
Monday, June 15, 2015

09:00 - 11:00 **Opening and plenary session**

**Saastin
sali**

Chairperson: Rauno Heikkilä

09:10

Welcome Words

Olli Silvén
Vice Rector –Education
University of Oulu, Finland

09:30

The Intelligent Mine: Next Generation Technologies And The Need For Interoperability

Stephen Fraser
Queensland Centre for Advanced Technologies, Australia

10:15

Construction Robotics Enabling Innovative Disruption And Social Supportability

Thomas Bock
University of Tokio, Germany

11:00 - 12:15 **Session 1 A 1**

**Saastin
sali**

Chairperson: Pär Åhman

11:05

A Cloud-based System Framework For Storage And Analysis On Big Data Of Massive BIMs

Hung-Ming Chen; Kai-Chuan Chang
National Taiwan University of Science and Technology, Department of Civil and Construction Engineering, Taiwan

11:25

User-Guided Dimensional Analysis Of Indoor Scenes Using Depth Sensors

Yong Xiao¹; Chen Feng¹; Yuichi Taguchi²; Vineet Kamat¹
¹University of Michigan, Civil and Environmental Engineering, United States; ²Mitsubishi Electric Research Laboratories, United States

11:45

A Study On Design Of Virtual Desktop Infrastructure (VDI) System Model For Cloud Computing BIM Service

Kyuhyup Lee¹; Joongwhan Shin¹; Soonwook Kwon¹; Gyusung Choi²
¹Sungkyunkwan University, Jangangoo Chunchun Dong 300, Korea, Republic of; ²Sungkyunkwan University, Korea, Republic of

11:00 - 12:15 **Session 1 B 1**

Room L 10

Chairperson: Thomas Bock

- 11:05 **Coordination Of Cost Estimation For Industrialized Residential Projects Through The Use Of BIM**
Beda Barkokebas¹; Samer Bu Hamdan²; Mohamed Al-Hussein²; Juan D. Manrique³
¹Universit of Alberta, Dept. Of Civil and Environmental Engineering, Canada; ²University of Alberta, Dept. Of Civil and Environmental Engineering, Canada; ³Landmark Group of Builders, Canada
- 11:25 **BIM Studio - An Immersive Curricular Tool For Construction Project Management Education**
V Paul C Charlesraj; Anil Sawhney; Manav Mahan Singh; Aiswarya Sreekumar
RICS School of Built Environment, India
- 11:45 **Implementation Of An Open And Interoperable Process To Optimise Design And Construction Phases Of A Residential Building Project: A Case Study Using BIM In A Public Procurement**
Angelo Luigi Camillo Ciribini; Silvia Mastrolemba Ventura; Michela Paneroni
University of Brescia, Civil Engineering and Architecture (DICATAM), Italy
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11:00 - 12:15 **Session 1 C 1**

Room IT
115

Chairperson: Ioannis Brilakis

- 11:05 **Robotic Kinematics Analogy For Realignment Of Defective Construction Assemblies**
Mohammad Nahangi; Jamie Yeung; Carl Haas; Scott Walbridge; Jeffrey West
University of Waterloo, Civil and Environmental Engineering, Canada
- 11:25 **A Study On Optimal Algorithm For Generating Earthwork 3D Model And Meshed Imagery**
Donghyun Kim¹; suwan Jung¹; Soonwook Kwon¹; Sooyeal Park²; Jaewoo Park³; jongwon Seo⁴
¹Sungkyunkwan University, Sungkyunkwan Univ. Natural Sciences Campus, Korea, Republic of; ²Korea Plant Management, Korea, Republic of; ³Korea Institute of Civil Engineering and Building Technology, Korea, Republic of; ⁴Hanyang University, Korea, Republic of
- 11:45 **Machine Guidance Based Site Control Technology (SCT) For Earthwork Equipment Fleet**
Jongwon Seo¹; Hakjune Lee¹; Leonildo Cassule¹; Moon Sungwoo²
¹Hanyang University, Dept. of Civil and Environmental Engineering, Korea, Republic of; ²Pusan University, Dept. of Civil and Environmental Engineering, Korea, Republic of

11:00 - 12:15 **Session 1 D 1**

**Room IT
116**

Chairperson: Frans van Gassel

11:05 **Analytical Tunnel-boring Machine Pose Precision And Sensitivity Evaluation For Underground Tunnelling**

Duanshun Li¹; Sheng Mao¹; Ming Lu¹; Xuesong Shen²

¹University of Alberta, Civil & Environmental Engineering, Canada; ²University of New South Wales, School of Civil & Environmental Engineering, Australia

11:25 **A Stereo Vision-based Support System For Tele-operation Of Unmanned Vehicle**

Ming-Chang Wen; Cheng-Hsuan Yang; Yie Chen; Er-Xuan Sung; Shih-Chung Kang
National Taiwan University, Civil Engineering, Taiwan

11:45 **Smart Quick Coupling System For Safe Equipment Attachment Selection And Operation**

Susanne Rinneberg¹; Jochen Teizer²; Stephan Kessler¹; Willibald A. Günthner¹

¹Technische Universität München, Institute of Material Handling, Flow, Logistics, Germany; ²RAPIDS Construction Safety and Technology Laboratory, Germany

