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An investigation of rail corrugation with a coupled, flexible, rotating wheelset, a flexible track and a non-steady contact model

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CM2009



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8th International Conference on
Contact Mechanics
and Wear of
Rail/Wheel Systems

GENERAL INFORMATION

www.cm2009.org

15th - 18th
September
2009
Firenze
ITALY

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**Centro Sviluppo
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Objective

CM2009 Conference was focused on the phenomena occurring between wheel and rail having origin in their contact area

A high number of papers (149) were presented about:

- fundamental studies in wheel/rail contact mechanics and material behavior
- fundamental studies wheel/rail friction
- damage of wheels and rails
- airborne and groundborne vibration and noise
- complementary studies on wheel and rail damage
- feedback from service: case studies
- "new" materials for wheels and rails
- management of the wheel/rail interface
- measurement and simulation of wheel/rail contact
- vehicle/track interaction studies
- diagnostics of vehicle/track interaction

Venue

The CM2009 Conference was held at Palazzo Degli Affari, Firenze, Italy, in front of the main railway station.

Proceedings

The proceedings of the Conference were distributed in printed format (17x24 cm paperback, 3 volumes, black and white, ISBN 978-88-904370-0-7).

Reprints are available from the editor (AB Editore) that is reachable at the address info@cm2009.org

Proceedings were also distributed on USB memory stick, available until sell-out. Please contact info@cm2009.org for further information

Publication on International Journals

The authors were asked to submit a specific version to be published in the International Journal "Wear" after the Conference. Other agreements with high level International Journals are in progress.

Further info can be obtained at info@cm2009.org

Web resources

The website www.cm2009.org contains a repository for conference photographs and a blog that we invite you to visit and to contribute to.

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CM2009 Organizing Committee

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8th International Conference on Contact
Mechanics and Wear of Rail/Wheel Systems
Firenze, 15-18.9.2009

CM2009

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Wednesday 16 September 2009 - MORNING SESSIONS

PLENARY ROOM (1st floor)

PARALLEL 1 (3rd floor)

PARALLEL 2 (3rd floor)

SESSION 01 Development, selection and testing of rail steels

SESSION 02 Monitoring and maintenance of wheel and rail damage

SESSION 03 Rail corrugation and short-wave irregularities

CHAIRMAN: JOHN COOKSON

CHAIRMAN: ROB DWYER-JOYCE

CHAIRMAN: XUESONG JIN

S06-Carroll
R. Carroll, J. Jaiswal, P. Pointner
Rail grade selection, the degradation approach

S10-Enblom
R. Enblom, S. Stichel
Industrial implementation of novel railway wheel damage prediction procedures

S01-Ciavarella
M. Ciavarella, L. Afferrante
Recent progress on railways corrugation

S07-Folgarait
P. Folgarait, A. Saccocci, F. Crobu, R. Porta, E. Petrone, R. Bucci, M. Raspolli
Performance-driven integrated thermal-microstructural-mechanical approach for top-edge rail production processes

S03-Kabo
E. Kabo, R. Enblom, A. Ekberg
Assessing risks of subsurface initiated rolling contact fatigue from field measurements

S09-Xie
G. Xie, S. Iwnicki, P. Vila, L. Baeza
An investigation of rail corrugation with a coupled, flexible, rotating wheelset, a flexible track and a non-steady contact model

S07-Saccocci
A. Saccocci, P. Folgarait
Metallurgical design of high-strength bainitic steels for rails

S03-Sandstrom
J. Sandström, J. De Maré
Probability of subsurface fatigue initiation in rolling contact

S03-Saulot
A. Saulot, S. Descartes, L. Baillel, Y. Berthier
Curved track corrugation: from tribological observations to numerical modelling

S01-Zapata
D. Zapata, J. Jaramillo, A. Toro
Rolling contact and adhesive wear of bainitic and pearlitic steels

S11-Magnus
D.L. Magnus, T.H. O'Brien
Optimization of wheel and rail performance through continuous condition-based monitoring

S11-Molodova
M. Molodova, Z. Li, R. Dollevoet
Simulation of dynamic responses of vehicle-track system for detection of track short wave defects

SESSION 04 Wheel profiles: design and evolution

SESSION 05 Development, selection and testing of rail and wheel steels

SESSION 06 Modelling of the wheel/rail contact

CHAIRMAN: STEFANO BRUNI

CHAIRMAN: GIORGIO DONZELLA

CHAIRMAN: ROB DWYER-JOYCE

S09-Polach
O. Polach
Wheel profile design for the targeted conicity and a wide contact spreading

