I. TUCKER-HASEGAWA AWARD LECTURE

Miroslaw J. Skibniewski
Optimal Buildings through Automation Technology: Toward Systems Unification for Secure, Intelligent, Green, and Immune Buildings

II. KEYNOTE PAPERS

Hojjat Adeli
Smart Structures and Building Automation in the 21st Century

Thomas Bock
Digital Design and Robotic Production of 3D Shaped Precast Components

Donatas Cygas, Alfredas Laurinavicius, Audrius Vaitkus, Virgaudas Puodziukas
Research of Experimental Road Pavement Structures

Ronie Navon
Automated Productivity Control of Labor and Road Construction

Eugenijus Uspuras, Sigitas Rimkevicius, Algirdas Kaliatka
Ignalina nuclear power plant safety issues

Edmundas Kazimieras Zavadskas, Arturas Kaklauskas
Advanced Information and Communication Technologies in Construction

III. AUTOMATION

Michal Bednarski, Dariusz Dabrowski, Jan Szlagowski
Can-Bus Application System in Close Loop Control Systems for Heavy Machines

Min-Yuan Cheng, Li-Chuan Lien, Ming-Hsiu Tsai
An Introduction for Mega House

Nuri Choi, Hyojoon Son, Changwan Kim, Changyoon Kim, Hyoungkwan Kim
Rapid 3D Object Recognition for Automatic Project Progress Monitoring Using a Stereo Vision System

Frans van Gassel, Glenco Jansen
A Simulation Tool for Radio Frequency Identification Construction Supply Chains

Web-Based Biometric Mouse Decision Support System for User's Emotional and Labour Productivity Analysis

Gu-Taek Kim, Kyoong-Tai Kim, Du-Heon Lee, Choong-Hee Han, Hyun-Bae Kim, Jin-Taek Jun
Development of a Life Cycle Costing System for Light Rail Transit Construction Projects

Kavin Kumar, K. Senthil Nathan, Koshy Varghese, K. Ananthnarayanan
Automated Geometry Control of Precast Segmental Bridges

Jaroslav Kusmierzcyk, Jan Szlagowski
Automated Excavation Process Analysis for Given Trajectory and Soil Parameters

Woo-Jae Lee, Jae-Hong Song, Soon-Wook Kwon, Sangyoon Chin, Cheolho Choi, Yea-Sang Kim
A Gate Sensor for Construction Logistics
M. T. Nguyen, H. Dalvand, Ying-Hao Yu, Q. P. Ha
Seismic Responses of Civil Structures under Magnetorheological-Device Direct Control ....................................................... 106

Shiegru Sarata, Niriho Kiyachi, Kazuhiro Sugawara
Measuring and Update of Shape of Pile for Loading Operation by Wheel Loader ................................................................. 113

Markus Schonit, Dirk Reusch
Online-Estimation of Vibratory Driven Piles' Bearing Capacity: A First Approach ................................................................. 119

Yan-Chyuan Shiau, Ming-Teh Wang, Chih-Ming Huang, Lian-Ting Lu
New Model of Cement Product - Precast Slab Track for THSR (Taiwan High Speed Rail) ....................................................... 129

IV. ROBOT TECHNOLOGY AND ROBOTICS APPLICATION

Jia-Ruey Chang, Shih-Chung Kang, Peter M. Liu, Shang-Hsien Hsieh
Tsun-Cheng Huang, Ping-Hung Lin
An Autonomous Robot Equipped With the GPS Virtual Reference Station (VRS) System to Perform Pavement Distress Surveys ........................................................................................................ 141

Pholchai Chotiprayanakul, Dalong Wang, Ngaiming Kwok, Dikai Liu
A Haptic Base Human Robot Interaction Approach for Robotic Grit Blasting ........................................................................ 148

S. Rolando Cruz-Ramirez, Yasushi Mae, Yuusuke Ishizuka, Tomohito Takubo, Tatsuo Arai
Detection of Screws on Metal Ceiling Structures for Dismantling Systems ........................................................................ 155

Marek Franaszek, Geraldine Cheok, Kamel Saidi, Christoph Witzgall
Effect of Scanning Density on the Accuracy of Locating Sphere Centers for Registration .......................................................... 163