12:15 - 13:30 Lunch

**Restaurant
Kastari**

13:30 - 15:00 **Session 1 A 2**

**Saalastin
sali**

Chairperson: Moonyoung Cho

- 13:35 **Testing Of A Tracer Gas Based Measurement Procedure To Assess Air Change Rates In Buildings**
Mariangela Benedettelli; Berardo Naticchia; Alessandro Carbonari; Michele Pascucci
Università Politecnica delle Marche, Italy
- 13:55 **Optimal Method Of Building Lifts Selection From The Point Of Their Energy Consumption Minimizing**
Jozef Gasparik¹; Sylvia Szalayová²
¹Slovak University of Technology in Bratislava, Radlinského 11, Slovakia; ²Slovak University of Technology in Bratislava, Faculty of Civil Engineering, Department of Building Technology, Slovakia
- 14:15 **Impact Of Building Occupancy On Assessing The Effectiveness Of Energy Conservation Measures**
Nan Li¹; Zheng Yang²; Chao Tang²; Nanlin Chen²; Burcin Becerik-Gerber²
¹Tsinghua University, Department of Construction Management, China; ²University of Southern California, Department of Civil and Environmental Engineering, United States
- 14:35 **Real-time Building Energy And Comfort Parameter Data Collection Using Mobile Indoor Robots**
Bharadwaj Mantha; Chen Feng; Carol Menassa; Vineet Kamat
University of Michigan, Department of Civil and Environmental Engineering, United States
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13:30 - 15:00 **Session 1 B 2**

Room L 10

Chairperson: Hung-Ming Cheng

- 13:35 **Automated Quality Inspection Of Precast Concrete Elements With Irregular Shapes Using Terrestrial Laser Scanner And BIM Technology**
Qian Wang¹; Jack C.P. Cheng²; Hoon Sohn³
¹The Hong Kong University of Science and Technology; The Korea Advanced Institute of Science and Tech, Hong Kong; ²The Hong Kong University of Science and Technology, Department of Civil and Environmental Engineering,, Hong Kong; ³The Korea Advanced Institute of Science and Technology, Korea, Republic of
- 13:55 **Robotized Method For Manufacturing Individual Concrete Elements With Specific Shapes**
Tapio Heikkilä¹; Pentti Vähä²; Tuomas Seppälä¹
¹VTT Technical Research Centre of Finland Ltd, Finland; ²University of Oulu, Finland

13:30 - 15:00 Session 1 C 2

Room IT
115

Chairperson: Chang-Soo Han

- 13:35 **Development Of A Server-Independent Algorithm For Safe Evacuation Systems Utilizing Exit Signs**
Jehyun Cho; Ghang Lee; Seungjae Lee; Hyunoh Kim
Yonsei University, Architectural Engineering, Korea, Republic of
- 13:55 **Framework For Evaluating The Thermal Insulation Performance Of Existing Residential Buildings Using The Infrared Thermal Image And Image Processing Method**
Taehoon Hong; Kwangbok Jeong; Choongwan Koo
Yonsei University, Architectural Engineering, Korea, Republic of
- 14:15 **Visualization Of The Airborne Dust Concentration On The Building Floor Plans**
Sangik Lee; SeoKyung Park; Jaeyoung Shin; Hyunsoo Lee; Jin-Kook Lee; Hyunjung Kim
Hanyang University, Interior Architecture Design, Korea, Republic of
- 14:35 **A Field-Oriented Test-Simulation Of Embedded Lift Information System For High-Rise Buildings**
Soonwook Kwon¹; Joonghwan Shin¹; Thomas Bock²; Daeyoon Moon¹
¹Sungkyunkwan University, Korea, Republic of; ²Technical University of Munich, Germany

13:30 - 15:00 Session 1 D 2

Room IT
116

Chairperson: Soonwook Kwon

13:35 **Electromechanical Development Of A Low Cost End Effector Pose Estimation System For Articulated Excavators**
Kurt M. Lundeen; Suyang Dong; Nicholas Fredricks; Manu Akula; Vineet R. Kamat
University of Michigan, Department of Civil and Environmental Engineering, United States

13:55 **Proposal Of Workspace Mapping Method For Conversion-less Unmanned Excavation System To Improve Operative Performance**
Yong-Seok Lee¹; Seung-Hoon Lee¹; Myeong-Su Gil²; Sang-Ho Kim¹; Min-Sung Kang²; Si-Hwan Moon¹; Dae-Hie Hong³; Chang-Soo Han⁴
¹Hanyang University, Mechanical Engineering, Korea, Republic of; ²Hanyang University, Mechatronics Engineering, Korea, Republic of; ³Korea University, Mechanical Engineering, Korea, Republic of; ⁴Hanyang University, Robot Engineering, Korea, Republic of

14:15 **A Low-Cost Robotic System For The Efficient Visual Inspection Of Tunnels**
Simon Stent¹; Cédric Girerd²; Peter Long¹; Roberto Cipolla³
¹University of Cambridge, Department of Engineering, United Kingdom; ²Institut Français de Mécanique Avancée, Department of Mechatronics, France; ³University of Cambridge and Toshiba Research Europe Ltd., United Kingdom

14:35 **Suitability Of A Three-Axis Inclinometer To The Automated Blade Control System Of Excavator**
Matti Immonen¹; Tomi Makkonen¹; Rauno Heikkilä²
¹University of Oulu, Finland; ²University of Oulu, PO.BOX 4200, Finland

15:00 - 15:30 Coffee

Restaurant
Kastari

15:30 - 17:00 **Session 1 A 3**

**Saalastin
sali**

Chairperson: Tapio Heikkilä

15:35 **Low-Cost Virtual Reality Environment For Engineering And Construction**

Thomas Hilfert; Markus König
Ruhr-University Bochum, Computing in Engineering, Germany

