

# 2022 INTERNATIONAL CONFERENCE FOR ROAD ENGINEERS

## PROGRAM BOOK

by Korean Society of Road Engineers

October 4th - 7th, 2022  
Booyoung Hotel & Resort Jeju

# WELCOME MESSAGE



**Seong-Min Kim**

Chair of ICRE 2022 and  
President of KSRE



**Heung Un Oh**

Chair of the Organizing Committee

It is with great pleasure that we host the 2022 International Conference for Road Engineers (ICRE 2022). The ICRE 2022 is held from October 4 to October 7, 2022 at wonderful Jeju Island in Korea. This event is organized by the Korean Society of Road Engineers (KSRE) and is sponsored by the Ministry of Land, Infrastructure and Transport of Korea, Jeju Special Self-Governing Province, Korea Expressway Corporation, Korea Institute of Civil Engineering and Building Technology, and Korea Transport Institute. Specialists and experts from all over the world in the field of road engineering participate in this conference. The ICRE 2022 is designed to provide a forum for road and transportation engineers to share knowledge about state-of-the-art research technologies and experiences. General topics include pavement, road infrastructure, highway, and transportation. The ICRE 2022 is filled with presentations, workshops, technical tours, an exhibition of industry suppliers, as well as opportunities for social gatherings. We sincerely thank you for your participation and we hope you enjoy the conference.

# CONFERENCE COMMITTEE

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## Conference Chair

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Seong-Min Kim, Chairman      Kyung Hee University

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## Chair of the Organizing Committee

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HeungUn Oh      Kyonggi University  
InTae Kim      Myongji University

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Dan Zollinger	Texas A&M University
Kiju Choi	Ajou University
George Chang	Transtec Group
Young Jae Lee	Morgan state University
Young Su Kim	NC State University
Hosin-david-Lee	Iowa state University
Young Kuk Seo	Kenethaw University
Keizo Kamiya	NEXCO
Sung Hee (Sonny) Kim	Uiniversity of Georgia
Moon Cheol Won	Texastech University
Ulf Sandberg	VTI
Byeong Kyu Park	Virginia Polytechnic Institute and State University

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IRIS Technology  
Seoul City

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Do Kyeong Kim  
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University of Seoul  
Korea Institute of Civil Engineering & Building Technology

### Organizing Committee

Deok Su Son  
Jin-Sun Lim  
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Korea Expressway Corporation Research Institute  
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Myongji University  
Sangmyung University

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Dong Min Lee  
Ju Yeong Park  
Cheol Min Baek  
Jae Jun Lee  
Jeong Hei Nam  
Jin Hoon Jeong  
Hyun Wook Kim  
Dae Wook Park  
Jae Joon Lee  
Geon U Lee  
Chan Deul Chae  
Young Jae Kim  
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Kangwon National University  
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Ministry of Land, Infrastructure and Transport  
Korea Institute of Civil Engineering & Building Technology  
Jeonbuk National University  
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Inha University  
IRIS Technology  
Kunsan National University  
The Korea Transport Institute  
Hanyang University  
The Korea Transport Institute  
Kangwon National University  
Kangwon National University

# 2022 INTERNATIONAL CONFERENCE FOR ROAD ENGINEERS

by Korean Society of Road Engineers

## Tuesday, October 4

17:00 - 18:30 **Welcome Reception**

## Wednesday, October 5

09:00 -

**Registration**

09:15 - 09:30

**Opening Ceremony of Exhibition Booth**

09:30 - 10:00

**Opening Speech**

◆ *Seong-Min Kim, President, Korean Society of Road Engineers, Korea*

**Welcome Speech**

◆ *Young-Hun Oh, Governor of jeju Special Self-Governing Province, Korea*

**Congratulatory Speech**

◆ *Hee-Ryong Won, Minister, Ministry of Land, Infrastructure and Transport, Korea*

◆ *Won-Wook Lee, Member of the National Assembly, Korea*

◆ *Byung-Wook Kim, Member of the National Assembly, Korea*

◆ *Byung-Suk Kim, President, Korea Institute of Civil Engineering and Building Technology, Korea*

◆ *Ju-Gi Cho, Executive Manager Director, Korea Expressway Corporation, Korea*

◆ *George K. Chang, President, International Society of Intelligent Construction, USA*

10:00 - 10:50

**Keynote Speech**

"Role of Concrete Curing and Joint Sealant Performance Factors in Pavement Design"

- **Dan Zollinger**, Professor, Texas A&M University, USA

10:50 - 11:40

**Keynote Speech**

"Changes and Innovations in Road Engineering in the Era of Digital Transformation"

- **Keechoo Choi**, President of Ajou University, Korea

11:40 - 13:00

**Luncheon**

**Diamond Restaurant, Hotel 1F**

13:00 - 15:00	<b>Emerald A</b> <b>Workshop</b> Asphalt Concrete Pavement 1	<b>Emerald B</b> <b>Workshop</b> Cement Concrete Pavement 1	<b>Board Room 1</b> <b>Workshop</b> Maintenance and Repair 1	<b>Board Room 3</b> <b>Workshop</b> Transportation Engineering 1
15:00 - 15:30 <b>Coffee Break &amp; Poster Session</b>				
15:30 - 17:00	<b>Emerald A</b> <b>Workshop</b> Asphalt Concrete Pavement 2	<b>Emerald B</b> <b>Workshop</b> Cement Concrete Pavement 2	<b>Board Room 1</b> <b>Workshop</b> Maintenance and Repair 2	<b>Board Room 3</b> <b>Workshop</b> Transportation Engineering 2
17:30 - 19:30	<b>Banquet</b> <b>Sapphire Hall</b>			

## Thursday, October 6

09:00 - 09:50	<b>Keynote Speech</b> "Shared Mobility - Can It be Our Solution for Future Mobility?" - <b>Young Jae Lee</b> , Professor, Morgan state University, USA			
09:50 - 10:40	<b>Keynote Speech</b> "Intelligent Construction – Present and Future" - <b>George K. Chang</b> , President of the ISIC, Director of Research, The Trastec Group, USA			
10:40 - 12:30	<b>Emerald A</b> <b>Oral Presentation</b> <Session A> Asphalt Concrete Pavement	<b>Emerald B</b> <b>Oral Presentation</b> <Session D> Cement Concrete Pavement 1	<b>Board Room 1</b> <b>Oral Presentation</b> <Session G> Transportation Design & Planning	<b>Board Room 3</b> <Special Session> Safety and Noise of Expressways
12:30 - 13:30	<b>Luncheon</b> <b>Diamond Restaurant, Hotel 1F</b>			



