DRAFT PROGRAMME

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

18-20 April 2012
Las Palmas de Gran Canaria - Spain

organised by
Civil-Comp Press
Stirlingshire, UK
Future Conferences organised by Civil-Comp Press:

- The Eleventh International Conference on Computational Structures Technology  
  venue: Dubrovnik, Croatia  
  period: 4-7 September 2012

- The Eighth International Conference on Engineering Computational Technology  
  venue: Dubrovnik, Croatia  
  period: 4-7 September 2012

- The Third International Conference on Parallel, Distributed, Grid and Cloud Computing for Engineering  
  venue: Pécs, Hungary  
  period: Spring 2013

- The Fourteenth International Conference on Civil, Structural and Environmental Engineering Computing  
  venue: Cagliari, Sardinia, Italy  
  period: 3-6 September 2013

- The Third International Conference on Soft Computing Technology in Civil, Structural and Environmental Engineering  
  venue: Cagliari, Sardinia, Italy  
  period: 3-6 September 2013

- The Second International Conference on Railway Technology: Research, Development and Maintenance  
  venue: Ajaccio, Corsica, France  
  period: 8-11 April 2014

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For information on past conferences, please visit:
- [http://www.civil-comp.com/pubs](http://www.civil-comp.com/pubs)
How to find a paper in the conference proceedings

The conference proceedings are published in two volumes.

The invited lectures are published in full as follows:

- **volume L**
  *International Journal of Railway Technology, Volume 1, Issue 1*
  Saxe-Coburg Publications, 2012

The contributed papers are published in a summary volume with the full papers available on the accompanying CD-ROM as follows:

- **volume P**
  *Proceedings of the First International Conference on Railway Technology: Research, Development and Maintenance*
  J. Pombo, (Editor)
  Civil-Comp Press, 2012

In this programme the letters immediately preceding a paper title refer to the volume identifier given above. For example: L.1 refers to the first lecture in the *International Journal of Railway Technology* 1(1) and P.2 refers to the second paper in *Proceedings of the First International Conference on Railway Technology: Research, Development and Maintenance*.

Conference venue layout

The conference registration desk is in Room “Principado” at the Hotel NH Imperial Playa. The presentation rooms are given letters: Room A, B, C and D. Coffee breaks and lunches will take place in the hotel restaurant. All rooms will be clearly signposted. Please look out for the Civil-Comp “tree” logo.
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 for presentation 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.

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Journal special issue submission

For details of the format specification and procedures for submitting conference papers for possible publication in the journal special issues:

(see final version of the programme)
Conference timetable

Day 0: Tuesday 17 April 2012
16.00-18.00: Conference registration desk open for pre-registration

Day 1: Wednesday 18 April 2012
08.00-18.00: Conference registration desk open
09.00-10.00: Opening plenary session in Room A
10.00-10.30: Coffee / tea
10.30-12.30: Parallel sessions
12.30-13.30: Lunch (admission by ticket only) in the restaurant
14.00-15.30: Parallel sessions
15.30-16.00: Coffee / tea
16.00-18.00: Parallel sessions

Day 2: Thursday 19 April 2012
08.00-18.00: Conference registration desk open
08.30-10.30: Parallel sessions
10.30-11.00: Coffee / tea
11.00-12.30: Parallel sessions
12.30-13.30: Lunch (admission by ticket only) in the restaurant
14.00-15.30: Parallel sessions
15.30-16.00: Coffee / tea
16.00-18.00: Parallel sessions
19.20 Conference dinner (admission by ticket only).
Coaches will collect guests. Please meet at the front entrance of the conference venue no later than 19.20 and follow directions from the conference registration desk staff. After the dinner, coaches will return the guests to the collection point near the conference venue.

