

# **19th EURO Working Group on Transportation Meeting (EWGT 2016)**

Transportation Research Procedia Volume 22

Istanbul, Turkey  
5 – 7 September 2016

## **Editors:**

**Hilmi Berk Celikoglu  
Abdullah Hilmi Lav  
Mehmet Ali Silgu**

ISBN: 978-1-5108-4088-1

**Printed from e-media with permission by:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571



**Some format issues inherent in the e-media version may also appear in this print version.**

Copyright© by Elsevier B.V.  
All rights reserved.

Printed by Curran Associates, Inc. (2017)

For permission requests, please contact Elsevier B.V.  
at the address below.

Elsevier B.V.  
Radarweg 29  
Amsterdam 1043 NX  
The Netherlands

Phone: +31 20 485 3911  
Fax: +31 20 485 2457

<http://www.elsevierpublishingsolutions.com/contact.asp>

**Additional copies of this publication are available from:**

Curran Associates, Inc.  
57 Morehouse Lane  
Red Hook, NY 12571 USA  
Phone: 845-758-0400  
Fax: 845-758-2633  
Email: [curran@proceedings.com](mailto:curran@proceedings.com)  
Web: [www.proceedings.com](http://www.proceedings.com)

# TABLE OF CONTENTS

<b>EDITORIAL</b> .....	1
<i>Hilmi Berk Celikoglu, Abdullah Hilmi Lav, Mehmet Ali Silgu</i>	
<b>THE CROSSING SPEED AND SAFETY MARGIN OF PEDESTRIANS AT SIGNALIZED INTERSECTIONS</b> .....	3
<i>Pelin Onelcin, Yalcin Alver</i>	
<b>STOCHASTIC USER EQUILIBRIUM IN THE PRESENCE OF INERTIA</b> .....	13
<i>Claudia Castaldi, Paolo Delle Site, Francesco Filippi</i>	
<b>DEFINITION OF USER GROUPS APPLYING WARD'S METHOD</b> .....	25
<i>Domokos Eszergár-Kiss, Bálint Caesar</i>	
<b>DEVELOPING A PERFORMANCE INDICATORS LEAN-SIGMA FRAMEWORK FOR MEASURING AVIATION SYSTEM'S SAFETY PERFORMANCE</b> .....	35
<i>Ilias Panagopoulos, Chris Atkin, Ivan Sikora</i>	
<b>EXPLOITING SMARTCARD DATA TO ESTIMATE DISTRIBUTIONS OF PASSENGERS' WALKING SPEED AND DISTANCES ALONG AN URBAN RAIL TRANSIT LINE</b> .....	45
<i>Fabien Leurent, Xiaoyan Xie</i>	
<b>COGNITIVE LEARNING APPROACH FOR TRAVEL DEMAND MODELING: ESTIMATION RESULTS</b> .....	55
<i>Sehnaz Cenani, Theo A. Arentze, Harry J. P. Timmermans</i>	