13:30 - 15:00	<b>Emerald A</b> <b>Oral Presentation</b> <Session B> New & Advanced Technology	<b>Emerald B</b> <b>Oral Presentation</b> <Session E> Cement Concrete Pavement 2	<b>Board Room 1</b> <b>Oral Presentation</b> <Session H> Traffic Operation1	<b>Board Room 3</b> <Special Session> An Interdisciplinary Approach to Road Transport and Human Values
15:00 - 15:30 <b>Coffee Break &amp; Poster Session</b>				
15:30 - 17:30	<b>Emerald A</b> <b>Oral Presentation</b> <Session C> Pavement Maintenance	<b>Emerald B</b> <b>Oral Presentation</b> <Session F> Composite Pavement & Bridge Deck	<b>Board Room 1</b> <b>Oral Presentation</b> <Session I> Traffic Operation2	<b>Board Room 3</b> <Special Session> R&D Project Session of KNPA

## Friday, October 7

09:00 - 14:00	<b>Technical Tour of Jeju Island</b> 09:00 Departure from Buyoung Hotel 10:20 Pyoseon-Seongeup Prosperity Road (Expansion and pavement section of the natural preservation road) 10:40 Saryani Forest Road 11:20 A Mysterious Road 12:30 Lunch 14:00 Airport 15:00 Arrival at Buyoung Hotel
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# Wednesday, October 5

# Emerald A

## PLENARY KEYNOTE SPEECH



10:00 - 10:50

**Dan Zollinger**

Professor, Texas A&M University, USA

"Role of Concrete Curing and Joint Sealant Performance Factors in Pavement Design"



10:50 - 11:40

**Keechoo Choi**

President of Ajou University, Korea

"Changes and Innovations in Road Engineering in the Era of Digital Transformation"



## Workshop of Asphalt Concrete Pavement



Presiding by **Cheol Min Baek**  
Senior Researcher, KICT, Korea

Theme : Towards Sustainable and Eco-Friendly Asphalt Pavement



**Y. Richard Kim**  
Jimmy D. Clark Distinguished University Professor,  
North Carolina State University, USA

"Mix Design Procedures for Asphalt Mixtures Containing  
Reclaimed Asphalt Pavement (RAP)"



**Hosin David Lee**  
Professor and Director, University of Iowa, USA

"Development of Quality Standards and Performance Database  
for Sustainable Asphalt Pavements"



**Keizo Kamiya**  
Senior Expert, NEXCO Central, Japan

"The Design and Construction of Composite Pavement in Japan"



**Dae Wook Park**  
Professor, Kunsan National University, Korea

"Innovative Materials and Methods for Asphalt Pavement"



**Kyung Won Park**  
Research Director, SG Corporation, Korea

"Long-Term Field Monitoring on the Performance of  
the Steel Slag Hot Mix Asphalt Pavement"

October 5, 13:00 - 17:00 Emerald B

## Workshop of Cement Concrete Pavement



Presiding by **Jeong Hee Nam**  
Research Fellow, KICT, Korea

Theme : Forecasting the Future of Concrete Pavement



**Dan Zollinger**  
Professor, Texas A&M University, USA

"Future of Concrete Pavement Design and Construction: A Perspective"



**Seung Wook Lim**  
Senior Pavement Engineer, California DOT, USA

"Concrete Pavement Sustainability in California"



**Tatsuo Nishizawa**  
Professor emeritus, Ishikawa College, Japan

"Development of Strategic Design and Maintenance Technology  
for 100 Year Serviceable Concrete Pavements in Japan"



**Sung Il Jeon**  
Senior researcher, KICT, Korea

"How to Make Concrete Pavement more Sustainable and Predictable?"



**Sung Woo Ryu**  
Principal researcher, Korea Expressway Corporation, Korea

"The Past, Present, and Future of Concrete Pavement on Expressway in Korea"

## Workshop of Maintenance and Repair



Presiding by **Hyun Wook Kim**  
Executive Director, IRIS Technology, Korea

Theme : **Advanced Pavement Management for the 4th Industrial Generation**



**Ulf Sandberg**  
Senior Research Leader, VTI, Sweden

"Experience in Sweden About the Design and Performance of Noise-Reducing Porous Asphalt Pavements"



**George K. Chang**  
Director of Research The Transtec Group, USA

1. Qualification and Certification for High-speed 3D Pavement Surface Condition Survey Systems
2. Real-Time Construction Quality Monitoring with Intelligent Construction Technologies



**Sung Hee (Sonny) Kim**  
Professor, University of Georgia, USA

"Detecting Subsurface Anomaly Utilizing Synthetic GPR Images and Deep Learning Algorithm"



**Aldous O. Madlangakay**  
Researcher, Sejong University, Korea

"Development of a Node Based GPR Signal Evaluation Algorithm for Pavement Profiling and Bridge Deck Evaluation"



**Hyun Sik Hwang**  
Associate Research Engineer, Chung-Ang University, Korea

"A Study on Structural Performance Evaluation Logic for Airport Pavement using Meta-Heuristic"



**Jong Ho Kim**  
Senior Managing Director, ROADTECH, Korea

"Application of the 4th Industrial Revolution Technology in Road Asset and Safety Management"



**Tran Thai Son**  
Researcher, IRIS Technology, Korea

"AI-based Pavement Distress Evaluation and Network-Level Pavement Management Considering Homogenized Sections"

October 5, 13:00 - 15:00 Board Room 3

## Workshop of Transportation Engineering 1



Presiding by **Seoung Bum Kim**  
Professor, Gyeongsang National University, Korea

Theme : Transportation, the Way to Go



**Chang Mo Kim**  
Associate Project Scientist, UC Davis, USA

"Effect of Public Bus Electrification on Carbon Footprint in USA and UAE"



**Tai Jin Song**  
Professor, Chungbuk University, Korea

"Classification of High Speed Trains Stations based on Car-Sharing Travel Patterns"



**Bum Joon Bae**  
Associate Research Fellow, Korea Transport Institute, Korea



**Soo Hyuk Bang**  
Associate Research Fellow, Korea Transport Institute, Korea

October 5, 15:30 - 17:00 Board Room 3

## Workshop of Transportation Engineering 2



Presiding by Dr. **Choong Heon Yang**  
Research Fellow, KICT, Korea

Theme : Road Safety Ahead



**Tea Jung Kwon**  
Professor, University of Alberta, Canada

"Advancing Winter Transportation Safety, Mobility, and Sustainability using Geostatistics and Deep Learning"



**Cheol Oh**  
Professor, Hanyang University, Korea

"Detection of Riding Risk Events using Inertial Measurement Unit (IMU) Sensor Data"



**Gunwoo Lee**  
Associate Professor, Hanyang University, Korea

## WELCOME BANQUET

Sapphire Hall

17:30 - 18:10 Magic Show

18:10 - 19:30 Banquet

# Thursday, October 6

## Emerald A

### PLENARY KEYNOTE SPEECH



09:00 - 09:50

**Young Jae Lee**

Professor, Morgan state University, USA

"Shared Mobility - Can it be Our Solution for Future Mobility?"