Yutaro Fukase, Keigo Takeuchi, Hitoshi Satoh, Shigeru Aoki
Development of Smart Showroom ............................................................................................................................................... 169

Wildan Lalo, Thorsten Brandt, Dieter Schramm, Manfred Hiller
A Linear Optimization Approach to Inverse Kinematics of Redundant Robots with Respect to Manipulability ................................................................................................................................. 175

Seungyeol Lee, Jungil Lee, Changsoo Han, Kyeyoung Lee, Sangheon Lee
Human Robot Cooperative Control and Task Planning for a Glass Ceiling Installation Robot ...................................................... 181

Seung-Hoon Lee, Seung-Nam Yu, Hee-Don Lee, Sung-Joon Hong, Chang-Soo Han, Jung-Soo Han
Proposal for a Modular-Type Knee-Assistive Wearable Unit and Verification of Its Feasibility ......................................................... 187

S. Martinez, C. Balaguer, A. Jardon, J.M. Navarro, A. Gimenez, C. Barcena
Robotized Lean Assembly in the Building Industry .......................................................................................................................... 195

Kyeong Won Oh, Dongnam Kim, Daehie Hong, Jong-Hyup Park, Sukhie Hong
Design of a Haptic Device for Excavator Equipped with Crusher ................................................................................................ 202

Kazimieras Ragulskis, Marijonas Bogdevicius, Vygantas Mistinas
Behavior of Dynamic Processes in Self-Exciting Vibration of an Inpipe Robot ........................................................................ 209

Yan-Chyuan Shiau, Chih-Ming Huang, Ming-Teh Wang, Jin-Yi Zeng
Discussion of Pot Bearing for Concrete Bridge ............................................................................................................................. 213

Andrzej Sluzek
Two Efficient Techniques for Difficult Applications of Machine Vision in Construction Industry ...................................................... 224

Hyojoo Son, Changwan Kim, Hyoungkwan Kim, Kwang-Nam Choi, Jeong-Min Jee
Real-Time Object Recognition and Modeling for Heavy-Equipment Operation ........................................................................ 232

VIII
Jan Szlagowski, Zbigniew Zebrowski, Tomasz Miroslaw
Modelling of Servo-Drive System with Hydraulic "Multi-Piston" Motor ...........................................238

Andrzej Typiak
Use of Laser Range finder to Detecting in Surroundings of Mobile Robot the Obstacles .................246

Andrzej Typiak, Zbigniew Zienowicz
Utilization of Remote Controlled Vehicle with Hydrostatic Driving System ....................................252

In-Kyoon Yoo, Soo-Hyung Lee
Performance Evaluation of Melting-Blown Color Pavement Method ..............................................257

V. AUTOMATED DATA ACQUISITION AND MONITORING

Susana Arad, Victor Arad, Joel Veres, Olimpiu Stoicuta
Safety Excavation in Salt Rock Used for Underground Storage in Romania .......................................265

Robertas Balevicius, Rimantas Kaivanauskas
DEM Analysis of Effect of the Particle Size during the Material Flow in Wedge-Shaped Hopper ..........272

F. Bosch, Carl T. Haas
Automated 3D Data Collection (A3DDC) for 3D Building Information Modeling ...............................279

3D Imaging System for the Intelligent Excavation System (IES) ......................................................286

Soungho Chae, Tomohiro Yoshida
A Study of Safety Management Using Working Area Information on Construction Site .....................292

A. Giretti, A. Carbonari, B. Naticchia, M. De Grassi
Advanced Real-Time Safety Management System for Construction Sites ...........................................300

Yevhen Gorokhov, Yaroslav Nazim, Volodymyr Vasylev, Sergiy Kuznetsov, Valentina Garkushova
Monitoring of Complex Design Systems of Special Structures .............................................................306

Arturas Kaklauskas, Laura Tupenaite, Loreta Kanapeckiene
Automated Selection of Value Efficient Buildings Refurbishment Alternatives ....................................312

Andrzej Karlowski
Telemetric System for Management in Concrete Process ........................................................................318

Itai Katz, Kamel Saidi, Alan Lytle
The Role of Camera Networks in Construction Automation .................................................................324