S01-Ahlstrom1
J. Ahlström, M. Schilke, B. Karlsson
Monotonic and cyclic deformation of medium and high strength rail steels

S10-Li
W. Li, G. Xiao, Z. Wen, X. Xiao, X. Jin
Plastic deformation of curved rail at rail weld caused by train-track dynamic interaction

S10-Cui
D. Cui, L. Li, X. Jin, X. Li
Optimizing design of wheel profiles based on weighed wheel/rail gap

S01-Franklin
F.J. Franklin, A. Gahlot, D.I. Fletcher, J.E. Garnham, C. Davis
Three-dimensional modelling of rail steel microstructure and crack growth

S01-Tanaka
T. Tanaka, B. Leban, T. Kubo, Y. Saito, M. Pau, H. Cheng, M. Ishida, A. Namura
Assessment of accuracy of real contact area observation in contact between rough surfaces

S10-Gerlici
J. Gerlici, T. Lack
Railway wheel profile development based on the geometric characteristics shapes

S07-Mutton
P.J. Mutton, D. Welsby, E. Alvarez
Wear and rolling contact fatigue behaviour of heat-treated eutectoid and hypereutectoid rail steels under high axle load conditions

S01-Mazzù
A. Mazzù, G. Donzella, M. Faccoli, C. Petrogalli, R. Roberti
Progressive damage assessment in the near-surface layer of railway wheel-rail couple under cyclic contact

S10-Pombo
J.C. Pombo, J. Ambrósio, M. Pereira, R. Lewis, R. Dwyer-Joyce, C. Ariaud, N. Kuka
Development of a wear prediction tool for steel railway wheels

S01-Garnham
J.E. Garnham, C.L. Davis
Very early stage rolling contact fatigue crack growth in pearlitic rail steels

S10-Bozzone
M. Bozzone, E. Pennestri, P. Salvini
A compliance based method for wheel-rail contact analysis

S09-Li
X. Li, X. Jin, D. Hu, D. Cui, W. Zhang
A new integrated model to predict wheel profile evolution due to wear

S01-Zhong
W. Zhong, W. Wang, Z. Li, Q. Liu, Z. Zhou
Study on growth behavior of fatigue crack of U75V and U71Mn rail

S01-Vollebregt
E.A.H. Vollebregt
Refinement of Kalker's Rolling Contact Model

Wednesday 16 September 2009 - AFTERNOON SESSIONS

PLENARY ROOM (1st floor)

PARALLEL 1 (3rd floor)

PARALLEL 2 (3rd floor)

SESSION 07

The effect of water and contaminants on wheel/rail traction

CHAIRMAN: STANISŁAW BODGAŃSKI

S02-Lewis2

S.R. Lewis, R. Lewis, U. Olofsson, D. Eadie, J. Cotter, X. Lu

Effect of humidity, temperature and railhead contamination on the performance of friction modifiers: pin-on-disk study

SESSION 08

Development, selection and testing of rail and wheel steels

CHAIRMAN: MICHAEL LUKE

S07-Cvetkovski

K. Cvetkovski, J. Ahlström, B. Karlsson

Monotonic and cyclic deformation of a high silicon pearlitic wheel steels

SESSION 09

Contact conditions in switches, crossings and tight curves

CHAIRMAN: PETER POINTNER

S10-Johansson

A. Johansson, B. Pålsson, M. Ekh, J. Nielsen, M.K.A. Ander, J. Brouzoulis, E. Kassa

Simulation of wheel-rail contact and damage in switches & crossings

S02-AriasCuevas

O. Arias-Cuevas, Z. Li, R. Lewis

A laboratory investigation of the influence of the particle size and slip during sanding on the adhesion and wear in the wheel-rail contact

S01-Brunel

J.F. Brunel, E. Charkaluk, P. Dufrénoy, F. Demilly

Methodology for the analysis of rolling contact fatigue of railways wheels and comparison of different steel grades

S09-Pletz

M. Pletz, W. Daves, F.D. Fischer, H. Ossberge

A dynamical wheel set - crossing model regarding impact, sliding and deformation.