15:55 **Augmented Reality- Based On-site Pipe Assembly Process Management Using Smart Glasses**

Daeyoon Moon¹; Soonwook Kwon¹; Thomas Bock²; Hyunglyul Ko³
¹Sungkyunkwan University, Korea, Republic of; ²Technical University of Munich, Germany; ³Sungkyunkwan University, Korea, Republic of

16:15 **Improving Planning In Congested Sites Using 3d And 4d Modelling: A Case Study Of A Pile-Supported Excavation Project In Chile**

Mauricio Toledo; Camila Matabenitez; Miguel Mora
Universidad Andres Bello, Sazie 2315, Piso 1, Chile

15:30 - 17:00 **Session 1 B 3**

Room L 10

Chairperson: Stephen Fraser

15:35 **An Approach To Translate Korea Building Act Into Computer-readable Form For Automated Design Assessment**

Hyunsoo Lee; Sangik Lee; SeoKyung Park; Jin-Kook Lee
Hanyang University, Seoul, Korea, Interior Architecture Design, Korea, Republic of

15:55 **Rule Checking Method-centered Approach To Represent Building Permit Requirements**

SeoKyung Park; Sang-Ik Lee; Hyunsoo Lee; Jaeyoung Shin; Jin-Kook Lee
Hanyang University, Interior Architect Design, Korea, Republic of

16:15 **Automated Code Compliance Checking Based On A Visual Language And Building Information Modeling**

Cornelius Preidel; André Borrmann
Technische Universität München, Chair of Computational Modeling and Simulation, Germany

16:35 **Towards A New BIM 'Dimension' - Translating BIM Data Into Actual Construction Using Robotics**

Shrinath Tandur
Fba Architects, India

15:30 - 17:00 **Session 1 C 3**

**Room IT
115**

Chairperson: Mika Jaakkola

- 15:35 **Automatic 3D Thermal Modeling Using Thermal Data Obtained From Unknown Viewpoints**
Sungwook Lee; Hyojoo Son; Changwan Kim
Chung-Ang University, Department of Architectural Engineering, Korea, Republic of
- 15:55 **Mobile Laser Scanning Technology In Road Depression Measurements**
Mika Jaakkola; Jussi Leinonen; Heikki Onninen
Destia, Finland
- 16:15 **Semantic As-built 3D Modeling Of Buildings Under Construction From Laser-scan Data Based On Local Convexity Without An As-planned Model**
Hyojoo Son; Jongchul Na; Changwan Kim
Chung-Ang University, Department of Architectural Engineering, Korea, Republic of
- 16:35 **IMU-Based Indoor Localization For Construction Applications**
Magdy Ibrahim; Osama Moselhi
Concordia University, Canada

15:30 - 17:00 **Session 1 D 3**

Room IT
116

Chairperson: Tomi Makkonen

15:35 **Development Of A Monitoring System With Adjusted Multiple Images Of Construction Site**

Soungcho Chae¹; Ryo Mizutani²
¹kajima, Japan; ²kajima, 2-19-1, tobitakyu, chohushi, Japan

15:55 **A Sway Reduction Controller For Construction Crane**

Sheng-Yung Cheng; Tai-Yen Kuo; Ci-Jyun Liang; Shih-Chung Kang
National Taiwan University, Civil Engineering, Taiwan

16:15 **Intelligent Crane Management Algorithm For Construction Operation**

Jacek Olearczyk¹; Zhen Lei¹; Brian Ofrim²; Sang Hyeok Han¹; Mohamed Al-Hussein¹
¹University of Alberta, Department of Civil & Environmental Engineering, Canada; ²University of Alberta, Department of Electrical and Computer Engineering, Canada

16:35 **Methods For Simulating Crane-deployment Plans Used In Construction Of Nuclear Power Plants**

Yohei Sugimoto¹; Hiroshi Seki¹; Takahiro Samo²; Norihiko Nakamitsu²
¹Hitachi, Ltd., 7-2-1, Omika-cho, Hitachi-shi, Ibaraki-ken, Japan; ²Hitachi-GE Nuclear Energy, Ltd., Japan

15:30 - 17:00 **BOD Meeting 1**

YT116

17:00 - 17:20 **Summary of the day**

Saalastin
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17:20 - 18:00 **Get together**

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Tuesday, June 16, 2015

09:00 - 10:30 Session 2 A 1

Saalastin
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Chairperson: Carl Haas

- 09:05 **Analysis Of Different Views Towards Social Sustainability In Construction**
Morvarid Farzanehrafat¹; [Ali Akbarnezhad](#)²; Parviz Ghoddousi¹
¹Iran University of Science and Technology, School of Civil Engineering, Iran; ²The University of New South Wales, School of Civil and Environmental Engineering, Australia
- 09:25 **An Introduction To South Korea's BIM Knowledge Base Development Project**
[Kyungha Lee](#)¹; Young-hyun Park¹; Ghang Lee¹; Hwayeon Lee²
¹Yonsei University, Department of Architectural Engineering, Korea, Republic of; ²Yonsei University, A511, Building of Engineering,, Korea, Republic of
- 09:45 **Construction Apps: A Critical Review And Analysis**
Salman Azhar¹; Andrew Jackson²; [Anoop Sattineni](#)³
¹Auburn University, 216 Miller Gorrie Center, United States; ²Auburn University, United States; ³Auburn University, McWhorter School of Building Science, United States
- 10:05 **A Vision Of The Future Construction Industry Of Hong Kong**
[James Wong](#); Judy Zhang; Julian Lee
Construction Industry Council, Hong Kong