Day 3: Friday 20 April 2012
08.00-12.30: Conference registration desk open
08.30-10.30: Parallel sessions
10.30-11.00: Coffee / tea
11.00-12.30: Parallel sessions
12.30-13.30: Lunch (admission by ticket only) in the restaurant
14.00-16.00: Parallel sessions
16.00-16.30: Coffee / tea
Opening Plenary Session

09.00-10.00:

Dr J. Pombo
IDMEC-IST, Lisbon, Portugal

Invited Opening Lecture

L.1 Next Generation Unconventional Trucks and Wheel-Rail Interfaces for Railways
Y. Suda, Y. Michitsuji and H. Sugiyama

Professor Y. Suda
Advanced Mobility Research Center
Institute of Industrial Science
The University of Tokyo, Japan

Abstract

The conventional rigid wheel-set benefits from its ability to self-steer and self-centre. Because the wheel-set has a simple structure and preferable dynamics, railway bogies with wheel-sets have been widely used for more than a hundred years. In the design of a railway bogie with wheel-sets, the compatibility between curving ability and hunting stability has been studied for a long time by many researchers. Based on past research, the bogie design with conventional wheel-sets has been well summarized. Today, the requirement for railway systems has dramatically changed. For example: high speed trains are required to reach over 300 km/h cruising speed, while maintaining a high quality of ride comfort; and LRVs, for urban transit, are required to achieve a high curving ability at intersections and turnouts while maintaining a sufficient degree of safety. It is true to say that unconventional approaches are necessary in designing the next generation of railway systems. In this paper, the history of research on steering trucks, including conventional wheel-sets, is explained. Unconventional bogie concepts with asymmetric trucks are introduced. Furthermore, a new wheel-set concept based on the reconsideration of the wheel-rail interface is proposed. In the design of new wheel-set concepts, the gravitational stiffness can be effectively used for minimizing wheel and rail wear. The proposed wheel-set has negative-conicity tread with independent rotating wheels. The fundamental effectiveness and dynamical benefits are introduced.
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Opening Plenary Session

J.M. Goicolea
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Dynamics of Railway Bridges
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page 11

S. Bruni
L.3

Modelling and Simulation of Railroad Vehicle Systems: Enhancements and Applications
P.20-25

Room C
page 12

R. Lewis
L.8

Wheel-Rail Contact Tribology
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OPENING PLENARY SESSION

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10.30-12.30: Chaired by: J.M. Goicolea and R.A.B. Calçada

INVITED LECTURE

L.2 The Dynamics of High-Speed Railway Bridges: A Review of Design Issues and New Research for Lateral Dynamics
J.M. Goicolea and P. Antolin

Dynamics of Railway Bridges
Special session organised by J.M. Goicolea and R.A.B. Calçada


P.2 Construction Engineering of the Madrid-Barcelona-French Border High Speed Railway Viaduct over the River Fluvia, T. Polo Orodea, C. Ramos Moreno, Á.C. Aparicio Bengoechea and G. Ramos Schneider

P.3 Preliminary Dynamic Assessment of Railway Bridges subject to Higher Speeds C. Johansson, C. Pacoste and R. Karoumi

P.4 The Ultimate Response of Slender Bridges subjected to Braking Forces A. Tesar

P.5 Dynamic Analysis of the Santana do Cartaxo Viaduct: Definition of the Experimental Verification using Statistical Analysis of the Numerical Results A.H. Jesus, Z. Dimitrovová and M.A.G. Silva

P.6 An Integral Bridge Concept in Avoiding Railway Expansion Joints D. Decloedt, B. De Pauw and Ph. Van Bogaert
10.00-10.30: Coffee

10.30-12.30: Chaired by: A.A. Shabana, H. Sugiyama and J.L. Escalona

**INVITED LECTURE**

L.3  
Active Control in Railway Vehicles  
R.M. Goodall, S. Bruni and A. Facchinetti

**Modelling and Simulation of Railroad Vehicle Systems: Enhancements and Applications,** Special session organised by  
A.A. Shabana, H. Sugiyama, K.E. Zaazaa and J.L. Escalona

P.20  
A Dynamic Formulation for Railroad Vehicles using Trajectory Coordinates  
A.M. Recuero, J.L. Escalona and R. Chamorro

P.21  
A Design Process for a Railway-Car Body with Aluminium Extrusion Panels using Structural Optimization  

P.22  
Novel Rail Vehicle Concepts for a High Speed Train: The Next Generation Train  
J. Winter