S01-Tomberger

C. Tomberger, P. Dietmaier, W. Sextro, K. Six
Friction in wheel-rail contact: a model comprising interfacial fluids, surface roughness and temperature

S01-Hernandez

F.C. Robles Hernandez, S. Kalay

Properties and microstructure of high performance wheels

S10-Haba

A. Haba, J. Zelenka, M. Kohout

Experimental and theoretical analysis of wheel-rail contact in the course of passing over turnout frog

S02-Nakahara

T. Nakahara, K.S. Baek, H. Chen, M. Ishida
Relationship between surface oxide layer and transient traction characteristics for two steel rollers under unlubricated and water lubricated conditions

S07-Hernandez

F.C. Robles Hernandez, S. Kalay, R. Ordoñez

Oliveres, C.I. Garcia, A. DeArdo
Development of the new rail steels for the 21st century

S08-Kohout

M. Kohout, J. Zelenka, A. Haba

Studies of wheel-rail contact conditions in curves of small radius

S02-Chen

H. Chen, M. Hishida, K.S. Beak, T. Nakahara, B. Leban, M. Pau

Estimation of wheel/rail adhesion under wet condition with measured boundary friction coefficient and real contact area

S09-Hernandez

F.C. Robles Hernandez, K. Gonzales, S.

Anankitpaiboon, N.G. Demas, A.A. Polycarpou

Wear performance of premium rail steels

S09-Suda

Y. Suda, M. Nishina, H. Komine, T. Tsuji, S. Lin, T. Miyamoto, H. Doi, H. Chen, H. Sugiyama, Y. Tani

Measurements and analyses of wheel/rail contact geometry in tight curving using test track

SESSION 10

Rail grinding and maintenance strategies

CHAIRMAN: PETER MUTTON

S08-Wu

H. Wu, S. Kalay, K. Hou, R. Thompson

Management of wheel/rail contact interface in heavy haul operations

SESSION 11

Rail corrugation: known and novel treatments

CHAIRMAN: AKIRA MATSUMOTO

S08-Ishida

M. Ishida, T. Ban, S. Fukagai

Friction moderating system for preventing low rail corrugations in sharp curves

SESSION 12

Fundamental contact mechanics

CHAIRMAN: ROGER LUNDÉN

S09-Myslinski

A. Myslinski, A. Chudzikiewicz

Thermoelastic wheel - rail contact problem with elastic graded materials

S11-Bredif

P. Bredif, J. Plu, C. Royer, C. Poidevin, P. Pouligny

Rail restoration lifetime on high speed line

S04-Wu

T. Wu

Effects on rail corrugation growth of rail vibration absorber/damper

S09-Zhao

X. Zhao, Z. Li, R. Dollevoet

Solution of the wheel-rail rolling contact in elasticity and elasto-plasticity using a transient finite element model

S08-Heyder

R. Heyder, T. Hempe

Maintenance strategies and material concepts to control rolling contact fatigue of rails

S03-Croft

B.E. Croft, C.J.C. Jones, D.J. Thompson

The effect of rail dampers on roughness growth rates with multiple wear mechanisms, non-Hertzian contact and velocity dependent friction

S09-Wu

L. Wu, Z. Wen, W. Li, W. Zhang, X. Jin

Thermo-elastic-plastic finite element analysis of wheel/rail sliding contact

S08-Zacher

M. Zacher

Prediction of gauge corner cracking in rails for rail maintenance

S03-Batten

R. Batten, P. Bellette, P. Meehan, R. Horwood, W. Daniel

Field and theoretical investigation of the mechanism of corrugation wavelength fixation under speed variation

S09-Wen

Z. Wen, L. Wu, W. Li, X. Jin, M. Zhu

Three-dimensional elastic-plastic stress analysis of wheel-rail rolling contact

Thursday 17 September 2009 - MORNING SESSIONS

PLENARY ROOM (1st floor)

PARALLEL 1 (3rd floor)

PARALLEL 2 (3rd floor)

