

PROBLEMY EKSPLOATACJI

MAINTENANCE PROBLEMS

no 4/2016





Problemy Eksplotacji – Maintenance Problems

Scientific quarterly of the Institute for Sustainable Technologies – National Research Institute (ITEE – PIB)

Information about articles printed in the Journal can be fund in the following three renowned databases:

- Index Copernicus – the international specialized platform promoting scientific achievements, and supporting national and international collaboration between scientists, publishers of scientific journals and R&D units;
- BazTech – bibliographic and abstract database about Polish technical journals, in which articles from selected Polish journals in the field of technical sciences and environmental protection are stored;
- TEMA (Technology and Management) WTI-Frankfurt eG, Frankfurt am Main.

Articles are reviewed by reviewers constantly cooperating with the Journal. The list of them is presented on the website of the Journal:

<http://www.problemyeksploatacji.itee.radom.pl/index.php/wskazówki/lista-recenzentów.html>

EDITORS

Editor-in-chief – Prof. Adam MAZURKIEWICZ

Deputy editor – Marian GRĄDKOWSKI, PhD

Secretary – Beata BELINA, PhD

Thematic editors:

- | | |
|------------------------|--|
| Prof. Tomasz Giesko | – mechatronic and optomechatronic systems, oprtomechatronic measurement methods; |
| Joanna Łabędzka, PhD | – knowledge transformation systems, IT platforms, technology transfer, foresight; |
| Andrzej Majcher, PhD | – control systems, metrology; |
| Marian Grądkowski, PhD | – biotechnologies, ecology, operational fluids management; |
| Beata Poteralska, PhD | – innovations, technology transfer, foresight; |
| Prof. Jerzy Smolić | – surface engineering, hybrid technologies, materials test methods; |
| Andrzej Zbrowski, PhD | – basis for the design and construction of machines, operational and standardization tests |

Adress:

ul. K. Pułaskiego 6/10, 26-600 Radom

tel. (0-48) 364-42-41 w. 298, fax (0-48) 364-47-60

e-mail: beata.belina@itee.radom.pl

Journal co-funded by the Ministry of Science and Higher Education

ISSN 1232-9312

© Copyright by Institute for Sustainable Technologies – National Research Institute (ITEE – PIB), Radom 2016

Editing: Andrzej Kirsz, Joanna Iwanowska

Edition: 200 copies.

2634. publication of the Institute for Sustainable Technologies – National Research Institute (ITEE – PIB)

ITEE – PIB Press

K. Pułaskiego 6/10, 26-600 Radom, tel. (0048) 48 364-42-41, fax (048) 364-47-65
e-mail: instytut@itee.radom.pl <http://www.itee.radom.pl>

PROBLEMY
EKSPLOATACJI
**MAINTENANCE
PROBLEMS**

4/2016 (103)

Contents

- | | |
|--|----|
| 1. MROZIŃSKI Stanisław, DOLNY Andrzej, HAWRYLUK Marek, JAKUBIK Joanna: Influence of elevated temperature on low cycle properties of WCLV/1.2344 steel | 7 |
| 2. GARBACZ Piotr, CZAJKA Piotr: Vision techniques for the inspection of tableware glass products | 17 |
| 3. KACPRZYŃSKA-GOŁACKA Joanna, SŁOMKA Zbigniew, CZAJKA Piotr, CZARNECKI Krzysztof, BOGDAŃSKI Bogdan, RYDZEWSKI Michał, MAZURKIEWICZ Adam, SMOLIK Jerzy: An analysis of the wetting angle of liquid glass on multicomponent coatings obtained by means PVD methods | 31 |
| 4. KACPRZYŃSKA-GOŁACKA Joanna, SŁOMKA Zbigniew, CZARNECKI Krzysztof, BOGDAŃSKI Bogdan, RYDZEWSKI Michał, MAZURKIEWICZ Adam, SMOLIK Jerzy: Analysis of the tribological resistance of coatings dedicated to improving the durability of tools used in the glass forming process .. | 43 |

5. RYDZEWSKI Michał, KACPRZYŃSKA-GOŁACKA Joanna, SŁOMKA Zbigniew, MAZURKIEWICZ Adam, SMOLIK Jerzy: **The impact of magnetron source power on mechanical properties and phase composition of TiB₂ coatings** 53
6. MIZIOŁEK Mariusz, OLIK Roman, HERMANOWICZ Paweł, RATAJSKI Jerzy: **An innovative control system for the gas nitriding process including an interactive module to predict the results of the process** ... 63
7. KOMOREK Andrzej, GODZIMIRSKI Jan: **The selected aspects of the research into impact loading of adhesive joints in block samples – comparison of different ways of applying the load** 77
8. MICHALSKI Rajmund, JANISZEWSKA Jolanta: **Ion chromatography – a method of choice for the determination of ionic species in waters and waste waters** 93
9. SUŁEK Marian Włodzimierz, SEWERYN Artur, BĄK-SOWIŃSKA Anna, BUJAK Tomasz: **Ecological cutting fluids** ... 107
10. RUMIANOWSKI Roman, JÓZEFCZYK Izabela: **Wavelet analysis of time-of-flight ion mass spectrometry signals** 119

| | |
|---|-----|
| 11. SWAT Marek: The energy efficiency and ecological benefits of low-power furnaces powered by secondary biofuel | 127 |
| 12. ADAMKIEWICZ Andrzej, POJAWA Bogdan: Operational diagnostics of damage to heat exchange surfaces of high-pressure recuperation exchangers in a block of a heat and power generating plant | 141 |
| 13. ZBROWSKI Andrzej, KOZIOŁ Stanisław, JÓZWIK Wojciech, PRYMON Marek: A concept of a thermal comfort system with energy storage in structure of the building | 155 |
| 14. KOZIOŁ Stanisław, SAMBORSKI Tomasz, ZBROWSKI Andrzej: Monorail mobile platform | 165 |
| 15. BONDARUK Jan, GIEROSZKA Agnieszka, KRUCZEK Mariusz: Role of specialist observatories in regional innovative development | 177 |