P.23  
Locomotive Cab Whole-Body Vibration Assessments and Methods to Identify Seat-Motion Artifacts  

P.24  

P.25  
The Influence of Bearing Flexibility on High Speed Vehicles  
C. Casanueva, A. Alonso and J.G. Giménez
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Room C

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10.30-12.30: Chaired by: R. Lewis and U. Olofsson

INVITED LECTURE

L.8 Tribology of the Wheel-Rail Contact: The Effect of Third Body Materials
R. Lewis, R.S. Dwyer-Joyce, S.R. Lewis, C. Hardwick and
E.A. Gallardo-Hernandez

Wheel-Rail Contact Tribology
Special session organised by R. Lewis and U. Olofsson

P.91 A Field Test Study of Leaf Contamination on Railhead Surfaces
Y. Zhu, U. Olofsson and R. Nilsson

P.92 Optimization of the Planning and Control of Locomotive Wheel Machining
L.M. Vianna, L.A.S. Lopes and G.M.C. Viglioni

P.94 MXRAIL: A Numerical Tool for the Design and Maintenance of Rails subject to
Fatigue and Fracture, K. Dang Van

P.95 The Suitability of Using Accumulated Plastic Strain to Assess the Damage at the
Rail-Wheel Interfaces, I.U. Wickramasinghe, D. Hargreaves and D. De Pellegrin

P.96 Squat Formation on Train Rails: Origination
M.J.M.M. Steenbergen

P.97 Squat Formation on Train Rails: Growth
M.J.M.M. Steenbergen
14.00-15.30: Chaired by: J.M. Goicolea and R.A.B. Calçada

**Dynamics of Railway Bridges**

Special session organised by J.M. Goicolea and R.A.B. Calçada

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**Modelling and Simulation of Railroad Vehicle Systems: Enhancements and Applications**, Special session organised by
A.A. Shabana, H. Sugiyama, K.E. Zaazaa and J.L. Escalona

P.26 Evaluation of the Admissible Longitudinal Compressive Forces by Means of Multibody Train Simulations, L. Cantone, D. Negretti and V. Vullo

P.27 Using the ERTMS Reference Laboratory for the Validation and Commissioning of New Lines

P.28 Analysis of Longitudinal Forces in Heavy and Long Trains
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P.29 Stochastic Railway Dynamics: Modelling and Simulation
W.V. Wedig

P.30 Numerical Analysis of Derailed Vehicle Motion from Wheel-Sleeper Impacts
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P.31 Practical Use of a Vehicle Vibration Control System using Secondary Variable Vertical Dampers on a Sightseeing Train
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16.00-18.00: Chaired by: A.A. Shabana, H. Sugiyama and J.L. Escalona

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P.33 Modal Vibration Characteristics of Flexural Vibrations in Railway Vehicle Cabodies, T. Tomioka, T. Takigami and K. Aida

P.34 Enhanced Vehicle-Track Modelling: Methods, Models and Results
I. Kaiser


P.36 Railway Composite Multifunction Structures: An Innovative Numerical Methodology to Evaluate Performance and Requirements, P. Pantaleone

P.37 The Use of a Displacement-Dependent Rubber Bush to Prevent Bending Vibration of a Cabody
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P.38 Finite Element Simulation of the Quasi-Static Homologation Procedure for Prestressed Concrete Sleepers
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Room C

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P.98 Rail Wear: Understanding the Effect of Third Body Materials
   C. Hardwick, R. Lewis, D.T. Eadie and A. Rovira
P.99 Wheel Wear Predictions and Analyses of High-Speed Trains
   X.C. Jin, S.G. Sun and Q. Li
P.100 Wear Modelling in Railway Vehicles: Development and Implementation of an
      Innovative Model for the Prediction of the Wheel Profile Evolution due to Wear
      J. Auciello, M. Ignesti, L. Marini, E. Meli, A. Rindi and P. Toni

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Special session organised by E. Kassa and V. Markine
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P.136 Simulation of Train-Turnout Interaction and Validation using Field
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P.137 Field Experimental Studies of Railway Switches and Crossings
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P.138 Modelling Turnout Behaviour when Achieving a Neutral Temperature
   T. Arts, V.L. Markine and I.Y. Shevtsov
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08.30-10.30: Chaired by: C. Vale and A. Bracciali