Kyon-Tai Kim, Jae-Goo Han
Design and Implementation of a Real-Time Slope Monitoring System
Based on Ubiquitous Sensor Network ........................................................................................................330

Jung-Ryul Kim, Hyun-Suk Yoo, Soon-Wook Kwon, Moon-Young Cho
Integrated Tunnel Monitoring System Using Wireless Automated Data Collection Technology .............337

Vygaudas Kvedaras, Rokas Kvedaras, Kicardas Masilionis
Methods of Strain Measurements in Construction Monitoring Systems ..............................................343

Joo-Sung Lee, Kyung-Min Min
Building Ontology to Implement the BIM (Building Information Modeling)
Focused on Pre-Design Stage ....................................................................................................................350

Soo-Hyung Lee, In-Kyoon Yoo
Overview of Pavement Management System in Korea and Its Operation Results ....................................355
Ger Maas, Arjen Vos
Data Collection to Meet Contract Requirements ................................................................. 365

Marius Malcius, Darius Muncys, Sarunas Atkociunas
Indoor Heading Measurement System .................................................................................. 373

Eimuntas Parseliunas
LITPOS - A Service for Precise Positioning in Real Time ..................................................... 379

Sugoog Shon, Inkyoon Yoo, Soohyung Lee, Jewon Kim
Implementation and Verification of a New California Type Profidograph Based on WLAN .... 384

Jochen Teizer, Uday Mantripragada, Manu Venugopal
Analyzing the Travel Patterns of Construction Workers ....................................................... 391

Leonas Ustinovicius, Dmitry Kochin, Vladislav Kutut, Galina Shevchenko
Verbal Analysis of Renovation Investment Strategy of Old Town ........................................ 397

Min Wu, Daniel C.W. Ho
A Real Time Building Energy Effectiveness Assessment Model ........................................... 411

Wen-der Yu, Yu-teh Wei, Shen-jung Liu, Pei-lun Chang
Preliminary Study on the Automatic Lessons-Learned File Generator .................................. 422

E. Zavadskas, A. Kaklauskas, M. Seniut, S. Ivanikovas, G. Dzemyda,
V. Stankevic, C. Simkevicius, A. Jarusevicius
Web-Based Biometric Mouse Intelligent System for Analysis of Emotional State and Labour Productivity ................................................................. 429

VI. INFORMATION AND COMPUTATION TECHNOLOGY

Po-Han Chen, Nguyen Thi Lan True
Automatic 3D Modeling Development and Application for Hydraulic Construction ............ 435

Po-Han Chen, Nguyen Thi Lan True

Po-Han Chen, Seyed Mohsen Shahandashti
Stochastic Scheduling with Multiple Resource Constraints Using a Simulated Annealing-Based Algorithm ........................................................................... 447

Min-Yuan Cheng, Yu-Wei Wu
Dynamic Prediction of Project Success Using Evolutionary Support Vector Machine Inference Model ................................................................. 452

Marcin Gajzler
Hybrid Advisory Systems and the Possibilities of It Usage in The Process of Industrial Flooring Repairs ................................................................. 459

Rimantas Gatautis, Elena Vitkauskaite
External Web Services for Construction Sector SMEs ......................................................... 465

Kyeong Jin Han, Moonsae Park, Hyun-Soo Lee, Sae-Hyun Ji
Cost Estimation Methodology Using Database Layer in Construction Projects ................. 470

Seong Y. Jeong, Jin U. Kim, Seung S. Yang
A Study on the Development of Highway Facility Information Library System .................. 476

Oleg Kaplinski
IT Applications in Polish Construction Sector ........................................................................ 483

Du Yon Kim, Byoungil Kim, Seung Heon Han
Two-Staged Early Cost Estimation for Highway Construction Projects ............................... 490

X
Changyoon Kim, Hyungkwan Kim, Tae Kwun Park, Moon Kyum Kim, Changwan Kim

Virtual 3D Modeling For Optimized Bridge Construction Process ................................................................. 496

Olavi Tupamaki

Total LCC and Probabilistics ............................................................................................................................... 500

Tatjana Vilutiene

Automated Processing of Subcontractor Work Performance Data to Improve the Quality Control and Support the Subcontractor Selection Process ................................................................. 507

Min Wu, Steve Rowlinson

An Intelligent Approach for Managing Materials Purchasing in the RMC Industry ........................................ 515