<b>A TRANSIT BOTTLENECK MODEL FOR OPTIMAL CONTROL STRATEGIES AND ITS USE IN TRAFFIC ASSIGNMENT IN PARIS</b> .....	65
<i>Jian Wen, Fabien Leurent, Xiaoyan Xie</i>	
<b>DETECTING CHANGE IN ROAD ENVIRONMENT VIA ANALYSIS OF MARKED POINT PROCESSES ASSOCIATED WITH TRAFFIC SIGNS</b> .....	75
<i>Zoltán Fazekas, László Gerencsér, Péter Gáspár</i>	
<b>ENERGY CONSUMPTION MINIMIZATION PROBLEM IN A RAILWAY NETWORK</b> .....	85
<i>T. Montrone, P. Pellegrini, P. Nobili</i>	
<b>DETERMINING AN OPTIMAL AREA TO LOCATE A BIOREFINERY UNDER ECONOMIC AND ENVIRONMENTAL CRITERIA</b> .....	95
<i>Adrian Serrano-Hernandez, Javier Faulin, Jesús M. Pintor, Javier Belloso</i>	
<b>A RELOCATION STRATEGY FOR MUNICH'S BIKE SHARING SYSTEM: COMBINING AN OPERATOR-BASED AND A USER-BASED SCHEME</b> .....	105
<i>Svenja Reiss, Klaus Bogenberger</i>	
<b>A COMPARATIVE STUDY BETWEEN VEHICLE ACTIVATED SIGNS AND SPEED INDICATOR DEVICES</b> .....	115
<i>Diala Jomaa, Siril Yella, Mark Dougherty</i>	
<b>PEDESTRIAN FUZZY RISK EXPOSURE INDICATOR</b> .....	124
<i>Meriem Mandar, Azedine Boulmakoul, Ahmed Lbath</i>	
<b>A MULTIMODAL TRANSPORT NETWORK MODEL AND EFFICIENT ALGORITHMS FOR BUILDING ADVANCED TRAVELER INFORMATION SYSTEMS</b> .....	134
<i>Omar Dib, Marie-Ange Manier, Laurent Moalic, Alexandre Caminada</i>	
<b>CLASSIFICATION OF TRAVEL DATA WITH MULTIPLE SENSOR INFORMATION USING RANDOM FOREST</b> .....	144
<i>Muhammad Awais Shafique, Eiji Hato</i>	
<b>CYCLE-TOURIST NETWORK DESIGN</b> .....	154
<i>Alessandro Giovannini, Federico Malucelli, Maddalena Nonato</i>	
<b>FRAMEWORK FOR ORGANIZATIONAL STRUCTURE RE-DESIGN BY ASSESSING LOGISTICS' BUSINESS PROCESSES IN HARBOR CONTAINER TERMINALS</b> .....	164
<i>Zineb Besri, Azedine Boulmakoul</i>	
<b>THE INFLUENCE OF DRIVING PATTERNS ON ENERGY CONSUMPTION IN ELECTRIC CAR DRIVING AND THE ROLE OF REGENERATIVE BRAKING</b> .....	174
<i>Andreas Braun, Wolfgang Rid</i>	
<b>ESTIMATING FREEWAY TRAFFIC VOLUME USING SHOCKWAVES AND PROBE VEHICLE TRAJECTORY DATA</b> .....	183
<i>Khairul Anuar, Mecit Cetin</i>	
<b>MODIFIED TOP DOWN APPROACH FOR HIERARCHICAL FORECASTING IN A BEVERAGE SUPPLY CHAIN</b> .....	193
<i>Dejan Mircetic, Svetlana Nikolicic, Đurdica Stojanovic, Marinko Maslaric</i>	