Chairperson: Thomas Bock

- 09:05 **IFC-CityGML LOD Mapping Automation Based On Multi-Processing**
Tae Wook Kang; Chang Hee Hong
Korea Institute of Construction Technology, Korea, Republic of
- 09:25 **An Ontology For Process Information Modeling**
Seongki Lee¹; Shabtai Isaac²; Thomas Bock¹
¹Technische Universität München, Chair for Building Realisation and Robotics,
Germany; ²Ben-Gurion University of the Negev, Israel
- 09:45 **Integration Of Building Information Modeling (BIM) And LEED's Location And
Transportation Category**
Po-Han Chen; Thanh Chuong Nguyen
National Taiwan University, Department of Civil Engineering, Taiwan
- 10:05 **Automatic Detailing Of Parametric Sketches By Graph Transformation**
Simon Vilgertshofer; André Borrmann
Technische Universität München, Arcisstraße 21, Germany

09:00 - 10:30 **Session 2 C 1**

**Room IT
115**

Chairperson: Junbok Lee

- 09:05 **Model Based Quality Assurance Process In A Infra Construction Project - Case Riippa-Eskola RU2 -Double Rail Project**
Mika Jaakkola; Pasi Toppi
Destia, Finland
- 09:25 **Infra BIM Based Real-time Quality Control Of Infrastructure Construction Projects**
Teemu Kivimäki¹; Rauno Heikkilä²
¹Infrakit Oy, Finland; ²University of Oulu, Finland
- 09:45 **SmartSite: Intelligent And Autonomous Environments, Machinery, And Processes To Realize Smart Road Construction Projects**
Robin Kuenze¹; Marcus Mueller²; Jochen Teizer³; Alexander Blickle³
¹University Hohenheim, Information Systems 2, Germany; ²University of Hohenheim, Information Systems 2, Germany; ³Ed. Züblin AG, 5D / Research and Development, Germany
- 10:05 **Integrated Simulation Model For Maintenance And Repair Optimization For Rubble Mound Coastal Structures Using Markov Chains, Regression And Genetic Algorithms**
Ayman El Hakea¹; Soliman Abu-Samra¹; Ossama Hosny²; Moheb Iskander³; Hesham Osman⁴
¹The American University in Cairo, Construction and Architectural Engineering Dep., Egypt; ²American University in Cairo, Construction and Architectural Engineering Dept., Egypt; ³Coastal Research Institute, Hydrodynamics Department, Egypt; ⁴Cairo University, Structural Engineering Department, Egypt

09:00 - 10:30 Session 2 D 1

**Room IT
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Chairperson: Benny Raphael

09:05 **Development Of A Smart Shoe For Building A Real-Time 3D Map**

Luan Nguyen¹; [Hung La](#)²

¹University of Nevada, Computer Science and Engineering, United States; ²University of Nevada, 1664 N. Virginia St., United States

09:25 **Case Studies On Glazing Robot Technology On Construction Sites**

[Seungyeol Lee](#); Jeon Il Moon

Daegu Gyeongbuk Institute of Science & Technology, Room 614, Bldg. 3, DGIST, 50-1 Sang-Ri,, Korea, Republic of

09:45 **Augmented Reality-based Tele-robotic System Architecture For On-site Construction**

Dhinesh K. Sukumar; [Seongki Lee](#); Christos Georgoulas; Thomas Bock

Technische Universität München, Chair for Building Realisation and Robotics, Germany

10:05 **Comparison Of Automated And Robotic Support Bodies For Building Facade Upgrading**

Kepa Iturralde; [Thomas Linner](#); Thomas Bock

TUM / BR2, Arcisstrasse 21, Germany

10:30 - 11:00 Coffee

**Restaurant
Kastari**

11:00 - 12:30 **Session 2 A 2**

**Saalastin
sali**

Chairperson: Jochen Teizer

- 11:05 **Crowdsourcing Video-based Workface Assessment For Construction Activity Analysis**
Kaijian Liu¹; Mani Golparvar-Fard²
¹University of Illinois at Urbana-Champaign, Civil and Environmental Engineering Department, United States; ²University of Illinois at Urbana-Champaign, Civil and Environmental Engineering Department, United States
- 11:25 **Vision-Based Articulated Machine Pose Estimation For Excavation Monitoring And Guidance**
Chen Feng; Suyang Dong; Kurt M. Lundeen; Yong Xiao; Vineet R. Kamat
University of Michigan, Department of Civil and Environmental Engineering, United States
- 11:45 **Visibility And Proximity Based Risk Map Of Earthwork Site Using Real-time Simulation**
Faridaddin Vahdatikhaki¹; Amin Hammad²
¹Concordia University, Building, Civil and Environmental Engineering, Canada; ²Concordia University, Concordia Institute for Information Systems, Canada
- 12:05 **Dynamic Equipment Workspace Generation For Improving Earthwork Safety Using Equipment Pose And State Data**
Faridaddin Vahdatikhaki¹; Amin Hammad²
¹Concordia University, Building, Civil and Environmental Engineering, Canada; ²Concordia University, Concordia Institute for Information Systems, Canada