Wen-der Yu, Chih-Ming Wu, Wei-Chih Lien

Fast Innovation of Construction Technologies with Computer Aided Innovation Tools .................................. 521

Edmundas Kazimieras Zavadskas, Vaidotas Trinkunas, Arturas Kaklauskas

Reasoned Decisions in Construction Materials Selection .................................................................................. 528

VII. METHOD APPLICATION

Tomasz Blaszczyk, Maciej Nowak

Multiple-Criteria Interactive Procedure in Project Management ....................................................................... 533

Willem Karel M. Brauers, Edmundas Kazimieras Zavadskas, Friedel Peldschus, Zenonas Turskis

Multi-Objective Optimization of Road Design Alternatives with an Application of the MOORA Method .......... 541

Yi-Jao Chen, Chung-Wei Feng

Streamlining the Data Transformation Process for Construction Projects via Building Information Modeling .... 549

Min-Yuan Cheng, Ming-Hsiu Tsai, Wiraputra Sutan

Benchmarking for Construction Management Process Reengineering .......................................................... 559

Grazvydas Felinskas, Leonidas Sakalauskas

Variable Neighborhood Simulated Annealing Method and Application for Design ......................................... 566

Chung-Wei Feng, Yi-Jao Chen

Using the MD CAD Model to Develop the Time-Cost Integrated Schedule for Construction Projects ............. 573

Arturas Kaklauskas, Violeta Kersuliene, Vita Urbanaviciene

Determination of Rational Method for Resolution of Disputes with the Help of Multi-Criteria Negotiation Decision Support System for Real Estate .......................................................... 585

Je-nwon Kim, In-kyoon Yoo, Koji Tsunokawa

Evaluation of PMS in Korea Using PCM Method .............................................................................................. 592

Zdzislaw Milian

Monte Carlo Simulation with Exact Analysis for Stochastic Pert Networks .................................................... 598

Sigitas Mitkus, Eva Trinkuniene

Decision Support in Analysis of Construction Contracts .................................................................................. 604

Jerzy Paslawski

Flexibility Implementation in Construction Process Engineering ................................................................... 610

Vladimir Popov, Darius Migilinskas, Virgaudas Juocevicius, Saulius Mikalauskas

Application of Building Information Modelling and Construction Process Simulation Ensuring Virtual Project Development Concept in 5D Environment .......................................................... 616

XI
Donatas Rekus, Vladislovas Ceslovas Aksamitauskas, Vytautas Giniotis
Application of Digital Automatic Levels and Impact of Their Accuracy on Construction Measurements..........................................................625

Roma Rinkeviciene, Algimantas Juozas Poska, Alvydas Slepikas
Linear Electric Drives for Constructional Purposes..........................................................632

Magdalena Rogalska, Wojciech Bozejko, Zdzislaw Hejducki, Mieczyslaw Wodecki
Development of Time Couplings Method Using Evolutionary Algorithms..................................638

Yoonseok Shin, Dae-Won Kim, Sung-Woo Yang, Hun-Hee Cho, Kyung-In Kang
Decision Support Model Using the Adaboost Algorithm to Select Formwork Systems in High-Rise Building Construction..........................................................644

Henrikas Sivilevicius, Edmundas Kazimieras Zavadowskas, Zenonas Turskis
Multi-Attribute Assessment of the Asphalt Mixing Plants..........................................................650

Jonas Saparauskas
Automated Evaluation of Alternative Solutions of Building Design..........................................................656

Romualdas Tamosaitis
Automated Standard Work Time Development in Construction..................................................664

Romualdas Tamosaitis
Simulation of Technological Processes Using Knowledge-Based Sequences..........................................................670

Jolanta Tamosaitiene, Zenonas Turskis, Edmundas Kazimieras Zavadowskas
Modeling of Contractor Selection Taking into Account Different Risk Level.................................................676

Leonas Ustinovichius, Zenonas Turskis, Galina Shevchenko
Multi-Attribute Analysis of Investment Risks in Construction..........................................................682

Yu-Ren Wang, G. Edward Gibson
A Study of Preproject Planning and Project Success Using ANN and Regression Models..........................688