<b>ANALYSIS OF THE ELECTRIC VEHICLES ADOPTION OVER THE UNITED STATES</b> .....	203
<i>Ali Soltani-Sobh, Kevin Heaslip, Aleksandar Stevanovic, Ryan Bosworth, Danilo Radivojevic</i>	
<b>A REWARD-BASED ALGORITHM FOR THE STACKING OF OUTBOUND CONTAINERS</b> .....	213
<i>Sel Ozcan, Deniz Türsel Eliyi</i>	
<b>A BUS CREW SCHEDULING PROBLEM WITH ELIGIBILITY CONSTRAINTS AND TIME LIMITATIONS</b> .....	222
<i>Hande Öztop, Ugur Eliyi, Deniz Türsel Eliyi, Levent Kandiller</i>	
<b>MARKET DYNAMICS IN ON-RAIL COMPETITION</b> .....	232
<i>Emanuel Broman, Jonas Eliasson</i>	
<b>DETERMINATION OF RELIEF SUPPLIES DEMANDS AND ALLOCATION OF TEMPORARY DISASTER RESPONSE FACILITIES</b> .....	245
<i>Asli Sebatli, Fatih Cavdur, Merve Kose-Kucuk</i>	
<b>RAPID TRANSIT NETWORK DESIGN: CONSIDERING RECOVERY ROBUSTNESS AND RISK AVERSION MEASURES</b> .....	255
<i>Luis Cadarso, Esteve Codina, Laureano F. Escudero, Angel Marín</i>	
<b>AN INTEGRATION OF DIFFERENT COMPUTING APPROACHES IN TRAFFIC SAFETY ANALYSIS</b> .....	265
<i>Yetis Sazi Murat, Ziya Cakici</i>	
<b>VULNERABILITY ANALYSIS OF RAILWAY NETWORKS IN CASE OF MULTI-LINK BLOCKAGE</b> .....	275
<i>Mostafa Bababeik, Navid Khademi, Anthony Chen, M. Mahdi Nasiri</i>	
<b>AUTONOMOUS SHARED MOBILITY-ON-DEMAND: MELBOURNE PILOT SIMULATION STUDY</b> .....	285
<i>Hussein Dia, Farid Javanshour</i>	
<b>AN ORIENTEERING-BASED APPROACH TO MANAGE EMERGENCY SITUATION</b> .....	297
<i>Ilaria Baffo, Pasquale Carotenuto, Stefania Rondine</i>	
<b>A MULTICRITERIA ANALYSIS FOR THE GREEN VRP: A CASE DISCUSSION FOR THE DISTRIBUTION PROBLEM OF A SPANISH RETAILER</b> .....	305
<i>Bartosz Sawik, Javier Faulin, Elena Pérez-Bernabeu</i>	
<b>GIS-BASED IDENTIFICATION AND ASSESSMENT OF SUITABLE MEETING POINT LOCATIONS FOR RIDE-SHARING</b> .....	314
<i>Paul Czioska, Dirk C. Mattfeld, Monika Sester</i>	
<b>INTELLIGENT TRAFFIC LIGHTS: GREEN TIME PERIOD NEGOTIATION</b> .....	325
<i>Cristina Vilarinho, José Pedro Tavares, Rosaldo J. F. Rossetti</i>	
<b>DYNALOAD: A SIMULATION FRAMEWORK FOR PLANNING, MANAGING AND CONTROLLING URBAN DELIVERY BAYS</b> .....	335
<i>Antonio Comi, Berta Buttarazzi, Massimiliano M. Schiraldi, Rosy Innarella, Martina Varisco, Luca Rosati</i>	
<b>RAILWAY TIMETABLING BASED ON COST-BENEFIT ANALYSIS</b> .....	345
<i>Victoria Svedberg, Martin Aronsson, Martin Joborn</i>	
<b>NEW INTEGER PROGRAMMING FORMULATION FOR MULTIPLE TRAVELING REPAIRMEN PROBLEM</b> .....	355
<i>Gozde Onder, Imdat Kara, Tusan Derya</i>	
<b>DRIVERS' ATTITUDE TOWARDS CAFFEINE CHEWING GUM AS COUNTERMEASURE TO DRIVER TASK-RELATED FATIGUE</b> .....	362
<i>Yuval Hadas, Avi Tillman, Tova Rosenbloom, Riccardo Rossi, Massimiliano Gastaldi</i>	
<b>REFINEMENT OF PERFORMANCE MEASURES BASED ON HIGH-RESOLUTION SIGNAL AND DETECTION DATA</b> .....	372
<i>Igor Dakic, Aleksandar Stevanovic, Milan Zlatkovic, Cameron Kergaye</i>	
<b>DETECTION OF URBAN TRAFFIC PATTERNS FROM FLOATING CAR DATA (FCD)</b> .....	382
<i>Oruc Altintasi, Hediye Tuydes-Yaman, Kagan Tuncay</i>	
<b>DRIVING ON ROUGH SURFACE REQUIRES CARE AND ATTENTION</b> .....	392
<i>Akira Kawamura, Kazuya Tomiyama, Riccardo Rossi, Massimiliano Gastaldi, Claudio Mulatti</i>	
<b>BREAKDOWN OF WEATHER, INTERSECTION AND RECURRENT CONGESTION IMPACTS ON URBAN DELAY IN NEW YORK CITY</b> .....	399
<i>M. Anil Yazici, Ayberk Kocatepe, Eren Erman Ozguven</i>	
<b>ACCELERATING LOCAL SEARCH ALGORITHMS FOR THE TRAVELLING SALESMAN PROBLEM THROUGH THE EFFECTIVE USE OF GPU</b> .....	409
<i>Gizem Ermis, Bülent Çatay</i>	
<b>DYNAMIC ROUTING: ANTICIPATION OF EMISSION-SENSITIVE TRAFFIC MANAGEMENT</b> .....	419
<i>Felix Köster, Marlin W. Ulmer, Dirk C. Mattfeld</i>	

