PROGRAMME

The Third International Conference on Railway Technology: Research, Development and Maintenance

Conference Editor & Chairman:
Professor J. Pombo

5-8 April 2016
Cagliari - Sardinia - Italy

organised by
Civil-Comp Press
Stirlingshire, UK
How to find a paper in the conference proceedings

The conference proceedings are published in four volumes (three issues of the International Journal of Railway Technology (IJRT), and a volume of abstracts of contributed papers with full papers on the memory stick). All papers have been allocated DOIs and are available for download from www.CTResources.info

The Invited Opening Plenary Lectures are published as follows:

- Train Aerodynamics: Past, Present and Future
  C. Baker (IJRT volume 5-1, paper 1)
- Railway Wheelsets: History, Research and Developments
  A. Bracciali (IJRT volume 5-1, paper 2)

The invited lectures are published as follows:

- Lecture 2: Discrete Element Method Simulation as a Key Tool Towards Performance Design of Ballasted Tracks, C. Voivret, V.-H. Nhu and R. Peralès (IJRT volume 5-1, paper 4)
- Lecture 3: Performance Optimised Geometry of Railway Crossings: Design and Implementation, V.L. Markine and C. Wan (IJRT volume 5-2, paper 1)
- Lecture 4: Analysis of Train-Overturn Derailments caused by Excessive Curving Speed, A. Matsumoto, Y. Michitsuji and Y. Tobita (IJRT volume 5-2, paper 2)
- Lecture 5: Quantification of Railway Track Safety with an Inertial Vehicle Response Identification, R. Spinola Barbosa (IJRT volume 5-2, paper 3)
- Lecture 6: Modelling of Railway Vehicle Motion during Large Earthquakes, Y. Terumichi (IJRT volume 5-2, paper 4)
- Lecture 8: Improvement of Degraded Ballasted Track to Reduce Maintenance Work, Y. Momoya, T. Nakamura, S. Fuchigami and T. Takahashi (IJRT volume 5-3, paper 2)
- Lecture 9: Classification and Consideration of Plasticity Phenomena in Wheel-Rail Contact Modelling, K. Six, A. Meierhofer, G. Trummer, C. Marte, G. Müller, B. Luber, P. Dietmaier and M. Rosenberger (IJRT volume 5-3, paper 3)
- Lecture 10: Improving Switches and Crossings Performance and Reliability, S.S. Hsu and N. Fagan (IJRT volume 5-3, paper 4)

The abstracts of contributed papers (identified by papers number in the programme) are published in the following volume with full papers available on the memory stick in the conference pack:

Proceedings of the Third International Conference on Railway Technology: Research, Development and Maintenance
J. Pombo, (Editor)
Civil-Comp Press, 2016
Computational and Technology Resources

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How to reference Civil-Comp Conference papers

Pre-formatted references for all papers in the conference proceedings, past and present, as well as lectures published in Computational Technology Reviews or in the dedicated lecture volumes can be found at www.CTResources.info.

The search mechanism can be used to find the correct publication. Pre-formatted references can then be copied from the individual pages for each paper or lecture.

The typical structure of a reference to a contributed paper is as below. The # mark must be changed into the paper number given on the summary and on the full length paper. No page numbers should be quoted.


www.CTResources.info
A note for authors presenting papers and chairmen

All authors should meet at the front of the meeting room for their session at least 10 minutes before the session starts. Each contributed paper has been allocated 15 minutes for presentation and questions. Chairmen should indicate when 10 minutes have passed and again after 12 minutes that the presenter should immediately finish. Three minutes are available for questions and comments.

Invited lectures have been allocated 30 minutes in total, of which 5 minutes may be used for questions.

Authors are kindly asked to keep to the time allocated to them by the Chairmen. Authors are discouraged from using their own laptops unless absolutely necessary, in which case they should ensure that they can quickly and efficiently start their presentation when requested by the Chairman.

Chairmen are requested to keep to the timetable. Changes to the programme will be indicated on the copies of the programme displayed on the conference timetable board and at the entrance to each of the rooms.

As a courtesy and in politeness to all speakers and other participants, please turn off your mobile phone whenever you enter any of the meeting and lecture rooms.

Journal special issue submission

Authors of contributed papers are invited to submit extended versions of their papers to the International Journal of Railway Technology:

http://www.saxe-coburg.co.uk/ijrt/

Papers will be subject to review and authors should clearly state in the introduction of their paper how the paper has been improved and extended since the conference version has been published. Authors must correctly cite the original conference paper using the reference and DOI given on the following website:

www.CTResources.info

Authors should select a different paper title for their journal submission than the one used for the conference paper.
Conference timetable

Day 0: Tuesday 5 April 2016
15.00-19.00: Conference Office opens
17.00-18.45: Opening Plenary Session in Room T1
18.45: Drinks Reception in Room T2

Parallel sessions will be in Rooms T1a, T1b, T1c, T3, and T4 (First floor).

