POLISH ACADEMY OF SCIENCES COMMITTEE OF TRANSPORT

ARCHIVES OF QUARTERLY TRANSPORT

ARCHIWUM TRANSPORTU

ISSN 0866-9546

volume 30 issue 2 Warsaw 2014

Detailed instructions for authors and contacts to editors can be found on journal's webpage: www.archivesoftransport.com				
The Archive of Transport is indexed by the Polish Ministry of Science and Higher Education (6 points).				
All articles are peer-reviewed by two external reviewers. Reviewers list is published once each year in the last issue of the journal and also on journal's webpage.				
Copyright © 2014 by Polish Academy of Sciences.				
All rights reserved. No part of this publication may be modified, reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopying, recording, or by any information storage and retrieval system, without permission in writing from publisher.				
Printed by PAN Warszawska Drukarnia Naukowa, 00-656 Warszawa, ul. Śniadeckich 8.				
Circulation 200 copies.				

THE ARCHIVES OF TRANSPORT

Editor-in-Chief

Marianna Jacyna,

Warsaw University of Technology, Poland;

Editorial Committee

Andrzej Chojnacki, Andrzej Szarata, Military University of Technology, Cracow University of Technology, Poland: Poland: Agnieszka Merkisz-Guranowska, Adam Weintrit. Poznan University of Technology, Gdynia Maritime University, Poland: Poland:

Editorial Advisory Board

Chairman **Deputy Chairman** Marian Tracz. Jerzy Kisilowski, Cracow University of Technology, Poland; University of Technology and Humanities, Poland;

Membres

Salvatore Cafiso. Raffaele Mauro. University of Catania, Italy; University of Trento, Italy; Jan Celko, Larry Rillett, University of Zilina, Slovakia; University of Nebraska, USA; Csaba Koren, Efim N.Rozenberg, Széchenyi István University of Applied Sciences, Moscow Institute of Railway Engineering (MIIT), Hungary; Russia: Bogusław Liberadzki, Kumares Sinha. Warsaw School of Economics, Poland; Purdue University, USA;

Statistical Editor

Editorial Secretary Tomasz Ambroziak. Konrad Lewczuk. Warsaw University of Technology, Poland; Warsaw University of Technology, Poland; Jolanta Żak. Warsaw University of Technology, Poland;

Linguistic Editor

Joseph Woodburn. University of Bristol, United Kingdom;

Ghostwriting Firewall

Emilian Szczepański. Warsaw University of Technology, Poland;

Associate Editors (Subject Editors)

Transport Engineering

Air Transport Jerzy Manerowski,

Andrzej Chudzikiewicz,

Warsaw University of Technology, Poland;

Warsaw University of Technology, Poland; Radim Lenort.

Jozsef Rohacs.

VŠB-Technical University of Ostrava, Czech Republic;

Budapest University of Technology and Economics, Hungary;

Transport Infrastructure and Management

Maritime Transport

Gebhard Hafer.

Zbigniew Burciu,

University of Applied Sciences in Berlin, Germany; Edward Michlowicz.

Gdynia Maritime University, Poland; LU Huaging,

AGH University of Science and Technology, Poland;

Zhejiang Ocean University, China;

Optimization and Algorithmic in Transport

Ecology of Transport

Tadeusz Nowicki, Military University of Technology, Poland; Askoldas Podviezko. Vilnius Gediminas Technical University, Lithuanian;

Jerzy Merkisz, Poznan University of Technology, Poland; Vitalii Naumov. Kharkov National Automobile and Highway University, Ukraine;

Logistics Engineering

Telematics in Transport

Goran Dukic.

Vladimir Hahanov. Kharkov National University of Radioelectronics,

University of Zagreb, Croatia; Tomasz Nowakowski.

Ukraine: Mirosław Siergiejczyk,

Wroclaw University of Technology, Poland;

Warsaw University of Technology, Poland;

Railway Transport

Transport Safety

Yury V. Diomin, Kyiv University of Transport Economy & Technologies, Ukraine; Andrzei Lewiński. *University of Technology and Humanities, Poland;*

Geza Tarnai, Budapest University of Technology and Economics Hungary; George P. Sakellaropoulos,

Aristotle University of Thessaloniki, Greece;

Road Transport

Mobility in Transport

Dusan Malindzak, Technical University of Košice, Slovakia; Juan Carlos Villa, Texas A&M Transportation Institute, USA;

Włodzimierz Choromański, Warsaw University of Technology, Poland; Burford J. Furman. San Jose State University, USA;

Editorial Committee Contact:

THE ARCHIVES OF TRANSPORT

Faculty of Transport, Warsaw University of Technology Koszykowa 75, 00-662 Warsaw Poland E-mail: archivessecretary@wt.pw.edu.pl

Phone: +48 22 234-58-55

Contents