	SESSION 13 Approaches to modelling wear and rolling contact fatigue	SESSION 14 Wheel flats and out-of-roundness	SESSION 15 Measurement and effects of wheel/rail contact conditions
8.40	CHAIRMAN: STUART GRASSIE	CHAIRMAN: PAUL MEEHAN	CHAIRMAN: DAVID FLETCHER
9.00	S10-Dirks B. Dirks, R. Enblom Prediction model for wheel profile wear and rolling contact fatigue	S10-Corradi R. Corradi, A. Facchinetti, L. Mazzola, K. Lipp, U. May A methodology for estimating rolling contact fatigue damage in urban rail transport systems	S09-DwyerJoice2 R.S. Dwyer-Joyce, R. Lewis, C. Yao, J. Zhang, B.W. Drinkwater An approach for track mounted measurement of wheel rail contact using an ultrasonic array
9.20	S02-Tunna J. Tunna, J. Sinclair, J. Perez The development of a wheel wear and rolling contact fatigue model	S03-Dhardivilliers W. D'Hardivilliers Studies of flattenings located on the running surface of the wheel	S02-Wang W. Wang, P. Shen, J. Song, J. Guo, Q.Y. Liu, Z.R. Zhou Study on the adhesion behaviour of wheel/rail under dry and water conditions
9.40	S07-Stock R. Stock, R. Pippin Rcf and wear in theory and practice - the influence of rail grade on wear and RCF	S09-DiGialleonardo E. Di Gialleonardo, F. Braghin, S. Bruni Effect of wheel defects and out of roundness on dynamic loads at wheel-rail interface	S11-Girardi L. Girardi, J. Plu, B. Blakeley, P. Bredif, C. Davis, M. Lugg, M. Papaalias, C. Roberts Innotrack SP4.4 - Detection of rolling contact fatigue in rails using electromagnetic and ultrasonic phased-array inspection technique
10.00	S06-Pointner P. Pointner Functions for wear and RCF	S03-Kwon S.J. Kwon, D.H. Lee, J.W. Seo, W. You Damage evaluation of wheel tread using flat generation and replication test	S02-Jaramillo J. Jaramillo, D. Zapata, M. Palacio, A. Toro Effect of lubrication on wear and traction coefficient in a simulated rail/wheel contact

	SESSION 16 Rail corrugation measurement and control	SESSION 17 Traction, friction and creep measurement and modification	SESSION 18 Rolling contact fatigue: modelling and control
10.30	CHAIRMAN: YOSHIHIRO SUDA	CHAIRMAN: MAKOTO ISHIDA	CHAIRMAN: ANDERS EKBERG
10.50	S03-Spannar J. Spännar Measured rail corrugation growth	S02-Lewis1 S.R. Lewis, R. Lewis An alternative method for the assessment of railhead traction	S01-Bogdanski S. Bogdanski, M. Pietrzyk The behaviour of squat-type cracks under quasi-static and dynamic loading
11.10	S11-Matsumoto A. Matsumoto, H. Tsunashima, T. Kojima Detection methods of rail corrugation from vibration or noise in passenger cabin	S01-Doi H. Doi, T. Miyamoto, Y. Nishiyama, S. Ohe, H. Kamachi A new experimental device to investigate creep forces between wheel and rail	S09-Six K. Six The influence of the local slip distribution on the development of rolling contact fatigue in the wheel/rail contact of railway vehicles
11.30	S11-Lee J.S. Lee, S. Choi, S.S. Kim, C. Park Identifying the characteristics of high-speed railway by an on-board measurement of the noise and vibration from the wheel and railway interaction	S02-Bosso N. Bosso, A. Gugliotta, A. Somà, M. Spiryagin Methodology for the determination of wheel-roller friction coefficient on 1/5 scaled test rig	S01-Daves W. Daves, W. Yao, F.D. Fischer Surface deformation and crack initiation in wheel rail contact
11.50	S08-Chestney M. Chestney, N. Dadkah, D. Eadie The effect of top of rail friction control on a european passenger system: the Heathrow express experience	S10-Adachi M. Adachi, A. Matsumoto Improvement of running performance by modification of wheel/rail contact condition	S10-Markine V.L. Markine, M.J.M.M. Steenberg, I.Y. Shevtsov Combating RCF on switch points by tuning elastic track properties
12.10	S10-Kurzeck B. Kurzeck Combined friction induced oscillations of wheelset and track while curving of metros and their influence on corrugation	S02-Magel E. Magel, Y. Liu Study of friction – Measurement, analysis and practical implications for the wheel/rail contact	S01-Datsyshyn O. Datsyshyn, V. Panasyuk, A. Glazov The model of fatigue contact damages formation in rolling bodies and estimation of their durability

Thursday 17 September 2009 - AFTERNOON SESSIONS

PLENARY ROOM (1st floor)

PARALLEL 1 (3rd floor)

PARALLEL 2 (3rd floor)