Day 1: Wednesday 6 April 2016
Overview pages 8-9, detailed programme 14-23
08.15-18.00: Conference Office opens
08.45-10.30: Parallel sessions
10.30-11.00: Coffee / Tea in Room T2 and H Lobby 1
11.00-12.45: Parallel sessions
12.15-13.30: Lunch (admission by ticket only) in the Room T2 and H Lobby 1
13.45-15.30: Parallel sessions
15.30-16.00: Coffee / Tea in Room T2 and H Lobby 1
16.00-18.00: Parallel sessions

Day 2: Thursday 7 April 2016
Overview pages 10-11, detailed programme 24-33
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08.45-10.30: Parallel sessions
10.30-11.00: Coffee / Tea in Room T2 and H Lobby 1
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12.15-13.30: Lunch (admission by ticket only) in the Room T2 and H Lobby 1
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Day 3: Friday 8 April 2016
Overview pages 12-13, detailed programme 34-41
08.30-16.00: Conference Office opens
09.00-10.45: Parallel sessions
10.30-11.00: Coffee / Tea in Room T2
11.00-12.45: Parallel sessions
12.15-13.30: Lunch (admission by ticket only) in the Room T2
13.45-15.45: Parallel sessions
15.30-16.00: Coffee / Tea in Room T2
Opening Plenary Session

17.00-18.45:

**Chairman:**
Professor J. Pombo  
Heriot-Watt University, Edinburgh, UK  
LAETA, IDMEC, IST - University of Lisbon  
& ISEL - Lisbon Polytechnic Institute, Portugal

**Invited Opening Lecture:**
“Train Aerodynamics: Past, Present and Future”  
*Professor C. Baker*  
Birmingham Centre for Railway Research and Education  
University of Birmingham, Gisbert Kapp Building, UK  
(IJRT volume 5-1, paper 1)

**Invited Opening Lecture:**
“Railway Wheelsets: History, Research and Developments”  
*Professor A. Bracciali*  
Dipartimento di Ingegneria Industriale  
Università di Firenze, Italy  
(IJRT volume 5-1, paper 2)

18.45-19.30: Drinks reception
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- SS17: Track Design and Rehabilitation of Old Railway Lines: Technical and Economic Issues
  - 11.00-12.30

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<td>D. Milne, L.M. Le Pen, G. Watson, D.J. Thompson, W. Powrie, M. Hayward and S.</td>
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Day 1: Wednesday 6 April 2016: AM
Room T1b

09.00-10.30: Chaired by: Dr K. Six and Professor R. Lundén

XVIII Special Session: Friction in Wheel-Rail Contact: Modelling and Experimental Validation
Organised by Dr K. Six and Dr E.A.H. Vollebregt

231 An Experimental Study of Squeal Noise Characteristics for Railways using a Scale Model Test Rig

232 Wheel-Rail Contact Parameters Sensitivity Analysis with Stochastic Track Geometry
A.M. Panunzio, G. Puel, R. Cottereau, S. Simon and X. Quost

233 A Test Rig for Multi-Wheelset Adhesion Experiments
N. Bosso, A. Gugliotta and N. Zampieri

234 Investigation of Creep Force Characteristics under a Flange Climbing Condition
H. Doi, T. Miyamoto and H. Ishida

235 Curve Squeal of Rail Vehicles: Linear Stability Analysis and Non-linear Time-Domain Simulation
A. Pieringer, P.T. Torstensson and J. Giner

236 A Study on the Friction Characteristics of Multiple Wheels in Wet Conditions
S.P. Lin, Y. Takino, Y. Suda, M. Hashimoto and M. Kageyama

10.30-11.00: Coffee

11.00-12.30: Chaired by: Dr E. Meli, Professor J.L. Escalona and Dr L. Pugi

XIV Special Session: Advanced Wheel-Rail Contact Models
Organised by Dr E. Meli, Professor J.L. Escalona and Dr L. Pugi

204 Development of An Innovative Wheel-Rail Conformal Contact Model
E. Boccini, L. Marini, E. Meli, A. Rindi and M. Romani

205 Thermomechanical Analysis of Wheel/Rail Contact using the Finite Element Method
C. Carini-Siguret and A. Boukamel

206 Development of a Novel Degraded Adhesion Model for Railway Systems
L. Marini, E. Meli, S. Pancioni, A. Ridolfi and A. Rindi

207 Advanced Techniques for Measuring Forces in Wheel-Rail Contact
J. Čapek

208 A Parametric Study of Wheel-Rail Contact
M. Habib, Y. Lifei, Q. Chenhui, H. Jun and Z. Chen

209 Development of a Novel Wheel-Rail Contact Model for Real-Time Applications
P. D’Adamio, J. Escalona, E. Galardi, L. Marini, E. Meli, L. Pugi and A. Rindi

12.45-13.15: Chaired by: Professor J. Merkisz

Lunch-Time Session

12.45-13.15: Chaired by: Professor J. Merkisz

Environmental Aspects and Impact of Rail Transport

297 Methods to Reduce Pollutant Emissions from Rail Vehicles
M. Andrzejewski, P. Daszkiewicz, A. Merkisz-Guranowska and H. Stawecka