INVITED LECTURE

   A. Bracciali

Track Condition Monitoring and Maintenance
Special session organised by C. Vale and A. Bracciali

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P.48 Predictive Railway Maintenance based on Statistical Analysis of Track Geometric Parameters, P. Insa, P. Salvador and J. Inarejos
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INVITED LECTURE

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Modelling and Simulation Techniques in Railway Dynamics for Virtual Homologation, Special session organised by
   B. Suarez and A. Facchinetti

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P.71 Reliable Stress Predictions for the Design of High Speed Trains
   S.S. Ding, L.F. Jin, M. Gong, A.Q. Tian and Z. Zhang
P.72 Experience with the Testing of Railway Vehicles according to the European Standards, J. Capek and Z. Malkovský
P.73 Middle-Frequency Wheel-Rail Contact Forces of High Speed Trains and the Validation of a Model with Field Measurements, X.C. Jin
P.74 Mesh Sensitivity Analysis in the Design of High Speed Trains
   A.Q. Tian, L.F. Jin, M. Gong, S.S. Ding and Z. Zhang
P.75 The Influence of Modelling of the Suspension Components on the Virtual Homologation of a Railway Vehicle, L. Mazzola, S. Alfi and S. Bruni

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P.77 The Influence of the Inter-Vehicle Suspension on the High Speed Electric Multiple Unit, Y. Wang, C.H. Huang, H.J. Kang, X.W. Song and J.Y. Guo
P.78 SiPESC Based Optimization for the Design of High Speed Trains
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P.79 A Dynamic Study of a High Speed Electric Multiple Unit Based on a Flexible Car Body, P.B. Wu, Y.L. Shan, H.C. Wu and J. Zeng
P.80 Numerical Studies of Rivets in the Design of a High Speed Train
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B. Blakeley and M. Lugg

P.52 A Mathematical Model for Railway Track Settlement
A. Chudzikiewicz, J. Drozdziel, B. Sowinski and A. Szulczyk

P.53 Modelling the Railway Track Infrastructure Variability for Maintenance Operations Optimization
N. Rhayma, Ph. Bressolette, P. Breul and S. Costa D'Aguiar

P.54 Heavy Rail Maintenance Machinery and System Innovations: The Technical, Procedural and Human Challenges Posed by Their Introduction and Piloting within the United Kingdom, B. Counter, A. Abutair, A. Franklin and D. Tann

**Non-Intrusive Inspection and Data Analysis for Predictive Maintenance**
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S.G. Cao, R.L. Chen and H.L. Tan

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P.83 Genetic Algorithms for Optimization of Railway Track Maintenance and Renewal Activities, H. Guler, C. Hosgor, Y. Yavuz, M. Kurkuoglu and V. Isler

P.84 Detection of Bolt Tightness of Fish-plated Joints using Axle Box Acceleration
Z. Li, M. Oregui, R. Carroll, S. Li and J. Moraal

P.85 Maintenance Performance Indicators for Railway Infrastructure Management
C. Stenström, A. Parida and D. Galar

P.86 Ultrasonic Testing of Hollow Axles with a Conical Rotation Scanner Phased Array Probe, U. Völz, R. Boehm, T. Heckel and W. Spruch

P.87 Fatigue Crack Growth in Railway Steel
D.F.C. Peixoto, P.M.S.T. de Castro and L.A.A. Ferreira

P.88 A Method of Measurement for the Diameter of Wheel Sets using Encoders
J. Kosmol and A. Kolka

P.89 Virtual Maintenance Laboratory (VirMaLab): A Modelling Approach for Optimizing Maintenance Strategies, L. Bouillaut, P. Aknin, I. Ayadi, S. Bondeux

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B. Indraratna, S. Nimbalkar and C. Rujikiatkamjorn