Chairperson: Isaac Shabtai

- 11:05 **Planning For Scanning Using Building Information Models: A Novel Approach With Occlusion Handling**
Humayun Biswas; Frederic Bosche; Ming Sun
Heriot-Watt University, School of Built Environment, United Kingdom
- 11:25 **Development Of O&M Data Management System For Pipeline Project In Permafrost Area**
Seo-Kyung Won; Chang-Han Kim; Choong-Hee Han; Junbok Lee
Kyung Hee University, Architectural Engineering, Korea, Republic of
- 11:45 **Integration Of Smart Glass Technology For Information Exchange At Construction Sites**
Sungwoo Moon¹; Jongwon Seo²
¹Pusan National University, #509 Construction Bldg., Pusan National University, Korea, Republic of; ²Hanyang University, Department of Civil and Environmental Engineering, Korea, Republic of
- 12:05 **Optimization Of The Quantity Take-off (QTO) Process For Mechanical, Electrical And Plumbing (MEP) Trades In Tender Estimation Phase Of The Construction Projects.**
Milad Rajabi¹; Thomas Bigga²; Mathias A.Bartl¹
¹Max Boegl, Germany; ²University of Stuttgart, Construction Management, Germany

11:00 - 12:30 **Session 2 C 2**

Room IT
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Chairperson: Koshy Varghese

- 11:05 **Automated Progress Monitoring Based On Photogrammetric Point Clouds And Precedence Relationship Graphs**
Alexander Braun¹; Sebastian Tuttas²; André Borrmann¹; Uwe Stilla²
¹TU München, Computergestützte Modellierung und Simulation, Germany; ²TU München, Photogrammetrie und Fernerkundung, Germany
- 11:25 **A Wireless System For Real-time Environmental And Energy Monitoring Of A Metro Station: Lessons Learnt From A Three-year Research Project**
Maddalena Nurchis¹; Mikko Valta¹; Massimo Vaccarini²; Alessandro Carbonari²
¹VTT Technical Research Centre of Finland, Italy; ²Università Politecnica delle Marche, DICEA, Italy
- 11:55 **Sensor Placement To Monitor Launching Girder Operations In Segmental Construction**
Ranjith K. Soman; Benny Raphael; Koshy Varghese
Indian Institute of Technology Madras, Department of Civil Engineering, India
- 12:05 **Integrated Framework For Automating The Structural Design Iteration**
Purva Mujumdar; J. Uma Maheswari
Indian Institute of Technology Delhi, Civil Engineering, India

11:00 - 12:15 **Session 2 D 2**

Room IT
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Chairperson: Tomi Makkonen

- 11:05 **Design And Implementation Of A Novel Cost-effective Fall Detection And Intervention System For Independent Living Based On Wireless Sensor Network Technologies**
Alexander Liu Cheng; Christos Georgoulas; Thomas Bock
Chair for Building Realization and Robotics, TUM, Germany
- 11:25 **Adaptive Speed And Sensitivity Configuration With Parallel Health Status Validation Via A Gesture-Based Controller - Robotic Arm Interface**
Joerg Guettler; Christos Georgoulas; Thomas Bock
Chair for Building Realization and Robotics, TUM, Germany

12:15 - 13:30 Lunch

Restaurant
Kastari

13:30 - 15:00 Session 2 A 3

Saalastin
sali

Chairperson: Ilkka Romo

13:35 **Drivers And Impediments Of Building Information Modelling From A Social Network Perspective**

Hemanta Doloi¹; Koshy Varghese²; Raphael Benny²

¹The University of Melbourne, Faculty of Architecture, Building and Planning, Australia; ²Indian Institute of Technology Madras, Department of Civil Engineering, India

13:55 **A Decision Support System (DSS) For Constructability Assessment In Seismic Retrofit Of Complex Buildings**

Vito Getuli; Tommaso Giusti; Pietro Capone

University of Florence, Dipartimento di Ingegneria Civile e Ambientale, Italy

14:15 **Evaluation Of Agent-Based And Discrete Event Simulation For Modeling Construction Earthmoving Operations**

Emile Zankoul¹; Hiam Khoury¹; Rita Awwad²

¹American University of Beirut, Civil & Environmental Engineering, Lebanon; ²Lebanese American University, Civil & Environmental Engineering, Lebanon

14:35 **Automatic Recognition Of Construction Worker Activities Using Dense Trajectories**

Jun Yang¹; Zhongke Shi²; Ziyang Wu¹

¹Northwestern Polytechnical University, School of Mechanics, Civil Eng. and Architecture, China; ²Northwestern Polytechnical University, School of Automation, China

13:30 - 15:00 **Session 2 B 3**

Room L 10

Chairperson: Anu Karvonen

13:35 **Is BIM Big Enough To Take Advantage Of Big Data Analytics?**

Fabiano Correa

University of Sao Paulo, Av. Prof. Almeida Prado, Trav. 2, n. 83, Brazil

13:55 **Computational Support For Tunneling Activities: A Case Study In The Construction Of The New Subway System Of Santiago, Chile**

Miguel Mora; Mauricio Toledo; Juan Sandoval

Universidad Andres Bello, Construction Engineering, Chile

14:15 **Fabrication Of BIM CAVE 2: Challenges In Handling 9 Video Walls**

Julian Kang; Jaeheum Yeon

Texas A&M University, Department of Construction Science, United States

13:30 - 15:00 **Session 2 C 3**

Room IT
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Chairperson: Mika Jaakkola

