

# XVI ECSMGE 2015

13-17 September 2015 - Edinburgh



## TC202 Workshop on Railroad Geotechnics at XVI ECSMGE, Edinburgh, 2015

**Sunday, September 13, 2015, 13:30-17:30**

**Venue: Tinto Room, Edinburgh International  
Conference Center (EICC)**

**Prof. Erol Tutumluer, Chair, TC202 Transportation Geotechnics**  
**[tutumlue@illinois.edu](mailto:tutumlue@illinois.edu), University of Illinois at Urbana-Champaign**

SIMSG ISSMGE



**International Society for Soil Mechanics and  
Geotechnical Engineering**

TC202 Workshop on Railroad Geotechnics, ECSMGE, Edinburgh – Sept. 13, 2015

# Technical Committee 202

## Transportation Geotechnics

61 members covering a good majority of ISSMGE member societies

TC202 Web Sites:

<http://www.issmge.org/en/technical-committees/applications/147-transportation-geotechnics>

<http://www.eng.hokudai.ac.jp/labo/geomech/ISSMGE%20TC202/>

Correspondence:

Dr. Tatsuya Ishikawa

Secretary, ISSMGE TC202 on Transportation Geotechnics


Laboratory of Analytical Geomechanics

Div. of Field Engineering for the Environment Faculty of Engineering Hokkaido University

Kita13, Nishi8, Kita-ku Sapporo, Hokkaido, 060-8628, Japan TEL & FAX: +81-11-706-6202

E-mail: [t-ishika@eng.hokudai.ac.jp](mailto:t-ishika@eng.hokudai.ac.jp)

# TC202 Workshop on Railroad Geotechnics, ECSMGE, Edinburgh – Sept. 13, 2015



## International Society for Soil Mechanics and Geotechnical Engineering

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### Transportation Geotechnics

Last Updated on 3 February 2015 [Print](#) | [Email](#)

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**Objective 1: Dissemination**

The goal of Technical Committee 202 is to apply broad engineering to bridge the gap between Pavement/Railway Engineering and Geotechnical Engineering. The main task is to promote co-operation and exchange of information and knowledge about the geotechnical aspects in design, construction, maintenance, monitoring and upgrading of roads, railways and airfields. The task also covers the related environmental aspects. For these purposes, several main topics were identified and materialized in the main Task Forces of the Committee as follows. Task Force 1. Promote of use of nontraditional materials in embankments and structural layers. Leaders: M. Winter and T. Edil Task Force 2. Reinforcement of geomaterials and its implications in pavement and rail track design. Leaders: E. Tutumluer and S.-W. Park. Task Force 3. Earthworks design, technology and management: To extend the previous work into intelligent compaction. Leaders: Jean-Pierre Magnan and A. Gomes Correia Task Force 4. Rail track substructures, including transition zones. Leaders: W. Powrie, C. Lai, P. Kolisoja, B. Indraratna. Task Force 5. Subsurface sensing for transportation infrastructure condition diagnostics among others. Leaders: S. Nazarian and C. Lai; A. Loizos Task Force 6. 3rd International Conference on Transportation Geotechnics (ICTG), Guimarães, Portugal, September 4-7, 2016. Chairman António Gomes Correia (University of Minho, ISSMGE-TC202). Leader: A. Gomes Correia (i) Themes: Optimized geomaterial (including hydraulically bound materials and asphalt mixtures) use, reuse and recycling; Unsaturated soil mechanics in transportation geotechnics; Earthworks design, technology and management; Slope stability, stabilization, and asset management; Mechanistic-empirical design (road, railways and airfields); Rail track substructures, including transition zones; Subsurface sensing for transportation infrastructure; Macro and Nanotechnology applied to transportation geotechnics; Effect of climate change; Sustainability in transportation geotechnics; and Case histories. (ii) Prof. Buddhima Indraratna will deliver the Inaugural Proctor Lecture at the 3rd ICTG Prof. Jorge Zornberg will deliver the IGS Mercer Proctor Lecture at the 3rd ICTG (iii) Workshops before or after the Conference. The following are planned: Geosynthetics in transportation geotechnics; Harbor geotechnics; Nondestructive technologies; and Ground improvement and soil stabilization (iv) Special attention will be paid to the publication of all the peer review papers that will be submitted to be indexed by Scopus and ISI Thomson Reuters Conference Proceedings Citation Index. Task Force 7. Transportation Geotechnics; Elsevier journal of TC202. Editors-in-Chief: António Gomes Correia; Erol Tutumluer, and Yunmin Chen. First issue was published in March 2014 of this quarterly journal, which aims to publish high quality, theoretical and applied papers on all aspects of geotechnics for roads, highways, railways, airfields and waterways.