09:50 - 10:40

**George K. Chang**

President of the ISIC, Director of Research, The Trastec Group, USA

"Intelligent Construction – Present and Future"

# Thursday, October 6

## Emerald A

### ORAL PRESENTATION

Emerald A  
10:40 - 12:30

Session Chair :  
**Kyung Won Park,**  
Research  
Director,  
SG Corporation

#### <Session A> Asphalt Concrete Pavement

- A1. Feasibility Study for Circular Pavement Wheel Tracker (CPWT) for Rut-potential Estimation of Asphalt Concrete  
◆ **Yeongsam Kim, Wonbae Kim, Sung Un Kim, Kwang W. Kim**
- A2. Research on the Development of Pavement Methods of High-Strength Medium-Low Temperature Asphalt Modifier for Carbon and Odor Reduction  
◆ **Jong Yul Lee, Choon Soo Kim, Young Wook Kim, Kang Hwi Lee, Youn Ik Kim**
- A3. A Study on the Field Applicability of Block Pavement for Sustainable Road Environment  
◆ **Jeong A Kim, Ho Jun Yoo, Won Ok Baek, In Tai Kim**
- A4. Development of Freeze-and-Thaw Testing Set-up for Subgrade Soils  
◆ **Yonathn Alemu Yami, Dong Hyun Kim, Ji Hoon Kim, Yoon Ho Cho**
- A5. Microbial Attempt to Improve Unpaved Road in Developing Countries as Low Cost and Easy Implementation  
◆ **Jin Ung Do, Hyeong Joon Kim, Yong Joo Kim, Kang Hun Lee, Hae Won Park**
- A6. Use of Waste Fishing Net to Reinforce Lightweight-Foamed Soil  
◆ **Jin Ung Do, Sun Bin Kim, Gil Lim Yoon**

12:30 - 13:30

**Luncheon**

**Diamond Restaurant, Hotel 1F**



Emerald A  
13:30 - 15:00

Session Chair :  
**Ki Hoon Moon**,  
Principal  
researcher,  
Korea  
Expressway  
Corporation

### <Session B> New & Advanced Technology

- B1. Investigation of Pavement Temperature by Depth Using Deep Learning  
◆ **Yonathn Alemu Yami, Hyun Sik Hwang, Young In Im, Yoon Ho Cho**
- B2. AI-Based Pavement Distress Evaluation and Network-Level Pavement Management Considering Homogenized Sections  
◆ **Thai Son Tran, Hyun Jong Lee, Hyun Wood Kim, Ki Deok Kim, Van Phuc Tran, SonDong Nguyen, Jun Sik Lee, Jeong Hun Song**
- B3. Development of a Node Based GPR Signal Evaluation Algorithm for Pavement Profiling and Bridge Deck Evaluation  
◆ **Julius Marvin Vinoya Flores, Hyun Jong Lee, Hyun Wook Kim, Aldous Madlangsakay, Ki Deok Kim**
- B4. Evaluation of Nighttime Visibility over Luminating Road Marking using Brightness Contrast Ratios under Virtual Reality  
◆ **Jiwon Kim, Yu Seop Park, Heung Un OH**
- B5. A Machine Learning-based Approach for Predicting Road Surface Frictions using Dashcam Images  
◆ **Qian Xie, Tae J. Kwon**
- B6. Winter Road Surface Conditions Recognition using Semantic Segmentation and Generative Adversarial Network – A Case Study of Iowa, US  
◆ **Mingjian Wu, Tae J. Kwon**

15:00 - 15:30

### Coffee Break & Poster Session

Emerald A  
15:30 - 17:30

Session Chair :  
**Dong Woo Cho**,  
Managing  
Director,  
Hyundai  
Bridge Co.

### <Session C> Pavement Maintenance

- C1. Development of Korean Airport Pavement Management System Framework Considering Multi Facilities  
◆ **Seung Hyun Roh, Je Il Lee, Yoon Ho Cho**
- C2. Development of Present Performance Prediction model for Local Roads Pavement in Jeju Island  
◆ **Jae Hoon Lee, Jae Hoon Lee, Yeon Tae Kim, Byoung Chan Woo, Byung Sik Ohm, Jin Hoon Jeong**
- C3. Development of the Present Performance Prediction Model for National Road Pavement in Gangwon-Do  
◆ **Byoung Chan Woo, Yeon Tae Kim, Jae Hoon Lee, Hee Won Kwon, Jun Hyeok Ko, Jin Hoon Jeong**
- C4. Development of Black Ice Prediction Computer Program Based on GIS and Meteorology Data  
◆ **Tam Minh Phan, Jung Woo Seo, Tae Hyeong Jin, Anh Truong Nguyen, Dae Wook Park**
- C5. Application Rate of Prewetted Salt for Winter Maintenance  
◆ **Woong Jin Nah, Jin Hwan Jang**
- C6. Correlations Between NOx/PM2.5 Concentrations and Weather Conditions/Traffic Information in Underpass Section  
◆ **Moon Kyung Kim, Ji Su Kang, Eun Seok Choi, Jong Won Gwark**
- C7. Application of Traffic Speed Deflectometer for Road and Airport Pavement Management  
◆ **Karsten Jensen**
- C8. A Study on the Estimation of Road Suspended Dust in Urban Area  
◆ **Ho Jun Yoo, Jeong Yeon Cho, Sung Jin Hong, Gyu Min Yeon, In Tai Kim**

# Thursday, October 6

## Emerald B

### ORAL PRESENTATION

Emerald B  
10:40 - 12:30

Session Chair :

**Byoung Hooi Cho,**  
Professor,  
Sangmyung  
University

#### <Session D> Cement Concrete Pavement 1

- D1. Early-Age Performance of Precast Continuously Reinforced Concrete Pavement at Central Bus Stations  
 ◆ **Sang Min Jeong, Soon Ho Baek, Jeong Hyun Whang, Sang Cheol Park, Seong Min Kim, Eui Seung Hwang, Nock Hee Han**
- D2. Image Clustering Method to Evaluate Consistency of Sprayed Curing Compounds on Concrete Pavements  
 ◆ **Jeong Hyun Whang, Soon Ho Baek, Sang Min Jeong, Kang In Lee, Seong Min Kim**
- D3. Development of Concrete Pavement Profile Measurement Method During Construction Using IoT System  
 ◆ **Moon Gyu Choi, Jin Su Kim, Gye Ju Na, Jin Hoon Jeong**
- D4. Uniformity of Crack Spacing in Advanced Reinforced Concrete Pavement  
 ◆ **Soon Ho Baek, Jeong Hyun Whang, Sang Min Jeong, Kang In Lee, Seong Min Kim, Jun Ho Lee**
- D5. A Case Study: Remedial Methods for Crack Control During the Construction of Airport Apron Pavement Quality Concrete (PQC)  
 ◆ **Sheau Feng Lee, Nur Najwani Kamarulzaman**
- D6. Fundamental Research for Securing the Mechanical Performance of Permeable Concrete using Photocatalyst  
 ◆ **Gi Hyun Kim, Tae Jin Jang, Seung Won Choi, Oli Topendra, Seung Won Kim, Cheol Woo Park**
- D7. Mechanistic-Based Damage Cost Evaluation of Concrete Pavement Systems Subjected to Superloads  
 ◆ **Yong Sung Koh, Halil Ceylan, Sung Hwan Kim, In Ho Cho**