298 The Research of Rail Vehicles According to the Real Driving Emissions Procedure
J. Merkisz and W. Stawecki

Day 1: Wednesday 6 April 2016: AM
Room T1c

09.30-10.30: Chaired by: Professor A. Matsumoto and Professor H. Nakamura

III Special Session: Accidents Analysis and R&D of Safety Technologies
Organised by Professor A. Matsumoto, Professor R.A. Smith and Professor H. Nakamura
63 A Study of the Factors Affecting Flange-Climb Derailment in Railway Vehicles
G. Diina, S. Bruni, E. Di Gialleonardo, R. Corradi and A. Facchinetti
64 Monitoring of Derailment Coefficients “Y/Q” for In-service Trains and the Analysis for the Increase of Curve Safety
A. Iwamoto, K. Matsumoto, K. Yano, T. Fukushima, A. Matsumoto, Y. Sato, H. Ohno,
Y. Michitsuji, M. Tanimoto and D. Shinagawa
65 The Application of an On-board Track Condition Monitoring System for Local Railways
H. Tsunashima, H. Mori, M. Ogino, S. Azami and A. Asano

10.30-11.00: Coffee

11.00-12.45: Chaired by: Professor H. Nakamura and Professor A. Matsumoto

Lecture 4: Analysis of Train-Overttyn Derailments caused by Excessive Curving Speed
A. Matsumoto, Y. Michitsuji and Y. Tobita (IJRT 5-2, paper 2)

III Special Session: Accidents Analysis and R&D of Safety Technologies
Organised by Professor A. Matsumoto, Professor R.A. Smith and Professor H. Nakamura
66 The Potential for Using Big Data Analytics to Predict Safety Risks by Analysing Rail Accidents
H.J. Parkinson and G. Bamford
67 Investigation of a Derailment and Collision of a Crude Oil Unit Train in Casselton, North Dakota
E.M. Mueller and X. Liu
68 How Accident Investigation Can Influence Railway Technology
A.R. Hall and W.G. Rasiah
69 Contribution of Automatic Train Protection Systems to the Safety Record of Japanese Railways
R. Takagi and S. Sone
71 Statistical Analysis of Collisions at French Level Crossings
C. Liang, M. Ghazel, E.M. El Koursi and O. Cazier
Day 1: Wednesday 6 April 2016: AM
Room T3

09.00-10.30: Chaired by: Professor C. Baker and Dr H. Hemida

Freight and Heavy Haul Railways
326 In-Train Coupler Forces on Freight Railway Vehicles
   P.G. Kurka, A.A. Santos, A. Oliveira, M.C. Perazzo and L. Barnabé
327 Situation and Development of Rail on a Heavy Haul Railway
   Y. Zhang, Q. Zhou, Z. Chen, F. Liu and Z. Yu

II Special Session: Train Aerodynamics
Organised by Professor S. Krajnovic, Professor C. Wagner and Dr H. Hemida
39 Aerodynamics of Trains in Tunnels
   S. Faramehr and H. Hemida
40 Aerodynamic and Pressure Effects on Lateral Vibration of High-Speed Trains
   H. Akai, S. Takahashi, M. Ota and K. Maeno
41 An Experimental Study of Unsteady Flow Structures in the Wake of a Train Model
   A. Buhr, A. Henning and K. Ehrenfried
42 Flow and Thermal Comfort Simulations for Double Decker Train Cabins with Passengers,
   M. Konstantinov and C. Wagner

10.30-11.00: Coffee

11.00-12.30: Chaired by: Professor C. Wagner and Dr H. Hemida

II Special Session: Train Aerodynamics
Organised by Professor S. Krajnovic, Professor C. Wagner and Dr H. Hemida
43 A Two-Dimensional Numerical Case Study of Fluid-Structure Interaction
   V. Partimbene, P. Spiteri, P. Marthon and L. Ratsifandrihana
44 Cross-Flow Induced Pressure on Air Outlets
45 The Influence of Ballast Shoulder Height on Train Aerodynamic Flow Development
   D. Soper, M. Gallagher, C. Baker and A. Quinn
46 Effects of Accessory Parts Topology on the Aerodynamics of High-speed Trains
   Y. Zhang, Z.X. Sun, D.L. Guo and G.W. Yang
47 The Influence of Affiliated Components and Train Length on the Train Wind
   D. Guo, S. Keming, Y. Zhang, G. Yang and Z. Sun
48 A Numerical Study of Crosswind Effects on the Slipstream of a Freight Train
   D.C. Flynn, H. Hemida and C.J. Baker
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<td>L. Schlicher, M. Slikker and G.J. van Houtum</td>
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<td>Resource Planning, Scheduling and Simulations for Railway Maintenance</td>
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<td>Rolling-stock Maintenance Scheduling in an Uncertain Environment</td>
<td>D. Grimes, P. Ó Duinn and B. O’Sullivan</td>
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<td>Rolling Stock Door System Reliability Improvement using Maintenance Optimisation</td>
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Room T1a