<http://www.journals.elsevier.com/transportation-geotechnics/>

<http://www.issmge.org/en/technical-committees/applications/147-transportation-geotechnics>

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International Society for Soil Mechanics and Geotechnical Engineering



## TC202 Transportation Geotechnics

**NEW** 1 Jun 2014 Update applied to reflect the new TC regime launched last year.

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### WELCOME TO TC202

Host member society: USA  
Short name: Transportation (TC202)

Technical Committee 202 (formerly TC-3) of the ISSMGE was established in 2001 in accordance with the proposal approved by the ISSMGE Board serving the 2001-2005 term. The Committee completed three 4-year terms under the leadership of Professor Antonio Gomes Correia as Chairman (2001-2013). Professor Erol Tutumluer is the current Chairman of TC202 serving the 2013-2017 term.

Technical Committee 202 works closely with its members to organize symposia, workshops, and international exchanges dealing with all aspects of Transportation Geotechnics in both traditional and emerging areas. Thanks to the dedicated efforts of Prof. Gomes Correia, TC202 has created a new named lecture series in commemoration to late R.R. Proctor to be delivered by the world's most distinguished achievements in Transportation Geotechnics. The inaugural Proctor Lecture will be delivered at the 3rd International Conference of Transportation Geotechnics in Guimaraes, Portugal, on September 4-7, 2016.

You are encouraged to contact us, bring new proposals, and/or participate in the ongoing activities of TC202.

Prof. Erol Tutumluer, Chair  
Prof. Tatsuya Ishikawa, Secretary



<http://www.eng.hokudai.ac.jp/labo/geomech/ISSMGE%20TC202/>

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International Society for Soil Mechanics and Geotechnical Engineering



## TC202 Transportation Geotechnics

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### PROCTOR LECTURE

The Proctor Lecture was first established with the Board approval during the time of the September 2013 ISSMGE Conference in Paris, to commemorate the significant contributions of late Ralph Roscoe Proctor, and to be delivered by the world's most distinguished achievers in Transportation Geotechnics. This memorial Lecture is organised as the primary keynote event at each Transport Geotechnics conference hosted by ISSMGE-TC202. The guidelines of ISSMGE-TC202 for the nomination of the Proctor Lecture recipient are given in the [Nomination](#).



#### Ralph Roscoe Proctor (1894-1962)

Ralph Roscoe Proctor was an American Civil Engineer well-known as the inventor of the 'Proctor test' and the associated theory of compaction.

As a veteran of World War 1 who served the Company E, Twenty-Third Engineers, he was primarily involved in railroad construction work in France. Afterwards, having completed his studies in Civil Engineering at the University of Southern California in Los Angeles (1914-1916), Ralph Proctor worked at the California Water Authority of Los Angeles (BWWS - Bureau of Water Works and Supply), where he remained during the rest of his career, mostly involved in construction, design and maintenance. Much of his field experience was



Professor Buddhima  
Indraratna

**1st Proctor Lecture  
by Professor Buddhima Indraratna**  
Guimarães, Portugal, Sep, 2016

See lecture slides (Coming Soon)

# TC202 Terms of Reference

## Objective 1: Dissemination

The goal of Technical Committee 202 is to apply broad engineering to bridge the gap between Pavement/Railway Engineering and Geotechnical Engineering. The main task is to promote co-operation and exchange of information and knowledge about the geotechnical aspects in design, construction, maintenance, monitoring and upgrading of roads, railways and airfields. The task also covers the related environmental aspects. For these purposes, several main topics were identified and materialized in the main Task Forces of the Committee as follows.

- |                                   |   |
|-----------------------------------|---|
| Task Force 1.                     | Promote use of nontraditional materials in embankments and structural layers.<br>Leaders: M. Winter and T. Edil   |
| Task Force 2.                     | Reinforcement of geomaterials and its implications in pavement and rail track design.<br>Leaders: E. Tutumluer and S.-W. Park   |
| Task Force 3.                     | Earthworks design, technology and management: CCC and intelligent compaction.<br>Leaders: Jean-Pierre Magnan and A. Gomes Correia   |
| Task Force 4.                     | Rail track substructures, including transition zones.<br>Leaders: W. Powrie, C. Lai, P. Kolisoja, B. Indraratna   |
| Task Force 5.                     | Subsurface sensing for transportation infrastructure condition diagnostics among others.<br>Leaders: S. Nazarian and C. Lai; A. Loizos  |
| Task Force 6.                     | 3 <sup>rd</sup> International Conference on Transportation Geotechnics (ICTG), Guimarães, Portugal, September 4-7, 2016. Chairman António Gomes Correia (University of Minho,<br>Leader: A. Gomes Correia |
| ISSMGE - TC202).<br>Task Force 7. | Transportation Geotechnics; Elsevier journal of TC202. Editors-in-Chief: António Gomes Correia; Erol Tutumluer, and Yunmin Chen   |