12:30 - 13:30

**Luncheon**

**Diamond Restaurant, Hotel 1F**

Emerald B  
13:30 - 15:00

Session Chair :

**Han Jin Oh,**  
Senior Researcher,  
Seoul Institute  
of Technology

### <Session E> Cement Concrete Pavement 2

- E1. Sensitivity Analysis of Factors Affecting the Potential of Concrete Pavement Growth and Blow-up  
◆ **Young Kyu Kim, Hui Rak Ahn, Lyhour Chhay, Seung Woo Lee**
- E2. Investigation of the Relationship Between Tire-Pavement Interaction Noise and Pavement Texture Condition  
◆ **Jae Hoon Kim, Gwang Hyun Kim, Woo Hyung Jung, Seung Woo Lee**
- E3. Plastic Shrinkage Cracking, Rheology and its Interaction in Latex-Modified Concrete at the Plastic Stage  
◆ **Valerii Panov, Kyoung Ku Yun**
- E4. Combined Effects of PVA Fibers and EOGO Nanoflakes on flexural behaviors of Cement Composite  
◆ **Joo Kyeung Sung, Seok Ju Park, Jung Heum Yeon, Byoung Hooi Cho**
- E5. Microstructure and Mechanical Properties Analysis of Various Carbon Fibers Reinforced Cement Composites  
◆ **Mohammad Shakhawat Hossain, Seung Yeon Han, Kyong Ku Yun**
- E6. Comparative Evaluation of Heat Generation Performance and Mechanical Properties of Carbon-Based Conductive Materials  
◆ **Tae ho Ha, Seung Hak Choi, Chang Seok Song, Kyong Ku Yun**

15:00 - 15:30

### Coffee Break & Poster Session

Emerald B  
15:30 - 17:30

Session Chair :  
**Jae Joon Lee,**  
Profesor,  
Jeonbuk  
University

### <Session F> Composite Pavement & Bridge Deck

- F1. Characterization of Interfacial Shear Strength of Thin Epoxy Overlay for Bridge Deck  
◆ **Jae Hoon Lee, Moon Gyu Choi, Seung Ho Hong, Dong Hyuk Kim, Jin Hoon Jeong**
- F2. Development of Mechanistic-Empirical Design Logic to Predict the Reflection Cracking Life of Composite Pavement  
◆ **Debby Marcelia Andryanti, Phung My Lam, Phat Tien Nguyen, Bruce Alfred Aplicano, Dae Wook Park**
- F3. Tensile Behavior Analysis of Rebar Exposure to High Temperature for Tunnel Fire Damage Diagnosis Method  
◆ **Seungwon Choi, Gi Hyun Kim, Tae Jin Jang, Oli Topendra, SeungWon Kim, Cheol Woo Park**
- F4. Development of Bridge Slab's Bottom Rehabilitation Process using Dry Mix Shotcrete  
◆ **Seung Hak Choi, Tae Ho Ha, Chang Seok Song, Kyong Ku Yun**

# Thursday, October 6

## Board Room 1

### ORAL PRESENTATION

Board Room 1  
10:40 - 12:30

Session Chair :  
**Gunwoo Lee**,  
Associate  
Professor,  
Hanyang  
University

#### <Session G> Transportation Design & Planning

- G1. Evaluating Competitiveness in Land Transport on the Expressway  
◆ **Jung Yeol Hong, You Jeong Kang, Jeong Hoon Moon, Ho Won Lee, Jun Ho ye, Yoon Hyuk Choi**
- G2. A Study on the Optimal Location of Shared E-scooter Parking Space using Regression Model and Survey Technique  
◆ **Dae Won Kim, Su Hwan Kim, Na Yeon Kim, Dong Min Lee**
- G3. Traffic Impact Analysis of Underground Expressway Construction in Seoul: Focused on the Seobu Underground Expressway  
◆ **Hyung Joon Bang, Tae Young Kim, Young Kyun Kang, Jae Young Jung**
- G4. Analysis of Effectiveness of Installation of E-Bike Charging Station Based on E-Bike Sharing Service Data  
◆ **Jae Young Jung, Young Kyun Kang, Tae Kyoung Kim**
- G5. A Scenario for the Capacity Calculation of Mixed and Uninterrupted Traffic Flow Based on Lv4+ Autonomous Cooperative Driving  
◆ **Seong Chae Baek, Je Jin Park**
- G6. The accuracy of Road Traffic Forecasts: Forecast Bias and Forecast Efficiency  
◆ **Ki Min Kim, Dong Joo Park**
- G7. A Study on the Systematic Standard Model of School Zone Reflecting Various Road Factors  
◆ **Ui Bum Chun, So Myoung Shin, Vo Dinh Quang Nhat, Soo Beom Lee**

12:30 - 13:30

**Luncheon**

**Diamond Restaurant, Hotel 1F**

Board Room 1  
13:30 - 15:00

Session Chair :  
**Ho Cheol Park,**  
Professor,  
Myongji University

### <Session H> Traffic Operation1

- H1. Effect of No Lane Changing in Tunnel Section  
◆ **Seung Jun Lee, Seung Kirl Baek**
- H2. Estimation of a Traffic Accident Probability Model for Underground Road Junctions using VISSIM  
◆ **Zion Park, Byong Chan Shin, Gun Woo Lee, Choong Heon Yang**
- H3. Investigating Factors Influencing the occurrence time of Drowsiness  
◆ **Chae Rim Lee, Seo Hyeon Park, Do Gyeong Kim**
- H4. Enhancement of Warning Signs for Black Ice based on Driving Simulator Experiments  
◆ **Ghang Shin Lee, Soon Cheon Hwang, Dong Min Lee**
- H5. A Study on Economic Benefit Measurement of Seoul Subway Tagless System Using CVM Method  
◆ **Ho Hyuk Na, Ung Seok Yu, Do Gyeong Kim**
- H6. Mode Choice in Transportation of Immigrants in Seoul, South Korea  
◆ **Dinh Quang Nhat Vo, So Myoung Shin, Soo Beom Lee**

15:00 - 15:30 **Coffee Break & Poster Session**

Board Room 1  
15:30 - 17:30

Session Chair :  
**Bum Joon Bae,**  
Associate  
Research Fellow,  
Korea Transport  
Institute