14.00-15.30: Chaired by: Professor Z. Dimitrovová and Dr C. Voivret

**Lecture 7:** An Investigation into Rail Corrugation, its Mechanisms and Effects on the Dynamic Behavior of Metro Trains and Tracks in China, X.S. Jin, W. Li, Z.F. Wen, H.Y. Wang and X.Z. Sheng (IJRT 5-3, paper 1)

I Special Session: Geotechnical Aspects in Rail-Track Performance
Organised by Professor A. Gomes Correia, Dr S. Costa d’Aguiar, Dr Y. Momoya and Professor P.K. Woodward

14. The Coupled Meshless-Finite Element Method and its Application to the CAM Layer of the Ballastless Track Slabs, L. Yang, M. Habib, F. Tang, J. Hun and Z. Chen
17. Analyzing the Effect of Groundwater Extraction on High Speed Railway Pile Raft Composite Foundation Treatment, H. Xiao, X. Tao, H. LuWei and W. SiXing

15.30-16.00: Coffee

16.00-18.00: Chaired by: Dr Y. Bezin and Professor P. Alves Costa

**Lecture 8:** Improvement of Degraded Ballasted Track to Reduce Maintenance Work
Y. Momoya, T. Nakamura, S. Fuchigami and T. Takahashi (IJRT 5-3, paper 2)

I Special Session: Geotechnical Aspects in Rail-Track Performance
Organised by Professor A. Gomes Correia, Dr S. Costa d’Aguiar, Dr Y. Momoya and Professor P.K. Woodward

18. Dynamic Stresses from Train Loading to the Ballast Layer and Subgrade: The Current State in Russia, A.A. Zaytsev
22. Dynamic Response of a Track with Dry Friction Presence in the Ballast
A.S. Bratus, A. Korovkin, A. Filimonov and D. Yurchenko
23. Track Instability in Tunnels: A Deadly Threat
R. Pusch
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Room T1c

14.00-15.15: Chaired by: Professor A. Matsumoto and Professor H. Nakamura

III Special Session: Accidents Analysis and R&D of Safety Technologies
Organised by Professor A. Matsumoto, Professor R.A. Smith and Professor H. Nakamura
70  A Proposal for the Design of Integrated Train Control Systems Capable of Improving Reliability and Safety, Y. Saito, A. Asano, H. Nakamura and S. Takahashi
72  Safety Analysis of a Railway Level Crossing using Coloured Petri Nets D. Wu and W. Zheng
73  Probabilistic Safety Analysis of High Speed Railway Lines including Human Errors E. Castillo, Z. Grande, A. Calviño, M. Nogal and A.J. O’Connor
74  Development of the Derailment-Rollover-Crash Detector and its Derailment Detection in Actual Accidents, S. Matsuoka, K. Ishikami and M. Nagamoto
75  Derailment Detection and Emergency Brake Systems for Freight Wagons J.E. Paddison, J. Bračković and M. Deuter

15.30-16.00: Coffee

15.45-18.00: Chaired by: Professor A. Matsumoto and Professor H. Nakamura

Lecture 6: Modelling of Railway Vehicle Motion during Large Earthquakes Y. Terumichi (IJRT 5-2, paper 4)

III Special Session: Accidents Analysis and R&D of Safety Technologies
Organised by Professor A. Matsumoto, Professor R.A. Smith and Professor H. Nakamura
76  Crash Concepts for the Next Generation Train Intermediate Waggon Zones M. Zimmermann, J. König, J. Winter and H. Friedrich
77  Development of a Device for Detecting Electric Power Failures on Board Shinkansen Trains, T. Yamashita and N. Ikeguchi
78  Development of a Vehicle Abnormal Behaviour Detection System S. Koga, K. Miyakawa, M. Kageyama and N. Shimada
79  Analysis of Train Derailment Caused by Natural Disasters in the Railways of Japan H. Suzuki
80  Development of a High Performance Brake System for Passenger Safety during Earthquakes, S. Kanamori and G. Kobayashi
81  Assessment of the Running Safety of a High-Speed Train Moving over a Bridge subjected to Moderate Earthquakes, P.A. Montenegro and R. Calçada

XV Special Session: Methods for the Safety Improvement in Railway Transport
Organised by Professor M. Sitarz and Dr I. Manka
Day 1: Wednesday 6 April 2016: PM  
Room T3

14.00-15.30: Chaired by: Professor C. Wagner and Dr D. Flynn

II Special Session: Train Aerodynamics

Organised by Professor S. Krajnovic, Professor C. Wagner and Dr H. Hemida

49 Towing Tank Experiments for Train Aerodynamics

50 Representing Large Boundary Layers in Slipstream Moving Model Tests
M. Sima, A. Tietze, B. Schulz and K. Ehrenfried

51 The Influence of Wind-Blown Sand on High-Speed Train Aerodynamic Performance

52 Estimation of the Aerodynamic Forces acting on a Train using a Simple Tornado Model, M. Suzuki, K. Obara and N. Okura

53 Aerodynamic Improvement of a Compact High Speed Train
I. Pereira and J.M.C.S. André

54 Aerodynamic Loads in Open Air of High Speed Trains: Analysis of Experimental Data, M.M. Caccialanza, D. Rocchi, P. Schito, C. Somaschini and G. Tomasini