13:35 **Inspection Robot In Complicated 3D Environments**

Tatsuo Arai; Kazuto Kamiyama; Pakpoom Kriengkamol; Yasushi Mae; Masaru Kojima; Mitsuhiro Horade

Osaka University, Japan

13:55 **Revealing The "Invisible Gorilla" In Construction: Assessing Mental Workload Through Time-frequency Analysis**

Jiayu Chen¹; Xiaowei Luo¹; Bin Ren²; Xinyi Song³

¹City University of Hong Kong, Department of Architecture and Civil Engineering, Hong Kong; ²China State Key Laboratory of Fluid Power Transmission and Control, Zhe Jiang University, School of Mechanical Engineering, China; ³Georgia Institute of Technology, School of Building Construction, United States

14:15 **Attenuation-based Methodology For Condition Assessment Of Concrete Bridge Decks Using GPR**

Kien Dinh¹; Nenad Gucunski¹; Jinyoung Kim¹; Trung Duong¹; Hung La²

¹Rutgers University, Department of Civil and Environmental Engineering, United States; ²University of Nevada, Reno, Department of Computer Science and Engineering, United States

13:30 - 15:00 **Session 2 D 3**

Room IT
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Chairperson: Stephen Fraser

13:35 **Management Of A Single-user Multi-robot Teleoperated System For Handling Large Valves In Offshore Plants**

Sunghoon Eom; Seungyeol Lee; Daejin Kim; Jeon Il Moon
DGIST, 333. Techno jungang-daero, Hyeonpung-myeon, Dalseo, Korea, Republic of

13:55 **Embedding Heuristic Rules In RRT Path Planning Of Excavators**

Seied Mohammad Langari¹; Amin Hammad²
¹Concordia University, Building, Civil and Environmental Engineering, Canada; ²Concordia University, Canada

14:15 **Reopening An Abandoned Underground Mine - 3D Digital Mine Inventory Model From Historical Data And Rapid Laser Scanning**

Tomi Makkonen¹; Rauno Heikkilä¹; Jouko Jylänki²; Stephen Fraser³
¹University of Oulu, Finland; ²Otanmäki Mine Oy, Finland; ³Queensland Centre for Advanced Technologies, CSIRO Mineral Resources Flagship, Australia

14:35 **The Applicability Of The Rapid Handled Laser Scanner To Underground Tunnels**

Tomi Makkonen¹; Rauno Heikkilä¹; Annemari Kaaranka¹; Marika Naatsaari²
¹University of Oulu, Finland; ²Outokumpu Chrome Oy, Kemi Mine, Finland

13:30 - 15:00 **Bod meeting 2**

YT116

15:00 - 15:30 **Coffee**

Restaurant
Kastari

15:30 - 17:00 **Session 2 A 4**

**Saastin
sali**

Chairperson: Vineet Kamat

- 15:35 **BIM Procedures For Simulation Of Historical Building Restoration Site**
Carlo Biagini¹; Pietro Capone²; Vincenzo Donato²; Nora Facchini²
¹University of Florence, Department of Architecture, Italy; ²University of Florence,
Department of Civil and Environmental Engineering, Italy
- 15:55 **Utilisation Of A New Terrestrial Scanner For Reconstruction Of As-built Models: A
Comparative Study**
Samad Sepasgozar¹; Samsung Lim²; Sara Shirowzhan³; Peter (Y.M.) Kim¹; Zahra
Moussavi Nadoushani²
¹UNSW, Construction, Australia; ²UNSW, Australia; ³UNSW, GIS Lidar, Australia
- 16:15 **How Sounds Influence People's Safety Decision ----Human Interaction With A Virtual
Reality Simulator**
Xueqing Lu; Steven Davis
UNSW, Australia
- 16:35 **Valuation Of Adaptation Technology To Climate Change Based On Target
Classification**
Sooji Ha; Hoyoung Jeong; Kinam Kim; Hongjo Kim; Hyoungkwan Kim
Yonsei University, School of Civil & Environmental Engineering, Korea, Republic of

Chairperson: Mani Golparvar-Fard

- 15:35 **Global Positioning System Data To Model And Visualize Workspace Density In Construction Safety Planning**
Sijie Zhang¹; Nipesh Pradhananga²; Jochen Teizer³
¹Chevron ETC, United States; ²Florida International University, United States; ³RAPIDS Construction Safety and Technology Laboratory, Germany
- 15:55 **Automated Collection, Identification, Localization, And Analysis Of Worker-Related Proximity Hazard Events In Heavy Construction Equipment Operation**
Jochen Teizer¹; Olga Golovina²; Di Wang³; Nipesh Pradhananga⁴
¹RAPIDS Construction Safety and Technology Laboratory, Germany; ²Moscow State University of Civil Engineering, Russian Federation; ³Atlanta Structural Engineering, United States; ⁴Florida International University, OHL School of Construction, United States
- 16:15 **Magnetic Field Proximity Detection And Alert Technology For Safe Heavy Construction Equipment Operation / Safety 360 Alert Systems**
Jochen Teizer
RAPIDS Construction Safety and Technology Laboratory, Germany
- 16:35 **Statistically Reviewing Construction Accidents Within South Australia During 2002-2013**
M. Reza Hosseini¹; Mojtaba Maghrebi²; Raufdeen Rameezdeen³; S. Travis Waller⁴
¹Deakin University, School of Architecture and Built Environment, Australia; ²University of New South Wales, School of Civil and Environmental Engineering, Australia; ³University of South Australia, School of Natural and Built Environments, Australia; ⁴School of Civil and Environmental Engineering, University of New South Wales, Australia

