diagnostics*, 13, 4, 7-14. ISSN 1451-1975. COBISS.SR-ID 107426572.
- 18. Milojević S., Pešić R., Application of biomethane in motor vehicles, Journal Tractors and Power Machines, Vol.19, No.4, pp. 16-25, ISSN 0354-9496-2014, 2014. (In Serbian).
- 19. Milojević S., Pešić R., Taranović D., Tribological solution in reciprocating machines development, *Journal Tractors and Power Machines*, Vol.19, No.3, pp. 79-87, ISSN 0354-9496-2014, 2014. (In Serbian).
- 20. Milojević S., Pešić R., Taranović D., Coating for cylinder liner of aluminium inside reciprocating compressors, *Journal Tractors and Power Machines*, Vol.20, No.3/4, pp. 67-73, ISSN 0354-9496, 2015. (In Serbian).
- 21. Saša Milojević, Radivoje Pešić, Dragan Taranović, Aleksandar Davinić. (2016). Tribological optimization of reciprocating machines according to improving performance. Mobility & Vehicle Mechanics, *International Journal for Vehicle Mechanics, Engines and Transportation Systems*, 42, 1, 29-44. ISSN 1450-5304. UDC: 629.014.6.
- 22. Milojević S., Pešić R. Designing system for fire protection of buses on natural gas, *Journal Tractors and Power Machines*, 0354-9496(2016) 21: 2/3, p. 63-69 (In Serbian).
- 23. Saša Milojević. (2016). Reconstruction of existing city buses on diesel fuel for drive on hydrogen. *Applied Engineering Letters*, 1, 1, 16-23. ISSN 2466-4677, e-ISSN 2466-4847.

Conference papers

- 1. Pešić Radivoje, Milojević Saša, Davinić Aleksandar, Veinović Stevan, Virgiliu Dan Negrea, Pop Gheorghe. (2005). The experimental VCR diesel engine and determination of double vibe function parameters. The IX-th International Congress Automotive and Environment, CAR 2005, Pitesti, 2-4.11. Proceedings CAR20051028, 1-10, ISBN 973-690-450-4.
- Saša Milojević, Radivoje Pešić, Aleksandar Davinić, Radomir Pavlović, Stevan Veinović. (2006). Influence of the compression ratio on combustion and emissions parameters of the diesel engine. International Congress Motor Vehicles & Motors 2006, Kragujevac, October 4th-6th, Proceedings MVM20060075, pp. 1-12, ISBN 86-80581-94-1.
- 3. Saša MILOJEVIĆ, Radivoje PEŠIĆ, Zoran VUJOVIĆ, Nenad ILIĆ, Ivana MILOJEVIĆ. (2010). CNG buses for clean and economical city transport. International Congress Motor Vehicles & Motors 2010, Kragujevac, October 7th-9th, 2010, Proceedings (Radonjić D., Pešić R.), MVM2010-039, pp. 319-328, ISBN 978-86-86663-57-3.
- 4. Milojević Saša, Pešić Radivoje. (2011). Logistics of application natural gas on buses. CAR 2011, The 10th International Automotive Congress "Automotive engineering and environment," University of Pitesti, Romania, 2 4 November 2011, Proceedings CAR2011_1105, pp. 1-10, ISSN 1453-1100.
- Dobrivoje Ninković, Dragan Taranović, Saša Milojević, Radivoje Pešić. (2012). Modelling valve dynamics and flow in reciprocating compressors – a survey. International Congress Motor Vehicles & Motors 2012, Kragujevac, October 3rd-5th, 2012, Proceedings (Pešić R, Lukić J.), MVM2012-022, pp. 113-125, ISBN 978-86-86663-91-7.