	SESSION 19 Surface defects on wheels and rails (1)	SESSION 20 Tribology of wheel flange/gauge face contact	SESSION 21 Wheel/rail noise
	CHAIRMAN: ERIC MAGEL	CHAIRMAN: FRANCIS FRANKLIN	CHAIRMAN: MATTHIAS PIPPERT
13.40	S05-Dedmon <i>S. Dedmon, D. Stone, T. Snyder</i> A proposed mechanism for accelerated shelling of railroad wheels induced by the hyperbaric transformation of ice	S02-Descartes <i>S. Descartes, A. Saulot, C. Godeau, S. Bondeux, C. Dayot, Y. Berthier</i> Wheel flange / rail gauge contact lubrication: tribological investigations	S04-You <i>W. You, J. Park, H. Koh, H. Hur</i> A study on the characteristics of curving noise and wheel wear in subway system.
14.00	S03-Halama <i>R. Halama, R. Fajkoš, P. Matušek, P. Bábková, F. Fojtik, L. Václavek</i> Contact defects initiation in railroad wheels - Experience, experiments and modelling	S09-Jin <i>Y. Jin, M. Ishida, A. Namura</i> Experimental simulation and prediction of wear of wheel flange/rail gauge corner	S04-Brunel <i>J.F. Brunel, P. Dufrénoy, F. Demilly</i> Numerical approach for the attenuation of squeal noise of railway wheels in narrow curves
14.20	S03-Datsyshyn <i>O. Datsyshyn, A. Levus, A. Glazov, H. Marchenko</i> On some development features of pitting, spalling, cracking and dark-spot damages in rail steels under rolling contact	S08-Sone <i>Y. Sone, J. Suzumura, H. Koga, Y. Tamoto, H-o Yamazaki</i> Application of traction oil to the wheel/rail lubricant	S04-Gerlach <i>T. Gerlach, A. Brinkmann, C. Kemp-Lettkamp</i> Development of state of the art of systems for reducing the sound emission level of rolling noise and curve squealing noise
14.40	S03-Li1 <i>Z. Li, R. Dollevoet, M. Molodova, X. Zhao</i> The validation of some numerical predictions on squats growth	S08-Tietz <i>A. Tietz, K. Schnappenberger</i> Intelligent wheel flange lubrication for railway systems	S03-Nielsen <i>J.C.O. Nielsen, A. Ekberg</i> Acceptance criterion for rail roughness level spectrum based on assessment of rolling contact fatigue and rolling noise
15.00	S03-Grassie1 <i>S.L. Grassie, P. Summers, D. Fletcher</i> Squats and squat-type defects in rails	S09-DwyerJoyce1 <i>R.S. Dwyer-Joyce, C. Yao, R. Lewis</i> An ultrasonic sensor for monitoring wheel flange contact	S04-Quarz <i>V. Quarz, C. Klotz, T. Gerlach, A. Brinkmann, C. Kemp-Lettkamp</i> Acoustical structural optimization of railway running gears under consideration of the interaction in the wheel-rail-contact
15.20			

	SESSION 22 Wheel/rail interface policy and maintenance monitoring	SESSION 23 Rail maintenance: common and uncommon problems and treatments	SESSION 24 Wear models & railhead contamination
	CHAIRMAN: WILLIAM DANIEL	CHAIRMAN: SEMIH KALAY	CHAIRMAN: JOHAN AHLSTRÖM
15.50	S05-Paulsson <i>B. Paulsson, P. Pointner, J. Jaiswal, R. Carroll, G. Baumann, B. Ripke, J. Amore, A. Ekberg</i> An overview of wheel-rail interface related research in the European project INNTRACK including issues in technical and economical validation	S08-Hartleben <i>D. Hartleben</i> Tasks for mobile railway machining and predestined machining methods	S02-Sundh <i>J. Sundh, U. Olofsson</i> Relating contact temperature and wear transitions in a wheel-rail contact
16.10	S03-Smith <i>L. Smith, R. Allen, J. Jayswal</i> A scientific approach to minimum actions	S08-Taubert <i>M. Taubert, K. Von Dienst, A. Poeschel</i> High speed grinding preventative rail care	S01-Tountas <i>E. Tountas, A. Tudor, N. Sandu</i> A thermomechanical wear model for the metro wheel-rail contact
16.30	S10-Acquati <i>M. Acquati, E. Magel</i> Preliminary wheel/rail interface study: what benefits?	S04-Steenbergen <i>M.J.M.M. Steenbergen</i> Efficient long-term track design: energy flux optimisation	S02-Vuong <i>T. Vuong, P. Meehan, D.T. Eadie, K. Oldknow, D. Elvidge, P. Bellette, W. Daniel</i> Investigation of a transitional wear model for wear prediction and control in rolling contact
16.50	S10-Higashida <i>O. Higashida</i> Development of a new wheel tread profile and examination result in narrow-gauge lines	S03-Fischmeister <i>E. Fischmeister, H.P. Rossmanith, F. Loibnegger, H.N. Linsbauer, P. Mittermayr, A. Oberhauser</i> From Rail Surface Cracks to Rail Breaks – Recent Investigations and Results of Research at the Wiener Linien Metro System	S05-Olofsson <i>U. Olofsson</i> A study of airborne wear particles generated from the train traffic
17.10	S04-Pippert <i>M. Pippert</i> The political and economical relevance of rail noise abatement	S03-Grassie2 <i>S.L. Grassie, E. Fischmeister, A. Oberhauser</i> Rail breaks, rail grinding and rolling contact fatigue	S02-Suzumura <i>J. Suzumura, Y. Sone, A. Ishizaki, D. Yamashita, Y. Nakajima, M. Ishida</i> In-situ X-ray analysis of rail surface contamination
17.30			