# TC202 Workshop on Railroad Geotechnics, ECSMGE, Edinburgh – Sept. 13, 2015



**3rd ICTG**  
International Conference  
On Transportation  
Geotechnics

Portuguese Geotechnical Society  
University of Minho



Guimarães, PORTUGAL  
4–7 September 2016  
Vila Flor Cultural Centre

**ISSMGE**  
International Society for Soil  
Mechanics and Geotechnical  
Engineering



## 3<sup>rd</sup> International Conference on Transportation Geotechnics

### CALL FOR ABSTRACTS

<https://easychair.org/conferences/?conf=ictg2016>



#### Contact

3rd ICTG Secretariat  
University of Minho – School of Engineering  
Campus de Azurém, 4800-058 Guimarães – PORTUGAL  
Tel.: (+351) 253 510 218  
Fax: (+351) 253 510 217  
e-mail: [3ictrgeo2016@civil.uminho.pt](mailto:3ictrgeo2016@civil.uminho.pt)

**Registration for exhibitor  
and Sponsors is open.**

**Conference Website: <http://civil.uminho.pt/3rd-ICTG2016>**

#### Important Dates

**March, 2015:** Call for abstracts  
**May 15, 2015:** Deadline abstract submission  
**June 12, 2015:** Notify authors of accepted abstracts  
**Submission of papers:** After abstract acceptance  
**November 6, 2015:** Deadline paper submission  
**February 26, 2016:** Notify authors of accepted papers  
**March 25, 2016:** Submission of final camera-ready papers

#### Conference Themes

- Theme 01:** Optimized geomaterial (including hydraulically bound materials and asphalt mixtures) use, reuse and recycling
- Theme 02:** Unsaturated soil mechanics in transportation geotechnics
- Theme 03:** Earthworks design, technology and management
- Theme 04:** Slope stability, stabilisation, and asset management
- Theme 05:** Mechanistic-empirical design (road, railways and airfields)
- Theme 06:** Rail track substructures, including transition zones
- Theme 07:** Subsurface sensing for transportation infrastructure
- Theme 08:** Macro and Nanotechnology applied to transportation geotechnics
- Theme 09:** Effect of climate change
- Theme 10:** Sustainability in transportation geotechnics
- Theme 11:** Case histories

#### Workshops Themes

- Workshop 01:** Geosynthetics in transportation geotechnics
- Workshop 02:** Harbour geotechnics
- Workshop 03:** Non destructive technologies
- Workshop 04:** Ground improvement and soil stabilization

#### Honour Lectures

**ISSMGE - TC202: Proctor Lecture:** Prof. Buddhima Indraratna (Australia)  
**IGS: Mercer Lecture:** Prof. Jorge Zornberg (USA)

#### Co-Sponsors

updated on 2015/03/20

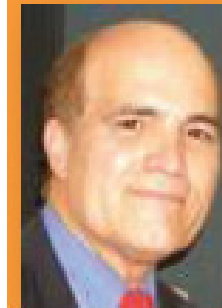


TC202 Workshop on Railroad Geotechnics, ECSMGE, Edinburgh – Sept. 13, 2015

# NEW JOURNAL TRANSPORTATION GEOTECHNICS

ISSMGE TC 202

EDITORS



**Professor Antonio  
Gomes-Correla,**  
University of Minho,  
Guimarães, Portugal

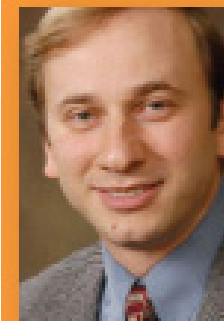
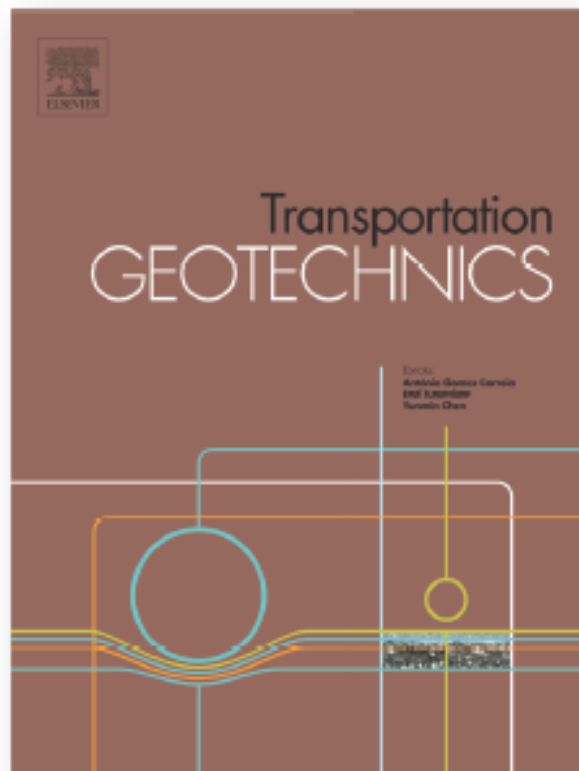
1<sup>st</sup> issue  
03/2014

*Transportation Geotechnics* is a new journal publishing high quality theoretical and applied papers on all aspects of geotechnics for roads, highways, railways, airfields and waterways.