Trackbed Assessment and Improvement
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P.140 Measurement of the Magnitude of the Contact Area between Under Sleeper Pads and Ballast Bed Aggregates, L. Hornícek
P.141 Three-Dimensional Finite Element Analysis of Sleeper Vibration with the Influence of Ballast, H. Sakai and A. Aikawa
P.142 Design of a Cover Element for Slab Track Systems
A. Andreatta, Y. Theiner, J. Feix, G. Hofstetter, M. Kowalski and S. Knittel
P.143 The Effect of Under-Sleeper Pads on Trackbed Deterioration Rate
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S.D. Iwnicki and A.J. Bevan

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P.144 The Influence of Wheelflats on the Railway Track Dynamic Response in a Time-Domain Model, P. Fesharakifard, A. Dequidt and T. Tison
P.145 Topographic Modelling of a Railway Track using a Global Navigation Satellite System
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P.146 Selected Numerical Calculations for a Reinforced Track Substructure Subject to Various Static and Dynamic Loads, J. Kukulski
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M. Sacchi, L. Ascari, S. Cagnoni, A. Piazzi and D. Spagnoletti
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P.176 A New Approach to the Assessment of the Unbalance Produced by Railway Networks, J. de D. Sanz Bobi and R. Loiero

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P.56 A Study of the Steering Ability Index for Railway Vehicles
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P.57 Stabilization of Single Axle Truck Hunting Motion using a Gyroscopic Damper with a Gravitational Restoring Mechanism
S.P. Lin, D. Tomimatsu, K. Nishimura, H. Yabuno and Y. Suda
P.59 Mechanical Semi-Active Control for Radial Steering Curving of Railway Vehicles, H. Wang and G. Shen
P.60 Optimisation of Railway Polynomial Transition Curves: A Method and Results
K. Zboinski and P. Woznica

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11.00-12.30: Chaired by: K. Zboinski and S. Iwnicki

P.61 A Comparative Study of Two Different Anti-hunting Modes for High-Speed Bogies, M.W. Piao, S.L. Liang, W.G. Kong, Z.G. Fang and W.Z. Zhao
P.62 Research on Linear and Nonlinear Stability of Wheelsets with Primary Suspension, H. Dong, J. Zeng, Y. Wang, R. Luo and Z.P. Yang
P.63 Roller Rig Implementation of Active Wheelset Steering
J. Kalivoda and P. Bauer
P.64 Research on the Swaying Phenomenon of the High-Speed Electric Multiple Unit
P. Luo, J. Zeng, H.Y. Dai and W.X. Teng
P.65 Dynamic Characteristics of a New Guiding System
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L.4 Dynamic Effects Induced by High Speed Traffic on Rail Bridges
R. Delgado and R. Calçada

Vibration Analysis of Train-Bridge Time-Varying Systems and Their Application
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P.148 Mechanical Performance of Heavy Haul Railway Bridges Retrofitted using External Prestressing CFRP Tendons, F. Xu, L.H. Xu, H. Zeng and J. Ding
P.149 Coupled Vibration Analysis of a Train-Rail-Bridge System Based on Multi-Body Dynamics, Z.J. Chen, H.P. Zhu, Z.Q. Qian, J. Li and H.Y. Cao

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P.131 New Design Criteria for Railway Infrastructure: Application to a Spanish High Speed Line, I. Gallego, S. Sanchez-Cambronero, A. Rivas and E. Laguna
P.132 A Comparative Analysis of Railway Ballast
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P.134 Non Destructive Tests for Evaluation of Railway Platforms: Application of Ground Penetrating Radar, S. Fontul, E. Fortunato, F. De Chiara and A. Paixão
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L.7  The Dynamics of Foundations for High Speed Lines on Soft Soils
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P.109 Estimation of Parameters for Soil Vibration Caused by Railway Traffic
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P.110 The Influence of Subgrade Subsidence on Train Track Dynamic Interaction
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P.111 Dynamic Effects in Bernoulli-Euler Beams subject to a Moving Load with Variable Speed, P. Bogacz and K. Frischmuth

P.112 The Response of a Double-Beam on a Nonlinear Foundation arising from a Moving Load, Z. Hryniewicz and P. Koziol

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P.113 Phase Anticipating in Two Forced Self-Sustained Oscillators
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P.114 Moving Loads on a Visco-Elastically Supported Beam with Localized Disturbances, Z. Dimitrovová