Friday 18 September 2009 - MORNING SESSIONS

PLENARY ROOM (1st floor)

PARALLEL 1 (3rd floor)

PARALLEL 2 (3rd floor)

	SESSION 25 Vehicle dynamics and vehicle/track interaction	SESSION 26 Surface defects on wheels and rails (2)	SESSION 27 Friction modifier and its application
8.40	CHAIRMAN: JENS NIELSEN	CHAIRMAN: BIRGER KARLSSON	CHAIRMAN: ULF OLOFSSON
9.00	S10-Tournay H. Tournay The influence of wheel/rail interaction on loaded car hunting	S03-Li2 Z. Li, X. Zhao, R. Dollevoet The determination of a critical size for rail top surface defects to grow into squats	S05-Lewis R. Lewis, E.A. Gallardo, J. Cotter, D.T. Eadie The effect of friction modifiers on wheel/rail isolation
9.20	S10-Zakharov S.M. Zakharov, I.G. Goryacheva, D.Yu. Pogorelov, I.A. Zharov, S.N. Soshenkov, V.A. Simonov, V.N. Yasikov Computer-aided simulation of the influence of track and vehicle parameters on the wheel/rail interaction characteristics	S09-Sasaki T. Sasaki, O. Yaguchi, Y. Kobayashi Application of area detector type diffraction residuals stress measurement of shelling problem in railway tracks	S08-Stock R. Stock, D.T. Eadie, D. Elvidge, K. Oldknow Influencing rolling contact fatigue through top of rail friction modifier application- a full scale wheel rail test rig study
9.40	S10-Mazzola L. Mazzola, S. Alfi, S. Bruni Bogie design optimization to minimize wheel wear	S01-Kato T. Kato, A. Sugeta, E. Nakayama Investigation of influence factors on spalling property in railway wheel steel	S08-Kusuda M. Kusuda, Y. Yamaguchi, S. Fukagai The effect of friction modifiers on reducing lateral force and rail renewal cost in Shinkansen track
10.00	S10-Sun Y.Q. Sun, C. Cole, P. Boyd A numerical method using Vampire modelling for prediction of turnout curve wheel-rail wear	S09-Takahashi S. Takahashi, T. Kato, H. Suzuki, T. Sasaki Residual hoop stress evaluation of railway wheels	S02-Horst J.J. Horst, E.J.M. Hiensch Experimental evaluation of friction modifiers for integral network wheel/rail interface friction management