**Editors:**

António Gomes Correia  
Erol Tutumluer  
Yunmin Chen

**Read the guide for authors  
and submit your article at**  
[www.elsevier.com/locate/trgeo](http://www.elsevier.com/locate/trgeo)



**Professor Erol  
Tutumluer,**  
University of Illinois,  
Urbana-Champaign,  
USA



**Professor Yunmin  
Chen,**  
Zhejiang University,  
Zhejiang, China



## **TC202 Current & Upcoming Activities**

- **At the XVI ECSMGE, Prof. Antonio Gomes Correia, TC 202 Past Chairman, will deliver a keynote presentation on “Geotechnical Engineering for Sustainable Transportation Infrastructure.”**
- **TC 202 will participate in the 2<sup>nd</sup> International Symposium on Transportation Soil Engineering in Cold Regions, to be held in Novosibirsk, Russia, on September 24-26, 2015.**
- **TC 202 will have a Special Session, approved by VP (Asia), Prof. Ikuo Towhata, to discuss important issues in further developments of Transportation Geotechnics at the Asian Regional Conference (ARC) on Soil Mechanics and Geotechnical Engineering, Fukuoka, Japan, November 9-13, 2015 ([www.15arc.org/index.html](http://www.15arc.org/index.html)).**
- **TC 202 will have a Meeting and Two Sponsored Sessions at the XV PCSMGE to be held in Buenos Aires, Argentina, November 15-18, 2015. Professor Tutumluer will present an invited Panel Presentation on “Thinking Outside the Box: Emerging Geotechnical Engineering Theories and their Contribution to Transportation Systems.”**
- **TC 202 will participate and have a Transportation Geotechnics Session organized at the 4<sup>th</sup> GeoChina International Conference, Shandong, China, July 25-27, 2016.**
- **TC 202 Main Conference Event will be the 3<sup>rd</sup> International Conference of Transportation Geotechnics (ICTG) in Guimaraes, Portugal, on September 4-7, 2016. The inaugural Proctor Lecture will be delivered at the 3<sup>rd</sup> ICTG by Prof. Buddhima Indraratna.**

# Workshop Program

- |               |   |
|---------------|---|
| 13:30 - 13:40 | <b>Opening Address</b> , Prof. Erol Tutumluer, Chair of ISSMGE TC202  |
| 13:40 - 14:00 | <b>Some Unsaturated Soil-Related Aspects in Railway Substructures</b><br>Prof. Yu-Jun Cui, Ecole des Ponts Paris Tech (ENPC), France  |
| 14:00 - 14:20 | <b>Prediction of Earthworks Failure using Track Geometry Car Data</b><br>Dr. Phil Sharpe, AECOM, UK   |
| 14:20 - 14:40 | <b>Investigation of Ballast Flight under Aerodynamics Flow using Computational Fluid Dynamics</b><br>Mr. Lee Pardoe, University of Southampton, UK  |
| 14:40 - 15:00 | <b>Recent Solutions to Improve the Degraded Ballasted Tracks</b><br>Dr. Yoshitsugu Momoya, RTRI, Japan  |
| 15:00 - 15:20 | <b>Lateral Resistance Characteristics of Ballasted Tracks subjected to Angular Rotation at Boundaries between Structures</b><br>Prof. Kimitoshi Hayano, Yokohama National University, Japan |
| 15:20 - 15:35 | Questions and Answers / Discussion  |
| 15:35 - 15:55 | Coffee Break  |

## **Workshop Program (cont'd)**

- 15:55 - 16:15**      **Water Impact on Dynamic Performance and Accumulative Settlement of High-Speed Railway Infrastructure under Train Moving Loads**  
Prof. Xuecheng Bian, Zhejiang University, China
- 16:15 - 16:35**      **Soft Computing Applied to Earthworks Optimization: A Survey and Application**  
Prof. Antonio Gomes Correia, University of Minho, Portugal
- 16:35 - 16:55**      **Synergistic Effects of Moving Wheel Loads and Water Content Change on Mechanical Behavior of Substructures at Ballasted Track**  
Prof. Tatsuya Ishikawa, Hokkaido University, Japan
- 16:55 - 17:15**      **Effectiveness of Remedial Measures Applied to Mitigate Differential Movement at Railroad Track Transitions**  
Prof. Erol Tutumluer, University of Illinois @ Urbana-Champaign, USA
- 17:15 - 17:30**      **Questions and Answers / Discussion**