### <Session I> Traffic Operation2

- I1. A Survival Analysis of Traffic Breakdown on Urban Freeways  
◆ **Jin Hak Lee, Young Jun Han, Ha Sik Lee**
- I2. A Study on Relief of Transportation Inconvenience for the Local Resident through the Installation of the 3rd Maritime Bridge  
◆ **Rae Jin Park, Yong Hui Choi, In Hui Jang, Hyung Chan Lee**
- I3. Performance Evaluation of Speed Humps by Shape Using Vibration Dose Value  
◆ **Hong Kyun Kim, Do Gyeong Kim**
- I4. Smart Queue Management System  
◆ **Tavanam Vishnu Vardhan Reddy**
- I5. Prioritization of Factors Considered for the Application of Tagless Gate System in Subway Stations  
◆ **Ji Hye Kang, Young Shin Kim, Do Gyeong Kim**

## SPECIAL SESSION

October 6, 10:40 - 12:30 Board Room 3

# Safety and Noise of Expressways



Presiding by Dr. **Seung Hwan Han**  
Senior Research Adviser,  
Korea Expressway Corporation Research Institute, Korea



**Hyung Bae Kim**  
Division Director, Korea Expressway Corporation Research Institute, Korea  
"Welcome Address & Introduction"



**Tae Hun Lee**  
Deputy Principal Researcher,  
Korea Expressway Corporation Research Institute, Korea  
"Safety Performance of Climbing Lanes under Various Traffic Volume Conditions"



**Byung Chan Lee**  
Professor, Korean National University of Transportation, Korea  
"Noise Assessment of Porous Asphalt Pavement in South Korea Expressways"



**Ulf Sandberg**  
Senior Research Leader, VTI(Swedish Road Research Institute), Sweden  
"Noise Measurement Technology for Noise-Reducing Pavements"



**Keizo Kamiya**  
Senior Expert , NEXCO(Japan Expressway Corporation), Japan  
"Noise Mitigation of Porous Asphalt Pavement in Japan Expressways"

October 6, 13:30 - 15:00 Board Room 3

# An Interdisciplinary Approach to Road Transport and Human Values



Presiding by Dr. **Soo Ahn Kwon**

Research Fellow,  
KICT (Korea Institute of Civil Engineering and Building Technology), Korea



**Jin Woo Park**

Research Associate, Kyonggi University, Korea

"Flexible Curb Space Use in the Era of Autonomous Vehicles:  
On the Modeling and Simulation of Allocation"



**Su Ji Kim**

Research Associate,  
KAIST (Korea Advanced Institute of Science and Technology), Korea

"Non-Linear Impacts of Pandemic on Intra-City Mobility Patterns:  
a Comparative Analysis of Private Car and Public Transport"



**Ji Hye Byun**

Assistant Professor, University of Seoul, Korea

"Analysis of the Bus Drivers' Job Satisfaction Based on the Survey in South Korea"



**Hyeon Mi Kim**

Assistant Professor, Korea Aerospace University, Korea

"Design and Performance Evaluation of Unconventional Interchange and  
Intersection Designs: Analysis Tools and Practices"



**Ho Jung Kim**

Senior Research Associate,  
KRIHS (Korea Research Institute for Human Settlement), Korea



**Heung Un Oh**

Professor, Kyonggi University, Korea



**Young Soo Chang**

Executive Vice President, HDC Hyundai PCE, Korea



October 6, 15:30 - 17:30 Board Room 3

# R&D Project Session of KNPA(KoROAD)



Presiding by Dr. **Ki Tae Jang**  
Associate Professor, KAIST, Korea

**Theme : Development of Automated Traffic Violation Enforcement Equipments Eased on the Image Processing Technology and its Operating Platform**



**Shin Hyoung Park**  
Associate Professor, University of SEOUL, Korea

"Development of Video Processing-Based Automated Traffic Violation Enforcement Equipment and its Operating Platform"



**Yo hee Han**  
Research Professor, University of SEOUL, Korea

"Development of Video Processing-Based Automated Traffic Violation Enforcement Equipment and its Operating Platform"



**Seung Ryong Chae**  
Executive Director, BISTelligence, Korea

"Development of Traffic Control Equipment Based on AI Image Analysis Technology"



**Sun Jung Kim**  
Managing Director, PINTEL, Korea

"Development of Operating Platform Implementing Smart Traffic Enforcement System"



**Kyung Sik Hong**  
Senior Researcher, KoROAD, Korea

"Development of Video Processing-Based Automated Traffic Violation Enforcement"



**Ji Sup Shim**  
Research Fellow, KAIST Eco-friendly and Smart Vehicles Research Center, Korea



**Sang Hoon Son**  
Research Fellow, Jeju Research Institute, Korea

# Woojung Hall Robby

10:00, October 4, Wednesday - 17:30, October 7, Thursday

## POSTER PRESENTATION

### Asphalt Concrete Pavement

- P1. A Fundamental Study of Recycled Warm-mixed Asphalt with 50% RAP  
◆ Su Min Park, Chi Su Lim, Dae Seong Jang, Sang Hyeok Youn, Yu Seung Choi, Jae Jun Lee
- P2. A Pilot Project for the Maintenance Case of Asphalt Pavement Using Basalt Aggregate  
◆ Deok Soon An, Hee Beom Park
- P3. A Study on the Characteristics of Recycled Asphalt Mixtures Using Foamed Asphalt  
◆ Sang Gu Park, Jin Hoon Jeong
- P4. A Study on the Properties Evaluation before and after Construction for the Preventive Maintenance Method of Highway asphalt Pavement  
◆ Sung Ho Bae, Dong Hyun Lee, Soon Min Kwon, Hyung Bae Kim
- P5. Analysis on Performance of Asphalt Bridge Deck Pavement using Expressway LTPP Data  
◆ Hee Young Park, Jae Hoon Lee, Hyung Chul Mun, Tae Soo Kim, Jung Hun Lee
- P6. Basic Physical Property Test on Aging Characteristics of Recycled Warm-Mix Asphalt Mixture  
◆ Byeong Jun Kim, Soon Je Jeon, Joo Hong Park, Oh Sun Kwon, Kyung Ha Lee
- P7. Behaviour Analysis of Unpaved Roads by Surface Treatment Materials  
◆ Yong Joo Kim, Hae Won Park, Kyung Nam Kang, Kang Hun Lee, Hong Jun Kwon
- P8. Characteristics Evaluation of Asphalt Mixture for Efficient Road Management  
◆ Yeong Min Kim, Kyung Nam Kim, Byung Sik Uhm, Cesar Fernando Paiva Lezcano, Miguel Matias Flores G.
- P9. Evaluating the Physical Properties of the Warm Mix Asphalt  
◆ Nam Ho Kim, Jae Won Jo, Jung Hee Lee, Byeong Jun Kim, Joo Hong Park
- P10. Evaluation of Basic Properties and Laboratory Performance of Asphalt Mixtures using Basalt Aggregates  
◆ Soo Hyun Han, Cheol Min Baek
- P11. Evaluation of NOx Reduction Effect on Asphalt Pavement of Including TiO<sub>2</sub> and Asphalt Rejuvenator  
◆ Jong Won Lee, Sung Lin Yang
- P12. IoT Systemization of Marshall stability Test with Various Control Condition  
◆ Jun Seong Choi, Sang Jin Kim, Hyeon Ho JIN
- P13. Korea Expressway Field Investigation to Evaluate Noise Reduction Rate of Porous and Stone Mastic Asphalt Pavement Using CPX  
◆ Woo Young Cho, Oh Sun Kwon, Jong Sub Lee, Kyung Ha Lee, Yu Joong Hwang
- P14. Laboratory Performance Evaluation of the Foamed Recycling Warm-Mix Asphalt (FR-WMA) Mixture Using the Pre-Treatment RAP Process  
◆ Byung Soo Yoo, Ji Hoon Park, Yong Joo Kim
- P15. Permeability Evaluation of Porous Asphalt Mixtures used for Korea Expressway Using Laboratory Tests and CT Analyses  
◆ Yu Joong Hwang, Jong Sub Lee, Oh Sun Kwon, Kyung Ha Lee