<b>LOCATION ANALYSIS OF EMERGENCY VEHICLES USING AN APPROXIMATE QUEUEING MODEL</b> .....	430
<i>M. Altan Akdogan, Z. Pelin Bayindir, Cem Iyigun</i>	
<b>REDUCTION OF ERRORS WHEN ESTIMATING EMISSIONS BASED ON STATIC TRAFFIC MODEL OUTPUTS</b> .....	440
<i>Nikolaos Tsanakas, Joakim Ekström, Johan Olstam</i>	
<b>INVESTIGATING THE EMPIRICAL EXISTENCE OF STATIC USER EQUILIBRIUM</b> .....	450
<i>Juste Raimbault</i>	
<b>PERFORMANCE INDICATOR FOR TWO-LANE INTERCITY HIGHWAYS UNDER HETEROGENEOUS TRAFFIC CONDITION</b> .....	459
<i>Amardeep Boora, Indrajit Ghosh</i>	
<b>THE COMPARISON OF THE METAHEURISTIC ALGORITHMS PERFORMANCES ON AIRPORT GATE ASSIGNMENT PROBLEM</b> .....	469
<i>Abdullah Aktel, Betül Yagmahan, Tuncay Özcan, M. Mutlu Yenisey, Engin Sansarci</i>	
<b>ANALYSIS OF SPEED PATTERNS ON INTER-URBAN PARALLEL HIGHWAYS: A CASE STUDY IN THE SOUTHEAST FLORIDA</b> .....	479
<i>Ayberk Kocatepe, Eren Erman Ozguven, Arda Vanli, Ren Moses</i>	
<b>NETWORK DESIGN MODEL WITH EVACUATION CONSTRAINTS UNDER UNCERTAINTY</b> .....	489
<i>Oren E. Nahum, Yuval Hadas, Riccardo Rossi, Massimiliano Gastaldi, Gregorio Gecchele</i>	
<b>LARGE SCALE DATA-DRIVEN DELAY DISTRIBUTION MODELS OF EUROPEAN AIR TRAFFIC FLOW NETWORK</b> .....	499
<i>Baris Baspinar, Emre Koyuncu, Gokhan Inalhan</i>	
<b>A GENERAL MORPHOLOGICAL ANALYSIS TO SUPPORT STRATEGIC MANAGEMENT DECISIONS IN PUBLIC TRANSPORT COMPANIES</b> .....	509
<i>Maria De Fátima Teles, Jorge Freire De Sousa</i>	
<b>SPATIO-TEMPORAL ANALYSES FOR DYNAMIC URBAN ROAD NETWORK MANAGEMENT</b> .....	519
<i>Hande Demirel, Wasim Shoman</i>	
<b>FRAMEWORK FOR AUTOMATED TAXI OPERATION: THE FAMILY MODEL</b> .....	529
<i>Michal Kümmel, Fritz Busch, David Z. W. Wang</i>	
<b>UAV-BASED TRAFFIC ANALYSIS: A UNIVERSAL GUIDING FRAMEWORK BASED ON LITERATURE SURVEY</b> .....	541
<i>Muhammad Arsalan Khan, Wim Ectors, Tom Bellemans, Davy Janssens, Geert Wets</i>	
<b>AGE-BASED STRATIFICATION OF DRIVERS TO EVALUATE THE EFFECTS OF AGE ON CRASH INVOLVEMENT</b> .....	551
<i>Mehmet Baran Ulak, Eren Erman Ozguven, Lisa Spainhour</i>	
<b>LOOK-AHEAD SPEED PLANNING FOR HEAVY-DUTY VEHICLE PLATOONS USING TRAFFIC INFORMATION</b> .....	561
<i>Ingrid Johansson, Junchen Jin, Xiaoliang Ma, Henrik Pettersson</i>	
<b>EVALUATION OF RED RRFB IMPLEMENTATION AT FREEWAY OFF-RAMPS AND ITS EFFECTIVENESS ON ALLEVIATING WRONG-WAY DRIVING</b> .....	570
<i>Seckin Ozkul, Pei-Sung Lin</i>	
<b>THE EFFECT OF TEMPORARY SPEED RESTRICTIONS, ANALYZED BY USING REAL TRAIN TRAFFIC DATA</b> .....	580
<i>Rimmert B. K. Van Der Kooij, Andreas D. Landmark, Andreas A. Seim, Nils O. E. Olsson</i>	
<b>A NEW PROCESS MODEL FOR URBAN TRANSPORT OF FOOD IN THE UK</b> .....	588
<i>Dimitris Zissis, Emel Aktas, Michael Bourlakis</i>	
<b>LOCAL RAMP METERING STRATEGY ALINEA: MICROSCOPIC SIMULATION BASED EVALUATION STUDY ON ISTANBUL FREEWAYS</b> .....	598
<i>Ismail M. Abuamer, Hilmi Berk Celikoglu</i>	
<b>SIMULATION-BASED VARIABLE SPEED LIMIT SYSTEMS MODELLING: AN OVERVIEW AND A CASE STUDY ON ISTANBUL FREEWAYS</b> .....	607
<i>Mohd Sadat, Hilmi Berk Celikoglu</i>	
<b>SETTING SERVICES IN PUBLIC TRANSIT LINES IN SHORT TIME PERIODS UNDER TIME-VARYING DEMAND</b> .....	615
<i>Esteve Codina, Francisca Rosell, Luís Cadarso, Ángel Marín</i>	
<b>PREDICTION OF ARTERIAL TRAVEL TIME CONSIDERING DELAY IN VEHICLE RE-IDENTIFICATION</b> .....	625
<i>Xiaoliang Ma, Fadi Al Khoury, Junchen Jin</i>	
<b>TRAVELER-ORIENTED ADVANCED TRAVELER INFORMATION SYSTEM BASED ON DYNAMIC DISCOVERY OF RESOURCES: POTENTIALS AND CHALLENGES</b> .....	635
<i>Oudom Kem, Flavien Balbo, Antoine Zimmermann</i>	