	SESSION 28 Rolling contact fatigue: influences and observations	SESSION 29 Vehicle dynamics and multi-body modelling	SESSION 30 Material behaviour: wear, plastic flow and fatigue
10.30	CHAIRMAN: SERGEY ZAKHAROV	CHAIRMAN: HARRY TOURNAY	CHAIRMAN: WERNER DAVES
10.50	S03-Mutton P.J. Mutton, M. Tan, P. Bartle, A. Kapoor The effect of severe head wear on rolling contact fatigue in heavy haul operations	S10-Cantone L. Cantone, D. Negretti, L. Vita, V. Vullo Effect of train longitudinal dynamics on wheel-rail forces	S01-Jaiswal J. Jaiswal, D. Wilcox An objective measurement of the microstructural damage resulting from rail wheel contact
11.10	S03-Cookson J.M. Cookson, P.J. Mutton The role of the environment in rolling contact fatigue cracking of rails	S10-Manashkin A. Manashkin, S. V. Myamlina, A.N. Pshinko, V.I. Prikhodko Simulation of wheelset movement in car dynamics problems	S01-Ahlstrom2 J. Ahlström, B. Karlsson Stiffness changes during fatigue of railway steels R8/R8T at ambient and subzero temperatures
11.30	S03-Matsuda H. Matsuda, Y. Satoh, Y. Kanematsu, K. Iwafuchi Effect of grease lubrication on wear and rolling contact fatigue of high rail	S10-Fisette P. Fisette, N. Docquier, L. Ganovski Tramway/track interaction: dynamic analysis and performance evaluation of an articulated bogie with independent wheels	S09-Brouzoulis J. Brouzoulis, P. Torstensson, R. Stock, M. Ekh Prediction of wear and plastic flow in rails - test rig results, model calibration and numerical prediction
11.50	S01-Kobayashi J. Kobayashi Experimental study on gauge corner crack of high rail in gentle curves	S09-Magheri S. Magheri, M. Malvezzi, E. Meli, A. Rindi An innovative wheel-rail contact model for multibody applications	S01-Vasic G. Vasic, F.J. Franklin, D.I. Fletcher Influence of partial slip and direction of traction on wear rate in wheel-rail contact
12.10	S08-Schoech W. Schoech, R. Heyder, R. Dollevoet Specific railhead profiles to control rolling contact fatigue - design and maintenance, the European approach	S09-Falomi S. Falomi, M. Malvezzi, E. Meli, M. Rinaldi Multibody modeling of railway vehicles: innovative algorithms for the detection of wheel-rail contact points	S09-Mandal1 + S09-Mandal2 N.K. Mandal, M. Dhanasekar, P. Boyd Elasto-plastic stress analysis of an IRJ with a loading below shakedown limit / Shakedown stress analysis of an IRJ

Friday 18 September 2009 - AFTERNOON SESSIONS

PLENARY ROOM (1st floor)

PARALLEL 1 (3rd floor)

PARALLEL 2 (3rd floor)

	SESSION 31 Design of railway axles	SESSION 32 Track and network design and monitoring	SESSION 33 Rail corrugation and vehicle / track dynamics
	CHAIRMAN: ROGER LEWIS	CHAIRMAN: DANIEL STONE	CHAIRMAN: PAUL MEEHAN
13.40	S10-Bruni <i>S. Bruni, R. Corradi, L. Mazzola</i> Wheel rail contact forces as input for optimal and robust axle design	S04-Kalivoda <i>M. Kalivoda, B. Knoll</i> Enhanced methods for the assessment of rolling noise and rail vibrations	S01-Pieringer <i>A. Pieringer, W. Kropp, D. Thompson</i> Investigation of the dynamic contact filter effect in vertical wheel/rail interaction using a 2D and a 3D non-Hertzian contact model
14.00	S05-Luke <i>M. Luke, I. Varfolomeev</i> Fracture mechanics assessment of crack propagation behaviour in railway axles	S04-Brugola <i>M. Brugola</i> Rail wear reduction using low vibration "embedded rail" system chosen for the tramway lines 2 and 3 in Florence-Italy	S01-Bellette <i>P.A. Bellette, P.A. Meehan, W.J. Daniel</i> Tangent track corrugation model validation with a two disk test rig
14.20	S05-Varfolomeev <i>I. Varfolomeev, M. Luke, M. Burdack</i> Fatigue and fretting fatigue behaviour of a railway axle steel A4T	S04-Mannara <i>G. Mannara, M. Autiero, N. Barbat, N. Ciancia, F. Devoto, S. Infante</i> Innovative MEMS accelerometric wireless network for dynamic investigations on railways: application on a subway tunnel of Naples	S08-Kanematsu <i>Y. Kanematsu, Y. Satoh, K. Iwafuchi</i> Influence of type of grinding stones on efficiency of rail grinding
14.40		S04-Panzeri <i>P. Panzeri, A. Bonaldi</i> An experimental numerical combined approach to forecast groundborne vibrations and noise due to trains in underground lines	
15.00			