15.30-16.00: Coffee

16.00-18.00: Chaired by: M. Sima and Dr M. Konstantinov

IV Special Session: Modelling and Simulation of Railroad Vehicle Systems: Enhancements and Applications

Organised by Professor A.A. Shabana, Professor J.L. Escalona and Professor H. Sugiyama

84 A Numerical Algorithm for Modelling Dynamics of Oscillating Bogies, E.S. Sytov, I.V Kuznetsov, A.S. Bratus and D. Yurchenko

II Special Session: Train Aerodynamics

Organised by Professor S. Krajnovic, Professor C. Wagner and Dr H. Hemida


56 Aerodynamic Shape Optimization of Train Heads using Adjoint-Based Computational Fluid Dynamics with different Objective Functions, D. Jakubek and C. Wagner

57 Dynamic Response of Structures in Tunnels due to Aerodynamic Loading, M. Reiterer and H. Kari

58 Simplified Estimation of Train Resistance Parameters: Full Scale Experimental Tests and Analysis, C. Somaschini, D. Rocchi, G. Tomasini and P. Schito

59 Large Eddy Simulations of Side Flows past a Generic Model of a High-Speed-Train using a Finite Volume and a Lattice Boltzmann Method, N. Kin, R. Deiterding and C. Wagner

60 Multi-Objective Integrated Optimization of the Aerodynamic Shape Design of the Head-Type for a High Speed Electric Multiple Unit, L. Ming, L. Bin, Y. Miao and W. Dahai

62 Tunnel Pressure Wave Investigation with a new Moving Model Rig, G.W. Yang, J.H. Song, Q.S. Yang and D.L. Guo
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<td>VI Special Session: Switches and Crossings Organised by Dr. V. Markine and Professor E. Kassa</td>
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<td>Kassa and Markine</td>
<td>Lecture 3: Performance Optimised Geometry of Railway Crossings: Design and Implementation, V.L. Markine and C. Wan (IJRT 5-2, paper 1)</td>
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117 Numerical Analysis of Wheel-Crossing Interaction using a Coupling Strategy, Y. Ma, A.A. Mashal and V.L. Markine
118 Analysis of Failures within Railway Switches and Crossings using Failure Modes and Effects Analysis Methodology, E. Kassa and D. Gebretsadik
119 A Parametric Study on the Fatigue Life of Turnout Crossings using the Finite Element Approach, L. Xin and V.L. Markine

120 Rail Accidents caused by Switches and Frogs, E.M. Keretch and C.E.L. de Paiva
121 Winterproof Switch Systems, G. van der Werf
122 Optimisation of Switch Reliability and Safety through Flexure Analysis, A.R. Foan
123 Optimization of Support Stiffness at a Railway Crossing Panel, I. Grossoni, Y. Bezin and S.G.M. Neves
### Day 2: Thursday 7 April 2016: AM

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| 08.45-10.30   | XIII Special Session: Transition Zones: Understanding and Overcoming the Gap | Organised by Professor E. Fortunato and Professor S. Kaewunruen  
197 Effectiveness of Soft Baseplates and Fastenings to Mitigate Track Dynamic Settlement at Transition Zones on Railway Bridge Approaches  
S. Kaewunruen, A.M. Remennikov and A. Aikawa  
198 Dynamic Train-Track Interaction over Inhomogeneous Foundations  
J.N. Varandas, B. Correia, A. Paixão and E. Fortunato  
199 Modeling of Train-Induced Transitional Wavefields  
K.N. van Dalen and M.J.M.M. Steenbergen  
200 The Effect of Increasing Train Speed on Track Transition Performance  
R. Sañudo Ortega, V.L. Markine and L. Dell’Olio  
201 A Numerical Study of Railway Track Dynamics: The Case of a Transition Zone  
E. Arlaud, S. Costa D’Aguilar, E. Balmes and G. Fausurer  
202 Principles and Applications of a Continuously Variable Radius Track Panel  
A.R. Foan  
203 Analysis of the Long-Term Behaviour of Track Transition Zones  
H. Wang and V.L. Markine |
| 10.30-11.00   | Coffee  
11.00-12.30 | XVII Special Session: Track Design and Rehabilitation of Old Railway Lines: Technical and Economic Issues | Organised by Professor E. Fortunato and Dr G. Saussine  
225 Reinstallation of Tramways across a 100 Year Portal Frame Bridge  
P. Van Bogaert  
226 Mechanical Analysis of a Heavy Haul Track under Different Operational Conditions  
J. Pires and A.G. Dumont  
227 Geotechnical Aspects of the Rehabilitation of a Freight Railway Line in Africa  
E. Fortunato, S. Fontul, A. Paixão, N. Cruz, J. Cruz and F. Asseiceiro  
228 High Yield Geotechnical Characterization of Existing Railway Tracks  
Y. Haddani, N. Calon, G. Saussine, M.A. Benz-Navarrete, F. Ranvier, C. du Couedic and R. Gourvès  
229 A Laboratory Simulation of the Deflection Basin of a Dormant Lacquered Rail  
C.E.L. de Paiva and T.M.A. Arenas  
230 Understanding Track Loading Requirements to achieve Better Track Design  
Y. Bezin, S. Neves, I. Grossoni and A. Kaushal |
| Lunch-Time Session | 12.45-13.25 | Chaired by: Professor J. Merkisz  
### Traction, Transmission and Braking Systems  
323 The Evaluation of the Braking Process for a Rail Vehicle on the Basis of the Temperature Distribution of the Brake Disc, W. Sawczuk  
### Light Railways and Trams  
301 Repeatability of Vibroacoustic Processes for Tram Diagnostics in Normal Operating Conditions, B. Czechyra, F. Tomaszewski, T. Nowakowski and M. Orczyk  
303 Analysis of the Distribution of Passengers inside a Tram  
A. Gill, B. Firlik and A. Kołaczyńska-Twardowska  
304 Identification of Light Rail Track Geometry for Tram Running  
J. Kominowski and B. Firlik |
### VIII Special Session: Wheel-Rail Contact Tribology