- P16. Study on the Performance Evaluation of Asphalt Reinforced SBS Modified Mastic Carbon Fiber and Artificial Aggregate  
◆ Ji Hoo Seol, Hyungll Ga, Sung Ho Mun
- P17. Temperature Reduction Effects of Foamed Warm-Mix Asphalt Technology Using a Newly Developed Foaming Facility for Batch Type Mixing Plant  
◆ Yong Joo Kim, Kang Hun Lee
- P18. An Experimental Study on the Optimal Mixing Ratio of Backfill Material Using Stone Sludge  
◆ Hee Beom Park, Deok Soon An
- P19. Development of Strength and Mixing Standards for Ground Improvement Materials considering the Characteristics of Paraguay's Ground  
◆ Jong Nam Do, Na Gyoung Kim, Joes Amancio Gonzalez Aranda, Mariana Kallus, Osvaldo Ramon Mascareno Vera
- P20. A Development of Digital Solution for Automated Quality Test Management at Road Construction Site  
◆ Hyun Chul Oh, Young Hwan Shin, Sung Oh Byun, Ki Hyun Baek
- P21. A Study on Measurement Method of Fugitive Dust Generated from Vehicles Transporting Construction Materials  
◆ Sung Lin Yang, Cheol Min Baek
- P22. A Study on the Road Suspended Dust Reduction Using Dust Suppressants  
◆ Sung Jin Hong, Jeong Yeon Cho, Gyu Min Yeon, Woo Young Yeom, Min Chul Lee, In Tai Kim
- P23. Calculation of the Amount of Re-Scattering Dust on the Highway  
◆ Hye Jin Kang, Chul Hwan Kim
- P24. Development and Effectiveness of Removal Vehicles to Reduce Suspended Dust on Block Pavement  
◆ Ho Jun Yoo, Jeong A Kim, Sung Mo Cho, Won Ok Baek, In Tai Kim
- P25. Distribution of Fertilizers and Deicer from Compounds in The Soil Water around Highway  
◆ Byung Duk Lee, Yu Seok Gong
- P26. Estimation of Pollutant Source through Analysis of Components of Scattering Dust on Highway  
◆ Hye Jin Kang, Hee Man Kang
- P27. Tracing the Distribution of Deicer using Sodium Adsorption Ratio(SAR) of Soil around Highway Areas  
◆ Byung Duk Lee, Yu Seok Gong
- P28. Feasibility Study for Plastic Waste Recycling as an Aggregate in the Asphalt Mixture  
◆ Jong Myung Lee, Sang Kyu Cho, Do Yeong Jung, Sang Yum Lee, Yeong Min Kim
- P29. Field Application Study with Pelletized Asphalt Paving Material using Waste Tire  
◆ Yoon Shin Bae, Yeong Min Kim, Sang Yum Lee
- P30. Evaluation of the applicability of VTB/VR on the Bituminous Material for the Asphalt Pavement  
◆ Dae Yeol Kwak, Sung Lin Yang, Sung Do Hwang, Sang Yum Lee
- P31. Development of a Quality Monitoring System for Asphalt Batch Plants  
◆ Nam Ho Kim, Nader Nciri, Hyung Soo Jung, Hyung Joon Ji, Hong Suk Yang, Ju Hong Park, Young Jun Park, Pil Suk Mun

# POSTER PRESENTATION

## Cement Concrete Pavement

- P32. A Study on the Correlation between Field and Mock-up Test for the Verification of Friction Characteristics of Concrete Pavement by Subbase  
◆ **Sung Ho Bae, Jae Joon Lee, Won Kyong Jung, Sung Woo Ryu**
- P33. Alternative Strength Monitoring of Cement Concrete Pavement Based on Compressive Strength  
◆ **Tae Seok Yoo**
- P34. Application of Precast Concrete Pavement for Road Infrastructure in Seoul  
◆ **Gyeong Hoon Ma, Han Jin Oh, Won Jae Kim, Jong Eun Baek, In Kwang Ahn**
- P35. Durability Performance of Cement Composites Treated by Strontium Nitrate ( $\text{Sr}(\text{NO}_3)_2$ ) Aqueous Solution  
◆ **Seong Hwan Park, Joo Kyeung Sung, Boo Hyun Nam, Byoung Hooi Cho**
- P36. Design of Precast Concrete Pavement for the Exclusive Median Bus Stop  
◆ **Gyeong Hoon Ma, Han Jin Oh, Byoung Hooi Cho, Seong Min Kim, Won Jae Kim**
- P37. Design of Terminal Areas of Precast Continuously Reinforced Concrete Pavement for Bus Stations  
◆ **Kang In Lee, Sang Min Jeong, Soon Ho Baek, Jeong Hyun Whang, Sang Cheol Park, Seong Min Kim, Seok Hyeon Kim**
- P38. Development and Performance Evaluation of Expansion Joint for Continuous Construction  
◆ **Sung Woo Ryu, Jae Hoon Lee, Sung Ho Bae, Dong Hang Lee**
- P39. Development of Concrete Overlay Pavement Design Catalog Considering the Mechanical Condition of Aged Concrete Pavement  
◆ **Joung Min Lee, Jae Hoon Lee, Hae Won Park, Hyo Won Kim, Jin Hoon Jeong**
- P40. Establishment of Stress Relief Joint Installation Standards for Concrete Pavements Scheduled to be Overlaid with Asphalt  
◆ **Jae Hoon Lee, Dong Hyun Lee, Sung Woo Ryu, Sung Ho Bae**
- P41. Evaluation of Concrete Pavement Applicability through Long Term Performance survey of Paraguay Cement Concrete Pavement  
◆ **Diego Gonzalez Arrua, Felipe Eduardo Peralta Duarte, Sung Il Jeon, Jeong Hee Nam**
- P42. Evaluation of Freeze-thaw Resistance of Concrete Pavement with Estimated Standing Water  
◆ **Jong Ho Kim, Kyung Bae Lee, Hyung Chul Moon, Hyun Seok Kim, Deuck Su Sohn, Jae Hoon Lee**
- P43. Experimental study on Chemical Prestressing of Cement Composites using Strontium Cations ( $\text{Sr}^{2+}$ )  
◆ **Seok Ju Park, Seong Hwan Park, Boo Hyun Nam, Byoung Hooi Cho**
- P44. Experimental Study on the Characteristics of Roller-Compacted Concrete using Coal Bottom Ash  
◆ **Kyoung Su Kim, Ngiseng Seav, Hui Rak Ahn, Seung Woo Lee**
- P45. Field Feasibility Test of Monitoring System of Sprayed Curing Compound Consistency Based on IoT Technology  
◆ **Jeong Hyun Whang, Sang Min Jeong, Soon Ho Baek, Seong Min Kim**
- P46. Field Implementation of 2-Lift Exposed Aggregate Concrete Pavement using Small Size Aggregate  
◆ **Seung Hwan Han, Joon Young Park, Chhorn Chamroeun**