- 6. Dobrivoje Ninković, Dragan Taranović, Saša Milojević, Radivoje Pešić. (2012). A review of models for predicting instantaneous heat exchange between the gas and cylinder in reciprocating compressors. International Congress Motor Vehicles & Motors 2012, Kragujevac, October 3rd-5th, 2012, Proceedings (Pešić R, Lukić J.), MVM2012-023, pp. 126-136, ISBN 978-86-86663-91-7.
- 7. Saša Milojević, Dušan Gordić, Radivoje Pešić. (2012). Natural gas as a safe technology for clean urban vehicles. International Congress Motor Vehicles & Motors 2012, Kragujevac, October 3rd-5th, 2012, Proceedings (Pešić R, Lukić J.), MVM2012-066, pp. 269-279, ISBN 978-86-86663-91-7.
- MILOJEVIC SASA, PESIC RADIVOJE. (2014). Benefit and restrictions related to the application of natural gas as engine fuel for city buses. 13th International Conference on Clean Energy 2014 (ICCE-2014), Istanbul, Turkey, June 8-12, 2014, pp. 1-8, ISBN 978-605-64806-0-7
- 9. Sasa Milojevic. (2014). Optimization of the Hydrogen System for City Busses with Respect to the Traffic Safety. 20th World Hydrogen Energy Conference (WHEC 2014), KDJ Convention Center, Gwangju Metropolitan City, South Korea, June 15-20, 2014, Proceedings, pp. 853-861, ISBN: 978-1-63439-655-4.
- Saša MILOJEVIĆ, Nenad ILIĆ. (2014). Application of hydrogen as an alternative fuel for propulsion systems in city buses overview. International Congress Motor Vehicles & Motors 2014, Kragujevac, October 9th-10th, 2014, Proceedings (Krstić B., Taranović D.), MVM2014-013, pp. 268-275, ISBN 978-86-6335-010-6.
- 11. Saša MILOJEVIĆ, Radivoje PEŠIĆ, Dragan TARANOVIĆ, Aleksandar DAVINIĆ. (2014). Tribological optimization of reciprocating machines according to improving performance. International Congress Motor Vehicles & Motors 2014, Kragujevac, October 9th-10th, 2014, Proceedings (Krstić B., Taranović D.), MVM2014-053, pp. 372-382, ISBN 978-86-6335-010-6.

- 12. Saša Milojević, Radivoje Pešić. (2015). Application of biomethane in propulsion and mobile systems. DEMI 2015, 12th International Conference on Accomplishments in Electrical and Mechanical Engineering and Information Technology, Banja Luka, 29th 30th May 2015. Proceedings, 681-686. ISBN 978-99938-39-53-8.
- 13. Aleksandar Davinić, Radivoje Pešić, Dragan Taranović, Saša Milojević. (2015). The use of modern fuels in diesel engines of the older generation. DEMI 2015, 12th International Conference on Accomplishments in Electrical and Mechanical Engineering and Information Technology, Banja Luka, 29th 30th May 2015. Proceedings, 703-712. ISBN 978-99938-39-53-8.
- 14. Saša Milojević, Radivoje Pešić, Aleksandar Davinić, Dragan Taranović,. (2015). Coated al piston as technological solution to lowering of friction losses inside IC engine. DEMI 2015, 12th International Conference on Accomplishments in Electrical and Mechanical Engineering and Information Technology, Banja Luka, 29th 30th May 2015. Proceedings, 741-746. ISBN 978-99938-39-53-8.
- 15. Saša Milojević, Radivoje Pešić. (2015). Application Natural Gas on City Buses and Their Introduction in the Traffic. SimTerm 2015, 17th Symposium on Thermal Science and Engineering of Serbia, Republic of Serbia, Sokobanja, October, 20–23, 2015. Proceedings, 987-993. ISBN 978-86-6055-076-9. Publisher: University of Niš, Faculty of Mechanical Engineering in Niš.
- Saša Milojević, Radivoje Pešić, Dragan Taranović. (2016). Fire safety of cng buses proper experiences. International Congress Motor Vehicles & Motors 2016, Kragujevac, October 9th-10th, 2016, Proceedings (Lukić J., Taranović D.), mvm2014-035, pp. 97-106, ISBN 978-86-6335-037-3.

- Milan Bukvić, Živojin Petrović, Blaža Stojanović, Saša Milojević. (2016). Models and Simulations of Transmission of Hybrid and Electric Vehicles. International Congress Motor Vehicles & Motors 2016, Kragujevac, October 9th-10th, 2016, Proceedings (Lukić J., Taranović D.), MVM2014-059, pp. 149-155, ISBN 978-86-6335-037-3.
- 18. Saša Milojević, Jovanka Lukić, Radivoje Pešić. (2013). Contribution to the reduction of traffic noise by application of the CNG buses. DEMI 2013, 11th International Conference on accomplishments in electrical and mechanical engineering and information technology, Banja Luka, 30th May 1st June 2013. Proceedings, 873-878. ISBN 978-99938-39-46-0, COBISS.BH-ID 3729176.
- Dragan Taranović, Radivoje Pešić, Aleksandar Davinić, Saša Milojević. (2013). Thermodynamic characteristics of reciprocating compressors for motor vehicles. DEMI 2013, 11th International Conference on accomplishments in electrical and mechanical engineering and information technology, Banja Luka, 30th May 1st June 2013. Proceedings, 955-960. ISBN 978-99938-39-46-0, COBISS.BH-ID 3729176.

Registered patents

1. S. Milojević, N. Ilić, Z. Vujović, Mounting the compressed natural gas storage tanks on the top of the bus roof with the steel roof racks, Intellectual Property Office of the Republic of Serbia, Patent No. 52021, Belgrade, 2012.