Organised by Professor R. Lewis and Professor U. Olofsson

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#### Coffee

10.30-11.00

### VIII Special Session: Wheel-Rail Contact Tribology

Organised by Professor R. Lewis and Professor U. Olofsson

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98  Development of Flexible Track Models for Railway Vehicle Dynamics Applications
    J. Costa, P. Antunes, H. Magalhães, J. Ambrósio and J. Pombo
99  Construction of Three-Dimensional Track Models for Roller-Coaster Applications
    B. Sequeira, J. Pombo, P. Antunes, J. Ambrósio and P. Woodward
100 Simulation of a Railway Vehicle Running in a Mountainous Track at a Prescribed Speed, H. Magalhães, J. Ambrósio and J. Pombo

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11.00-12.45: Chaired by: Professor G.W. Yang and Professor O. Polach

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219 Research on Anti-sliding Control for Rolling Stock Based on the Optimal Slip Rate
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220 A Study of the Optimization Design Method for a High Speed Train
    G.L. Zhao, Z.X. Sun, S.B. Yao, D.L. Guo and G.W. Yang
221 Numerical Simulation of Pressure Waves in Railway Tunnels using a One-Dimensional Flow Model, Y.X. Jia, Y.G. Mei and C.H. Zhou
222 Analysis of the Influence of Mean Stress on the Fatigue Life of In-Service High-Speed Train Bogies using Monitoring Data, X. Wang and Y.Q. Ni
224 The Effect of Wheel Rotation on the Aerodynamic Performance of a High-Speed Train
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125 Freight Bogie Design Measures to Improve the Lifetime Performance of Switches and Curves, M. Hiensch, M. Linders, N. Burgelman, W. Hoeding, M. Steenbergen and A. Zoeteman
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127 Numerical Simulation of a Hadfield Steel Crossing subject to an Explosion, C. Chen, F.C. Zhang and D.Y. Sun
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33 Performance Evaluation of a New Type of Abutment with Geosynthetics, D.S. Kim and U.J. Kim
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185 Response of a Periodically Supported Beam on a Non-Uniform Viscoelastic Foundation subject to Moving Loads, T. Hoang, D. Duhamel, G. Foret, H.P. Yin, G. Cumunel, P. Joyez and R. Caby

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88 A Comparative Study: Modelling of an Elastomer subjected to Common Rail Track Loading, R. Zhuravlev, C. Froustey, S. Guérard, P. Viot and P.-E. Laurens

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132 Assessment of Existing Steel Bridge Structures
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133 Experiences with Orthotropic Plated Bridge Decks for High Speeds
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135 An Experimental Study on the Flexural Behaviour of Reinforced Concrete T-BeamsExternally Strengthened with CFRP Tendons
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136 Dynamic Interaction within a “Bridge-Track-Car” System on a High-Speed Railway
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137 The Effect of Track Levelling on Thermal Gradients in Composite Bridges
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10.30-11.00: Coffee

11.00-12.30: Chaired by: Professor R. Karoumi and Dr P.A. Montenegro

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Organised by Professor R. Karoumi, Professor J.M. Goicolea and Professor R.A.B. Calcada