15:30 - 17:00 Session 2 C 4

Room IT
115

Chair: Rauno Heikkilä

- 15:35 **A BIM-Based Simulation Model For Inventory Management In Panelized Construction**
Samer Bu Hamdan¹; Beda Barkokebas¹; Juan D. Manrique²; Mohamed Al-Hussein¹
¹University of Alberta, Department of Civil & Environmental Engineering, Canada; ²Landmark Group of Builders, Canada
- 15:55 **A Framework For Robot Assisted Deconstruction: Process, Sub-systems And Modelling**
Seongki Lee; Wen Pan; Thomas Linner; Thomas Bock
Technische Universität München, Chair for Building Realisation and Robotics, Germany
- 16:15 **Improvised Scheduling Framework Integrating WS, MS, & DS For Repetitive Construction Projects**
Pawan Pandey¹; Uma Maheswari²
¹Research Scholar, IIT Delhi, India; ²IIT Delhi, Department of Civil Engineering, India
- 16:35 **Flexible Construction Process Management Using Robust Strategy**
Andrzej Karlowski¹; Jerzy Paslawski²
¹Poznan University of Technology, Poland; ²Poznan University of Technology, Department of Civil and Environmental Engineering, Poland

15:30 - 17:00 Session 2 D 4

**Room IT
116**

Chairperson: Stephen Fraser

15:35

Automated Measurement And Estimation Of Concrete Strength By Mobile Robot With Small-sized Grinding Drill

Fumihiko Inoue¹; Satoshi Sato²; Shinya Watanabe³; Satoshi Yuzawa⁴

¹Shonan Institute of Technology, 1-1-25, Japan; ²TS Planing Co. Ltd., Japan; ³Japan Construction Method and Machinery Research Institute, Japan; ⁴Shonan Institute of Technology, Mechanical Engineering, Japan

15:55

Optimized Unmanned Aerial System For Bridge Inspection

Cheng-Hsuan Yang; Ming-Chang Wen; Yi-Chu Chen; Shih-Chung Kang
National Taiwan University, Civil Engineering, Taiwan

15:30 - 17:00 Lab demonstration-Printocent

VTT

18:00 - 19:30 City reception

**Oulu City
Hall**

20:00 - 22:00 Dinner

**Uusi
Seurahuone**

Wednesday, June 17, 2015

09:00 - 10:30 **Session 3 A 1**

**Saalastin
sali**

Chairperson: Thomas Bock

- 09:05 **State Of Research In Automatic As-Built Modelling**
Viorica Patraucean¹; Iro Armeni¹; Mohammad Nahangi²; Jamie Yeung²; [Ioannis Brilakis](#)¹;
Carl Haas²
¹University of Cambridge, Department of Engineering, United Kingdom; ²University of
Waterloo, Department of Civil and Environmental Engineering, Canada
- 09:25 **Modelling The Construction Technology Implementation Framework: An Empirical
Study**
Samad Sepasgozar¹; [Steven Davis](#)²
¹UNSW, High St, Australia; ²UNSW, Australia
- 09:45 **Predicting Carbon Monoxide Emissions With Multivariate Adaptive Regression
Splines (MARS) And Artificial Neural Networks (ANNs)**
[Seth Daniel Oduro](#)¹; Santanu Metia²; Hiep Duc³; Quang P. Ha⁴
¹University of Technology Sydney, Faculty of Engineering and Information Technology,
Australia; ²University Technology Sydney, Faculty of Engineering and Information
Technology, Australia; ³Office of Environment and Heritage, Lidcombe, NSW 1825,,
Australia; ⁴University of Technology, Sydney, Faculty of Engineering and Information
Technology, Australia
- 10:05 **Modeling Emissions Of Construction And Mining Equipment By Tracking Field
Operations**
[Khalegh Barati](#); Xuesong Shen
University of New South Wales, School of Civil and Environmental Engineering, Australia

09:00 - 10:30 **Session 3 B 1**

Room L 10

Chairperson: Isaac Shabtai

09:05 **Laser Scanning And The Continuous Wavelet Transform For Flatness Control**
Frédéric Bosché; Baptise Biotteau
Heriot-Watt University, Centre of Excellence in Sustain. Building Design, United Kingdom

09:25 **Challenges In Generation Of As-is Bridge Information Model: A Case Study**
Varun Kasireddy; Burcu Akinci
Carnegie Mellon University, Civil and Environmental Engineering, United States

09:45 **Relative Information Modelling Based Optimization For Asphalt Pavement Renovation**
Rauno Heikkilä¹; Manu Marttinen²
¹University of Oulu, Finland; ²NCC Roads, Finland

10:05 **Scan-to-BIM - An Overview Of The Current State Of The Art And A Look Ahead**
Hyojoo Son¹; Changwan Kim¹; Yelda Turkan²
¹Chung-Ang University, Department of Architectural Engineering, Korea, Republic of; ²Iowa State University, Department of Civil, Construction and Environmental, United States

09:00 - 10:30 **Session 3 C 1**

Room IT
115

Chairperson: Rauno Heikkilä

09:05 **A Lumped Parameter Model For Dynamic Simulation Of Energy Control Policies Applied To Small Public Buildings**
Riccardo Pontoni; Martina Giuliani; Alessandro Carbonari; Massimo Vaccarini
Università Politecnica delle Marche, DICEA, Italy