- P47. Measurements of Vertical Displacement Along the Edge of CRCP by Temperature Effect  
◆ **Tae Seok Yoo**
- P48. Optimum Joint Saw-Cutting Maturity Determined by Non-Contact Ultrasound and IoT Temperature Sensors  
◆ **Sung Chul Yang, In Suk Oh, Ju Hwan Yeon, Young Sun Ryuh, Jin Young Hong, Ho Min Song, Ha Jin Choi**
- P49. Performance of Thin Epoxy Overlay Bridge Deck Test Section  
◆ **Seung Ho Hong, Moon Gyu Choi, Jin Hoon Jeong**
- P50. Permeable Polycon Pavement to Improve Urban Environment  
◆ **Ho Seong Jeon, Jae Geun Lee, Young Chan, Yung Tak Oh, Seong Kyum Kim**
- P51. Real-Time Profile Measurement and Validation of Cement-Concrete Pavements  
◆ **Jin Su Kim, Moon Gyu Choi, Gye Ju Na, Jin Hoon Jeong**
- P52. The Thermal Expansion Coefficient Test of Concrete Pavement According to Admixture Type and Ratio  
◆ **Yu Kyung Kim, Jae Hoon Lee, Jae Hoon Lee, Byeong Jun Kim, Sang Gu Park, Hyuk Ju Kang, Jin Hoon Jeong**
- P53. Verification of IOT-based System for Increasing the Service Life of Concrete Pavement  
◆ **Chang Won Lee, Moon Gyu Choi, Gye Ju Na, Jin Hoon Jeong**
- P54. Performance of Mortars using Organic-inorganic Repair Materials  
◆ **Seung Tae Lee, Se Ho Park, Jae Nam Hwang, Jong Pil Kim**
- P55. The Performance Evaluation Test of Composite Reflective Sheet for the Development of Road Traffic Safety Facilities to which Low-Temperature Sensitive Materials are Applied  
◆ **Jong Min Han, Nam Gyu Kim, Jae Yong Park, Kyung Eun Kim**
- P56. Shrinkage Characteristics of High-Performance Concrete with Colloidal Silica and Silica Fume Addition  
◆ **Seung Yeon Han, Seung Hak Choi, Tae Ho Ha, Kyong Ku You**
- P57. Maintenance of Airside Rigid Pavement using Magnesium Phosphate Ceramic  
◆ **Nam Hyun Cho, Kyung Hwan Min, Si Wook Lee, Jin Sun Lim**
- P58. Investigation of Compressive Strength Model for ASR Reduction Cement Concrete Using Maturity  
◆ **Hyun Sik Hwang, Dong Hwan Kim, In Kyu Kim, Seung Hyun Roh**
- P59. A Study on the Causes of Failure on the Bus Stop Pavement of the Urban Road  
◆ **Sang Yum Lee, Jong Eun Baek, Tae Woo Kim, Sang Min Han**
- P60. The Evaluation of Curing Degree of Tack Coat by Image Data Analysis  
◆ **Sang Yum Lee, Dong Seok Song, Jun Ho Kim, Kyu Dong Jeong, Seong Do Hwang**
- P61. Numerical Analysis on The Dowel Action of CRCP Reinforced by GFRP  
◆ **Seung Hwan Han, Sung Woo Ryu**
- P62. Application of Life Cycle Assessment to Expressways in South Korea-Its Importance and Challenges  
◆ **Seung Hwan Han, Ki Hoon Moon**

# POSTER PRESENTATION

## Pavement Management

- P63. A Study on the Mock-up Test of Deterioration Detection Technique in Concrete Pavement Using GPR  
◆ Jiwon Kim, Sung Ho Bae, Dong Hyun Lee, Jae Hoon Lee, Dong Hang Lee
- P64. Analysis of Gyeonggi-do Pavement Management System  
◆ Jung Moo Kim, Yong Man Kim, Chang Ook Kim, Ki Deok Kim, Hyun Wook Kim, Hyung Jong Lee
- P65. Analysis on Effectiveness According to Expressway Pavement Rehabilitation Type  
◆ Jae Hoon Lee, Jung Hun Lee, Jang Rak Kim, Hee Young Park, Chul Ki Jung
- P66. Comparative Analysis of Condition Evaluation of the Bridge Pavement According to Surface Inspection Method  
◆ Gyeong Hoon Ma, Han Jin Oh, Jung Hun Lee, Jin Hwan Park
- P67. Development of 3D Profile-Based Standing Water Simulation Method using Watershed Algorithm  
◆ Jong Ho Kim, Kyung Bae Lee, Hyung Chul Moon, Jang Rak Kim, Dueck Su Sohn, Jae Hoon Lee
- P68. Development of Bridge Pavement Index for the Maintenance of Bridge Pavement System in Seoul Metropolitan City Using GPR  
◆ Sang Yum Lee, Han Jin Oh, Gyeong Hoon Ma, Byoung Hooi Cho
- P69. Evaluation of Cavity Management Program under Pavement System in Seoul Metropolitan City  
◆ Sang Yum Lee, Jeong Jun Park, Byoung Hooi Cho
- P70. Evaluation of Localized Roughness in Korea Expressway Based on Ride Comfort  
◆ Dueck Su Sohn, Jae Hoon Lee, Kyung Bae Lee, Jong Ho Kim, Hyung Chul Moon
- P71. Investigation and Analysis of PMS for Evaluation of the Pavement Condition in Jeju Island  
◆ Hae Kook Jung, Su Hyung Lee
- P72. Preliminary Study on Data Quality Variation of Walking Profiler Test for Measuring International Roughness Index  
◆ Dueck Su Sohn, Soon Min Kwon, Kyung Bae Lee, Jong Ho Kim, Hyung Chul Moon
- P73. A smart Surveillance System for Monitoring Winter Road Surface Conditions  
◆ Jun Yong Park, Min Cheol Park, Han Jin Oh, Kee Sei Lee, Gyeong Hoon Ma, Min Ji Kwon, Jun Chul Kim
- P74. A Study on Optimal Maintenance Time for Steel Bridge Coatings Considering Deterioration Degree  
◆ Chan Young Lee
- P75. A Study on the Priority and Decision-Making of Mid to Long Term Maintenance Investment in Road Bridges  
◆ Dong Hyun Lee, Ji Won Kim, Sung Ho Bae, Tae Hyun Jun, Dong Hang Lee
- P76. Analysis of Fiber-Reinforce Shotcrete Performance According to Mixing Content and Type of Steel Fiber  
◆ Seung Yeon Han, Chang Suk Song, Tae Ho Ha, Kyong Ku You
- P77. Analysis of the Effect of Reducing Particulate Matter on Road Facilities Using Photocatalysts  
◆ Gyeong Hoon Ma, Beom Jun Chon, Jin Wook Lee, Han Jin Oh, Dae Geun Park
- P78. Evaluation for Fire Safety of Anti-contamination Coatings for Tunnel  
◆ Chan Young Lee, Jae Won Shim