<b>ROBUST ADAPTIVE STRATEGIES FOR THE GUIDANCE OF USERS IN ROAD NETWORKS .....</b>	<b>645</b>
<i>Farida Manseur, Nadir Farhi, Habib Haj-Salem, Jean-Patrick Lebacque</i>	
<b>STAKEHOLDERS-BASED MULTI-CRITERIA POLICY ANALYSIS IN MARITIME TRANSPORT: FROM THEORY TO PRACTICE.....</b>	<b>655</b>
<i>Eliza Gagatsi, George Giannopoulos, Georgia Aifantopoulou, Georgios Charalampous</i>	
<b>IDENTIFYING PATTERNS UNDER BOTH NORMAL AND ABNORMAL TRAFFIC CONDITIONS FOR SHORT-TERM TRAFFIC PREDICTION .....</b>	<b>665</b>
<i>Athanasios Salamanis, Giorgos Margaritis, Dionysios D. Kehagias, Georgios Matzoulas, Dimitrios Tzovaras</i>	
<b>QUANTIFYING DEMAND DYNAMICS FOR SUPPORTING OPTIMAL TAXI SERVICES STRATEGIES.....</b>	<b>675</b>
<i>Elena Kourti, Christina Christodoulou, Loukas Dimitriou, Symeon Christodoulou, Constantinos Antoniou</i>	
<b>POLICY-DRIVEN INVESTIGATION OF SECTORAL LATENT INFORMATION REGARDING GLOBAL ROAD FATALITIES .....</b>	<b>685</b>
<i>Loukas Dimitriou, Paraskevas Nikolaou, Constantinos Antoniou</i>	
<b>Author Index</b>	