P.115 Railway Traffic Effects on Structures and the Environment
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Special session organised by J.E. Abdalla Filho and T. Mazilu
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P.102 The Effect of the R-Value on the Lifetime of Cracked Head-Hardened Steel Rails for Subways, H.P. Rossmanith and J. Broger

P.103 Criteria for Ballast Flight Initiation Induced by High Speed Trains

P.104 Railway Vehicle-Bridge Interaction Considering Wheel-Rail Contact, Track Irregularities and Speed Variations, L.F.M. Beghetto and J.E. Abdalla Filho

P.105 Evaluating the Performance of Three Dimensional Finite Element Modelling of High-Speed Trains

P.106 Development of a Vehicle Guide Device for use on a Ballasted Track
M. Kusuda

P.107 The Influence of Track Stiffness on the Measurement of the Wheel Rail Contact Force, A. Bracciali, L. Di Benedetto, F. Piccioli and M. Cavalletti

P.108 Dynamic Behaviour of Reinforced Concrete Floating Slabs
P. Carrazedo, J.T. Carvalho and A.R. Takeuti

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J. Pagenkopf, M. Fischer, S. Ehrenberger and H. Dittus

P.167 Technology Assessment in the High-Speed Train Manufacturing Industry: Evidence from a Case Study
S. Martins Moretto, A. Pastrana Palma and A. Brandão Moniz

P.168 The Potential for Passenger Rail Transportation in the Republic of Serbia
Z. Popovic, L. Lazarevic and L. Puzavac


P.170 Economic Analysis for Rail Projects using Fuzzy Set Theory
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Special session organised by K. Zboinski and S. Iwnicki

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P.68  How to Find a Compromise between Track Friendliness and the Ability to Run at High Speed
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P.69  Computer Aided Design for Spatial Railway Transition Curves
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P.183 Advanced Diagnostics for a Position Control System of the Pantographs of Tilting Trains
      D. Bolognese, D. Ferrara, G. Jacazio and M. Sorli

P.184 The Infrastructure Costs of New Tracks for Tilting Trains compared with Non-Tilting Trains
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P.178 Algorithms for Embedded Anti-Collision Devices for Rolling Stock Safety Tasks
A. Levchenkov, M. Gorobetz, P. Balckars and I. Alps

P.179 Operational and Technical Testing of the European Train Control System
L. Ebrecht, M. Meyer zu Hörste and K. Lemmer

P.180 Development of a Train Approach Alarm System with GPS-Linked Mobile Phones
Y. Haranou

P.181 Finding a Real Passenger Path in a Complex Transit Network Using a Smart Card Record
J. Min, J. Park, S. Oh and M. Sohn

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V. Pujol Baldellou, J. Tomas Acosta, C. Ramos Moreno
Á.C. Aparicio Bengoechea and G. Ramos Schneider

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E. Ginelli and L. Castiglioni

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Special session organised by M. Matos Neves and P. Koziol

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P. Lopes, P. Alves Costa, R. Calçada and A. Silva Cardoso

P.118 On the Modelling of Elastomeric Isolators to Predict the Attenuation of Track Vibration
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P.119 Wavelet-Based Analysis of a Multilayered Foundation subject to a Moving Load Using Generalized Coiflets
P. Koziol and M.M. Neves

P.120 The Wavelet Finite Element Analysis of a Beam subject to a Moving Load
M. Musuva and C. Mares

P.121 Efficiency of Ballast Mats for the Reduction of Vibrations Induced by Traffic: A Parametric Study
P. Alves Costa, P. Lopes, R. Calçada and A. Silva Cardoso

P.122 Viscoelastic Layer under Moving Load: Vibration Response using a Coiflet Expansion and the Finite Element Method
M.M. Neves and P. Koziol

P.123 A Time Domain Boundary Element-Finite Element Coupling Approach based on the Finite Element Implicit Green's Functions for Induced Vibrations from High-Speed Trains
A. Romero, J. Maestre, J. Dominguez and P. Galvín

P.124 A Comparison of Environmental Vibratory Effects of Railway Rolling Stock using a Compound Multibody-Finite Element Model
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