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143 Improvement Proposals of Eurocode 1 to Design Railway Bridges for Dynamic Loading, D. La Poutré, A. Ausserlechner and M. Vospernig
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294          | Transmission Power Control for Wireless Sensor Networks in Railway Applications  
J.B. Hughes, G.D. Horler and E.P.C. Morris |
| 10.30-11.00  | Coffee                                           |
| 11.00-12.45  | Chaired by: Professor J. Ros, Dr L. Pugi and Dr E. Meli |
|              | **XXIII Special Session: Hardware In the Loop Testing and Real-Time Identification for Railway Applications** |
| 259          | Real Time Modelling of a Railway Multibody Vehicle: Application and Validation on a Scaled Railway Vehicle  
P. D’Adamio, J. Escalona, E. Galardi, E. Meli, L. Pugi and A. Rindi  
260          | Dynamic Simulation of a Driving Wheelset on the Roller Test Rig  
M. Dub, J. Kolář, F. Lopot and V. Dynybyl  
261          | Real-Time Simulation of a Locomotive using Symbolic Multibody Methods  
A. Plaza, J. Ros, X. Iriarte and J.M. Pintor  
262          | Hardware in the Loop Testing as a Tool for Pantograph Virtual Homologation  
A. Facchinetti and S. Bruni |
|              | **Railway Vehicle-Infrastructure Interaction: Experimental, Analytical and Numerical Advances** |
| 269          | Study of Vehicle and Track Dynamic Behaviour due to Short-Wavelength Rail Defects  
V. Bourgeois, S. Neveu and J. Causse  
270          | Track Assessment and Track Optimization using a Train Track Interaction Model  
M. Baessler, J. Bronsert and M. Thiele  
271          | Track-Ground Vibrations on a Stretch of the Portuguese Railway Network  
N. Correia dos Santos, A. Colaço, P. Alves Costa and R. Calçada |
Day 3: Friday 8 April 2016: AM
Room T4

09.00-10.45: Chaired by: Professor A. Facchinetti and Dr J.-P. Massat

V Special Session: Pantograph-Catenary Interaction
Organised by Professor A. Facchinetti and Professor J. Ambrósio

101 Exploring Dynamic Behaviour of Soft Catenaries subject to Regular Loading using Full Scale Measurements, A. Ronnquist and P. Návik
103 Estimating the Damping of Existing Railway Catenary Sections from Full-Scale Measurements, P. Návik and A. Ronnquist
104 The Use of the Modal Superposition Method in Simulating Pantograph-Catenary Dynamic Interaction, P. Zdziebko and T. Uhl
106 Catenary Finite Element Model Initialization using Optimization
P. Antunes, J. Ambrósio and J. Pombo
107 The Influence of Pantograph Raising and Lowering on Multi-Pantograph Operation
Z.D. Liu and S. Stichel

10.30-11.00: Coffee

11.00-13.00: Chaired by: Dr J.-P. Massat and Professor A. Facchinetti

V Special Session: Pantograph-Catenary Interaction
Organised by Professor A. Facchinetti and Professor J. Ambrósio

108 Sensitivity Analysis of Catenary Geometry for Current Collection Quality
O. Vo Van, E. Balmes, A. Capitaine and X. Lorang
109 Numerical Simulation for the Vertical Vehicle-Track-Pantograph-Catenary Coupled System, Y. Song, Z. Liu, H. Wang, X. Lu and F. Duan
110 The Use of Finite Element Models to Study the Fatigue of Overhead Contact Wire
J.-P. Massat, E. Balmes and J.-P. Bianchi
111 On the Dynamic Behaviour of Catenary-Pantographs subject to Wind Loads
C. Sánchez-Rebollo, A. Carnicero and J.R. Jimenez-Octavio
112 The Influence of Wind Load Modelling in the Dynamic Simulation of Overhead Catenary Lines, C. Sánchez-Rebollo, J.R. Jimenez-Octavio and A. Carnicero
113 Assessing Aerodynamic Effects on a Railway Pantograph by means of Computational Fluid Dynamics, M. Carnevale, A. Facchinetti and D. Rocchi
115 Numerical Analysis of Pantograph-Catenary Arcing of a High-Speed Train
G. Zhu, G. Gao, G. Wu and W. Wei
Day 3: Friday 8 April 2016: PM
Room T1a

13.45-14.30 Chaired by: Professor U. Olofsson and Professor S. Kaewunruen

**Environmental Aspects and Impact of Rail Transport**
295 On Particulate Emissions from Individual Trains in Tunnel Environments
   Y. Cha, U. Olofsson, M. Gustafsson and C. Johansson
296 Environmental Impact Assessment of Rail Freight Intermodality
   A.L. Merchan, S. Belboom and A. Leonard
300 Bootstrap Statistical Analysis of GHG Emission from Railway Maintenance and Re-
   newal Projects, S. Krezo, O. Mirza, Y. He and S. Kaewunruen

14.30-15.15: Chaired by: Dr B. Firlik and L. Cunha

**Light Railways and Trams**
302 Wheel-Rail Interaction Analysis for the Development of a New Tram Wheel Profile
   B. Firlik
305 Analysis of Interaction between Tram Wheel and Rail in Regular Operation
   T. Staskiewicz

**New Trends for Regulations, Norms and Legislation**
330 Painfulness and Sustainable Work in Rail Transportation
   A.M.F. Petrus, D.M. Cunha, L.M.S. Cunha and M.H. Lacomblez
Day 3: Friday 8 April 2016: PM  
Room T1b