09:25 **BIM Enabled Optimisation Framework For Environmentally Responsible And Structurally Efficient Design Systems**
Stathis Eleftheriadis¹; Dejan Mumovic²; Paul Greening³; Angelos Chronis⁴
¹University College London, Price & Myers LLP, Institute for Environmental Design and Engineering, United Kingdom; ²University College London, Institute for Environmental Design and Engineering, United Kingdom; ³University College London, Civil, Environmental & Geomatic Engineering, United Kingdom; ⁴Bartlett School of Architecture, University College London, United Kingdom

09:25 **Microwave-Assisted Removal Of Tiles From Concrete Floors And Walls**
Ali Akbarnezhad¹; KCG Ong²
¹UNSW, Australia, Room 209, School of Civil Engineering, UNSW, Australia; ²National University of Singapore, Department of Civil and Environmental Engineering, Singapore

09:00 - 10:30	Lab demonstration	Oulu Mining School
10:30 - 11:00	Coffee	Restaurant Kastari
11:00 - 12:15	Session 3 A 2	Saalastin sali
Chairperson: Jozef Gasparik		
11:05	<p>A Comparison Of Mixed Integer Programming Models For The Construction Site Layout Problem</p> <p><u>Ahmed W A Hammad</u>; Ali Akbarnezhad; David Rey The University of New South Wales, Australia</p>	
11:25	<p>Optimal Reduction Of Project Risk Severity: A Case Study</p> <p><u>Nael Zabel</u>¹; Maged Georgy²; Moheeb Ibrahim³ ¹WorleyParsons, Saudi Arabia; ²RMIT University, Australia; ³Cairo University, Egypt</p>	
11.45	<p>Inspection Of Flyover Bridges Using Quadrotor</p> <p><u>Alexey Bulgakov</u>¹; Sergei Emelianov¹; Thomas Bock²; Daher Sayfeddine³; Vladimir Erofeev⁴ ¹South West State University, Russian Federation; ²Technical University Munich, Germany; ³South Russian State Polytechnic University, Russian Federation; ⁴State University Mordovia, Russian Federation</p>	
12.05	<p>Mathematical Modelling Of Phosphorus Accumulation In Photo-Biological Treatment Plants Of A Biosphere-Compatible City</p> <p>Natalia Buzalo¹; Pavel Ermachenko²; <u>Alexej Bulgakov</u>³; Thomas Bock⁴ ¹Platov South-Russian State Polytechnic University (NPI), SRSPU, Department of Applied Mathematics., Russian Federation; ²Platov South-Russian State Polytechnic University (NPI), Russian Federation; ³South West State University, Russian Federation; ⁴Technical University of Munich, Germany</p>	

11:00 - 12:15 **Session 3 B 2**

Room L 10

Chairperson: Osama Moselhi

- 11:05 **An Approach To The BIM-enabled Assessment Of Building Circulation Using Quantitative Data And Its Weight**
Jaeyoung Shin; Hyunsoo Lee; Sangik Lee; Seokyoung Park; Hyunjung Kim; Jin-Kook Lee
Hanyang University, Interior Architecture Design, Korea, Republic of
- 11:25 **Comparative Analysis Of Embodied Carbon Associated With Alternative Structural Systems**
Zahra Moussavi Nadoushani; Ali Akbarnezhad
University of New South Wales, School of Civil and Environmental Engineering, Australia
- 11:45 **Automatic Adjustment Of Rod Mill Grinding Based On The Frequency Analysis Of Acoustic Emission**
Rauno Heikkilä¹; Pekka Tyni²; Marko Paavola³; Ilkka Hynynen³
¹University of Oulu; ²University of Oulu, Finland; ³University of Oulu, Mining School, Finland
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11:00 - 12:15 **Session 3 C 2**

Room IT
115

Chairperson: Benny Raphael

- 11:05 **Active Building Structure And Envelope**
Wen Pan¹; Seongki Lee²; Thomas Bock¹
¹Technische Universität München, Chair for Building Realisation and Robotics, Germany; ²Technische Universität München, Arcisstrasse 21, Germany
- 11:25 **An Observational Study On Productivity Of Formwork In Building Construction**
Naoto Mine¹; Soon Han Wai¹; Ting Chuan Lim²
¹Universiti Tunku Abdul Rahman, Department of Construction Management, Malaysia; ²(retired) Universiti Tunku Abdul Rahman, Department of Construction Management, Malaysia
- 11:45 **FloodViz: A Visual-Based Decision Support System For Flood Hazard Warning**
Er-Xuan Sung¹; Meng-Han Tsai²; Shih-Chung Kang¹
¹National Taiwan University, Department of Civil Engineering, Taiwan; ²National Taiwan University, Center for Weather Climate and Disaster Research, Taiwan
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07:00 - 15:00 **Technical excursion**

Kemi mine

12:15 - 13:30 Lunch

Restaurant
Kastari

13:30 - 15:30 Plenary and closing session

Saalastin
sali

Chairperson: Mikko Malaska

13:35 **Benefits Of BIM And Automation Technologies In Construction Sites - Case
Skanska**

Ilkka Romo
Skanska, Finland

14:20 **Automation For Rapid Delivery For Metro Rail Projects**

Koshy Varghese
Indian Institute of Technology Madras Chennai India, India

Thursday, June 18, 2015

08:30 - 12:00 Technical excursion

Valkea
Construction
site