Kuo-Chung Wen, Sheng-Kai Huang
Application Monte Carlo Method on Simulation of Disaster Prevention and Protection in Community..........................................................697

Andrzej Wieckowski, Miroslaw Skibniewski
Errors of Calculations in M/M/1/FIFO/N/F Model with Limited Duration of Shift..............................................708

Edmundas Kazimieras Zavadowskas, Jurga Naimaviene, Arturas Kaklauskas,
Mindaugas Krutinis, Povilas Vainiunas
Multi-Criteria Decision Support System of Intelligent Ambient Assisted Living Environment..........................717

Edmundas Kazimieras Zavadowskas, Mindaugas Krutinis, Arturas Kaklauskas,
Povilas Vainiunas, Jurga Naimaviene, Lina Povilaityte, Laura Tupenaite
Model for Multiple Criteria Analysis of Integrated Intelligent and Built-Up Ambient Assisted Living Environment..........................................................725

Edmundas Kazimieras Zavadowskas, Friedel Peldschus, Zenonas Turskis
Multi-Criteria Optimization Software LEVI-4.0 A Tool to Support Design and Management in Construction..........................731

Edmundas K. Zavadowskas, Egidijus R. Vaidogas
Managerial Decisions about Alternative Automatic Equipment for Disaster Management in Construction..........................................................737
VIII. MANAGEMENT AND SOCIAL ISSUES

Sangyoon Chin, Su-Won Yoon, Tae-Hong Shin, Ghang Lee, Cheolho Choi, Soon-Wook Kwon
A Session-Based Collaboration Environment for BIM-BASED Project Life-Cycle Management, 745

Matthias Ehrlich, Robert Tiong Lee Kong
Modelling Country Reliability in Public Private Partnership Infrastructure Projects, 751

Romualdas Ginevicius, Valentinias Podvezko, Algirdas Andruskevicius
The Effectiveness of Diversification of Construction Enterprise Activities, 759

Christabel M. F. Ho
Situational Influences on Quantity Surveyors When Facing Ethical Dilemmas, 764

Rong-Yau Huang, I-Shiang Mao, Hao-Kang Lee
Using Data Mining to Explore the Deterioration Factors of Reinforced Concrete (RC)
Highway Bridges in Taiwan, 768

Agne Matuliauskaite, Vilma Vetaite, Arturas Kaklauskas
Assessment of Air Pollution Pm/o in the City of Vilnius and Its Influence on Life Quality, 782

Darius Migilinskas, Leonas Ustinovicius
Methodology of Risk and Uncertainty Management in Construction's Technological and Economical Problems, 789

Shigeomi Nishigaki, Katsutoshi Saibara, Fujio Matsuda, Hiroshi Ogura
Points on Construction, 769

Heedae Park, Seung Heon Han, Du Yon Kim, Sang H. Park
Approaches for Performance Measurement of Urban Renewal Megaprojects, 804

Miroslaw J. Skibniewski, S. Ghosh
Identifying Elements of Enterprise Wide Application Selection Ecosystem, 810

Jurate Sliogeriene, Mindaugas Krutinis
Assessment of Lithuanian Energy Generation Companies' Infrastructure Combined with Sustainable Environment Principles, 817

Kuo-Chung Wen, Yung-Hsin Chang
A Study of Ambient Noise Improve of Communities Elementary School: Noise Mapping Approach, 828

Jennifer K. Whyte
Reaching for the Skies: Time and Turbulence in Digital Technologies and Practices, 836

IX. EUROPEAN AND ASIA INFRASTRUCTURE ADVANTAGE WORKSHOP

Arturas Kaklauskas, Edmundas Kazimieras Zavadskas, Vaidotas Trinkunas
Model for an Integrated Analysis of Distance Learning Quality: The Case of Lithuania, 849

Gayani Karunasena, Dilanthi Amaratunga, Richard Haigh
Automation and Robotics in Post Disaster Waste Management: Post Tsunami Sri Lanka, 854

Kaushal Keraminiyage, Dilanthi Amaratunga, Richard Haigh, Arturas Kaklauskas
Minimising Content Stagnation in Construction Education: Automating the Content Update through a Shared Web Repository for Distance Construction Education, 858

Irene Lill
Sustainable Management of Construction Labour, 864

XIII