13.45-15.00: Chaired by: Professor F.C. Wang and Dr A. Pieringer

**Traction, Transmission and Braking Systems**

324  Structural Durability Analysis of High Speed Train Cast Alumínium Gearbox Housing  
   G.Q. Li, L.Q. Lu, W.J. Wang, X. Wang and X.J. Zhang

**Railway Noise and Vibration**

316  Sound Transmission through Panels: A Comparison of Different Methods and Development of Simplify Methodologies  
   E. Jorge, A. Guiral and A. Alonso

317  Primary Noise in Railways: Analysis, Damage and Mitigation Alternatives  
   S.M. Pessanha, S.L. Issomura and T.M.S. Dias

318  Analysis of the Vibration and Sound Radiation Characteristics of a Sprayed Damped Wheel with Different Damping Rings  
   M. Li, X. Liu, X. Zhou, X. Sheng, H. Shen and X. Jin

319  An Investigation of the Aerodynamic Noise of Long-Grouped High Speed Trains  
   Z.X. Sun, G.W. Yang and D.L. Guo

15.30-16.00: Coffee
13.45-15.45: Chaired by: Professor E. Kassa and Dr P. Alves Costa

**Railway Vehicle-Infrastructure Interaction: Experimental, Analytical and Numerical Advances**

272 A Periodic Track Model for the Prediction of Ground Borne Vibration due to Parametric Excitation, M. Germonpré, S. François, G. Degrande and G. Lombaert

273 Vehicle-Track-Soil Interaction for Track Damage, Ground Vibration and Mitigation, L. Aversch

274 A Numerical Approach of the Train-Track Interaction along Discontinuous Tracks, J. Bronsert and M. Baeßler

275 Detection of Acceleration Sensitive Areas of Rail using a Dynamic Analysis, X.P. Cai and E. Kassa

276 The use of Vehicle Dynamic Simulation for Infrastructure Design and Maintenance, F. Coudert, S. Kraft and J. Causse

277 Analysis of Train-Track-Bridge Interaction using Modal Superposition and Moving Track Method, S.H. Hwang, S.C. Yang and E. Kim


279 Railway Ground Vibrations: Influence of Train Geometry And Masses, A. Colaço, P. Alves Costa and D.P. Connolly

15.30-16.00: Coffee
### Changes to Programme since draft was issued

<table>
<thead>
<tr>
<th>Lecture 5: R. Spinola Barbosa, on Wednesday 6th April at 13.45 in room T1c - cancelled</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Paper 30</strong>: presented by R. Pusch, originally on Thursday 7th April at 16.00 in room T1b - moved to Wednesday 6th April at 16.00 in room T1a</td>
</tr>
<tr>
<td><strong>Paper 212</strong>: presented by M. Gonzva originally on Thursday 7th April at 16.00 in room T1a - moved to Wednesday 6th April at 15.45 in room T1c</td>
</tr>
<tr>
<td><strong>Paper 144</strong>: presented by G. Milani originally on Friday 8th April at 11.00 in room T1c - moved to Thursday 7th April at 16.00 in room T1c</td>
</tr>
<tr>
<td><strong>Paper 297, 298, 299</strong>: originally on Friday 8th April at 14.00 in room T1a - moved to Wednesday 6th April at 12.45-13.15 in room T1b</td>
</tr>
<tr>
<td><strong>Paper 302, 305, 330</strong>: originally on Friday 8th April at 14.00 in room T3 - moved to Friday 8th April at 14.00 in room T1a</td>
</tr>
<tr>
<td><strong>Paper 323</strong>: originally on Friday 8th April at 14.00 in room T1b - moved to Thursday 7th April at 12.45-13.15 in room T1b</td>
</tr>
<tr>
<td><strong>Paper 13</strong>: presented by M.H. Khalil originally on Wednesday 6th April at 13.45 in room T1a - cancelled</td>
</tr>
</tbody>
</table>

**Meeting Room T3a** - replaced with Room T3

**Meeting Room T3b** - replaced with Room T4 (First floor)
Conference venue layout

**Ground Floor**
- Parallel session room

![Ground Floor Map](image)

- A Ingresso Principale / Main Entrance;
- B Reception;
- C Internet Point;
- D T Restaurant;
- E T Bistrot;
- G Giardino d’inverno / Winter Garden Bar;
- H Lobby 1 Area Espositiva / Lobby 1 Exhibition Area;
- I Sala Congressi T1 / Congress Hall T1;
- J Sala Congressi T2 / Congress Hall T2;
- K Sala Congressi T3 / Congress Hall T3;
- L Segreteria Lobby 2 / Secretariat Lobby 2;
- M Guardaroba / Cloakroom;
- N Ascensore / Lift;
- O Bagni / Bathrooms

**First Floor**
- Parallel session room

![First Floor Map](image)

- A Foyer;
- B Sala Congressi T4 / Congress Hall T4;
- C Sala Meeting T5 / Meeting Room T5;
- D Sala Meeting T6 / Meeting Room T6;
- E Sala Meeting T7 / Meeting Room T7;
- N Ascensore / Lift;
- O Bagni / Bathrooms