- P79. Evaluation of Bridge Deck Pavement Conditions Using Light Falling Weight Deflectometer (LFWD) and Seoul Pavement Index (SPI)  
◆ **Gyeong Hoon Ma, Han Jin Oh, Ki Deok Kim, Snag Yum Lee, Jin Hwan Park**
- P80. Evaluation of Deterioration Condition of Concrete Bridge Deck using 3D GPR (Ground Penetrating Radar)  
◆ **Gyeong Hoon Ma, Han Jin Oh, Ki Deok Kim, Sang Yum Lee, Jin Hwan Park**
- P81. Performance Evaluation of Traffic Safety Assistance Facilities in Road Sections Vulnerable to Autonomous Driving using VR Technology  
◆ **Sung Kab Joo, D oHoon Kim, Ho Min Choi, Hye Min Mun**
- P82. Retaining Wall Structure Stability Evaluation using 3D Lidar  
◆ **Jong Nam Do, Beom Sik Hwang, Na Gyoung Kim**
- P83. Real-Time Pavement Damage Detection Technology Research for Pavement Maintenance of National Highway  
◆ **Moon Sup Lee, Myeong Ill Kim, Hyung Mog You, Sung Il An**
- P84. Research on AI Pavement Crack Analysis Technology for Pavement Crack Detection  
◆ **MyeongIll Kim, Tae Hoon Lee, Young Han Park, Man Ho Park, Moon Sup Lee**
- P85. Evaluation for Fire Damages of Steel Bridge under Small-Scale Fire Loading : (I) Visual Inspection  
◆ **Jae Won Shim, Jin Woo Cho**
- P86. Evaluation for Fire Damages of Steel Bridge under Small-Scale Fire Loading : (II) Material Properties  
◆ **Jae Won Shim, Jin Woo Cho, Tae Seok Yoo**
- P87. Evaluation of Modular Air Cleaning System Installed in Bus Station using Full-scale Environment Chamber  
◆ **Soo Young Moon, Sang Hyuk Lee, Jong Won Lee, Hee Mun Park**
- P88. Prediction of Areas affected by Heavy Rain on Highways According to Precipitation Intensity  
◆ **Ju Goang Lee**
- P89. RCP Scenario Selection for Predicting Heavy Snow Damage Areas on Highways  
◆ **Ju Goang Lee**
- P90. Road Deposited Sediment as a Source of Non-point Source Pollutants in Expressway Stormwater Runoff  
◆ **Do Gun Kim, Hee Man Kang, Seok Oh Ko**



# POSTER PRESENTATION

## Transportation

- P91. Curve Section Driving Safety Evaluation in 140kph Highway Environment using Driving Simulator  
◆ **Ki Young Lee, Hyun Jin Park**
- P92. Effect Analysis of Exclusive-Lane of Truck Operation using Micro-Traffic Simulation Program VISSIM  
◆ **Ki Young Lee, Hyun Jin Park, So Young Jeong, Dong Hee Han**
- P93. Study of an Empirical Analysis for Driving Safety under Multi-lane Toll Collection System Environment based on Vehicle Trajectory Data  
◆ **Hyun Jin Park, Hwan Pil Lee**
- P94. A Study on Determining to the Appropriate Lane Width for Autonomous Vehicle  
◆ **Jae Hong Park, Moataz Bellah Ben Khedher, Min Hyung Noh, Duk Geun Yun**
- P95. A Study on Driver Behavior Analysis of Urban Underground Road With VISSIM and VR Driving Simulator  
◆ **Sang Hyun Park, Jin Kak Lee, Sang Un Ko**
- P96. A Study on the Effectiveness of Speed Reduction Facilities in the Right-Turn Channelization Area  
◆ **Min Hwan Ryu, Do Gyeong Kim**
- P97. An Analysis of the Social Effects of Taxi Service Applications Based on Taxi Information Data : A Case Study of Seoul  
◆ **Young Beom Kim, Hye Rin Lee, Dong Min Lee, Sang Yeon Hong**
- P98. Analysis of Vehicle Speed and Environmental Impact Due to the Appearance of Pedestrian-Oriented Roads for Sejong-Daero, Seoul  
◆ **Su Jeong hong, Ji Ho Kim, Jeong Hun Choi, Soo Beom Lee**
- P99. Determining Possibility of the Occurrence of Traffic Congestion on Underground Roads  
◆ **Su Bin Park, Jae Pil Moon, Jin Guk Kim, Choong Heon Yang**
- P100. Development of Safety Management Model for Highway Work Zone using Advanced Technology  
◆ **Hyun Seock Lee**
- P101. The Reserch on Traffic Accident Reduction Effect Estimate of Traffic Safety Experiential Training  
◆ **Soo Jae Yu, Dong Jeong Seo**
- P102. Spatial Associations Between Severe Accidents and Minor Accidents  
◆ **Joon Ki Kim, Jong Il Park**
- P103. A Basic Study on the Durability Evaluation of Lane Painting Using Repetitive Loads  
◆ **Yeon tae Kim, Su Hyung Lee, Booll Kim**
- P104. A Study on the Visibility Analysis of Daytime Lanes Using Color Patches  
◆ **Yeon Tae Kim, Su Hyung Lee, Boo Il Kim**
- P105. Correlation Analysis of the Operation Status of the Intersection and the Separation Distance of Underground Road Exit  
◆ **Sang Un Ko, Jin Kak Lee, Sang Hyun Park**
- P106. Expressway Cold Wave Damage Forecast according to RCP4.5 Scenario  
◆ **Ju Goang Lee, Jae Won Shim**
- P107. Paraguay Road Safety Audit Introduction Research  
◆ **Se Yoon Oh, Bong Suk You, Jose Ramon Gomez P., Yeong Min Kim**
- P108. Towards Hybrid Motion Detection Based Smart Transportation System  
◆ **Dong Key Kim, Rosemary Koikara, Sun Jung Kim**

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## EXHIBITOR

 Development of Road Pavements  
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