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Xie, G., Iwnicki, S., Vila, P. and Baeza, L.

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

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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.
### Wednesday 16 September 2009 - MORNING SESSIONS

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<td>S06-Carroll  R. Carroll, J. Jaiswal, P. Pointner  Rail grade selection, the degradation approach</td>
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<td>S01-Daves W. Daves, W. Yao, F.D. Fischer Surface deformation and crack initiation in wheel/rail contact</td>
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<td>S01-Datsyshyn O. Datsyshyn, U. Panasyuk, A. Glazov The model of fatigue contact damages formation in rolling bodies and estimation of their durability</td>
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**Surface defects on wheels and rails (1)**

- **Chairman:** ERIC MAGEL

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S. Dedmon, D. Stone, T. Snyder  
A proposed mechanism for accelerated shedding of railroad wheels induced by the hyperbaric transformation of ice |
| 14.00 | S03-Halama  
R. Halama, R. Fajkoš, P. Matušek, P. Băbălkiö, F. Fojtk, L. Václavek  
Contact defects initiation in railroad wheels - Experience, experiments and modelling |
| 14.20 | S03-Datsyshyn  
O. Datsyshyn, A. Levus, A. Glazov, H. Marchenko  
On some development features of pitting, spalling, cracking and dark-spot damages in rail steels under rolling contact |
| 15.00 | S03-Grassie  
S.L. Grassie, P. Summers, D. Fletcher  
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**Tribology of wheel flange/gauge contact**

- **Chairman:** FRANCIS FRANKLIN

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Y. Sone, J. Suzumura, H. Kaga, F. Tamoto, H-o Yamazaki  
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R.S. Dwyer-Joyce, C. Yao, R. Lewis  
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**Wheel/rail noise**

- **Chairman:** MATTHIAS PIPPERT

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W. You, J. Park, H. Koh, H. Hur  
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J.F. Brunel, P. Dufrénoy, F. Demilly  
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Z. Li, R. Dilleveet, M. Malodova, X. Zhao  
The validation of some numerical predictions on squats growth |
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V. Quarz, C. Klitz, T. Gerlach, A. Brinkmann, C. Kemp-Lettikamp  
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### SESSION 22
**Wheel/rail interface policy and maintenance monitoring**

- **Chairman:** WILLIAM DANIEL

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| 16.30 | S10-Aquati  
M. Aquati, E. Mogel  
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### SESSION 23
**Rail maintenance: common and uncommon problems and treatments**

- **Chairman:** SEMIH KALAY

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### SESSION 24
**Wear models & railhead contamination**

- **Chairman:** JOHAN AHLSTRÖM

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E. Tountas, A. Tudor, N. Sandu  
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T. Quarz, C. Klitz, T. Gerlach, A. Brinkmann, C. Kemp-Lettikamp  
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U. Olofsson  
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**Session 22 - Wheel/rail Interface Policy and Maintenance Monitoring**

- **Chairman:** WILLIAM DANIEL

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**Session 23 - Rail Maintenance: Common and Uncommon Problems and Treatments**

- **Chairman:** SEMIH KALAY

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M.J.M.M. Steenbergen  
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**Session 24 - Wear Models & Railhead Contamination**

- **Chairman:** JOHAN AHLSTRÖM

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#### S10-Tournay
H. Tournay
The influence of wheel/rail interaction on loaded car hunting

#### S03-1/2
Z. Li, X. Zhao, R. Dollevoet
The determination of a critical size for rail top surface defects to grow into squats

#### S05-Lewis
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#### 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 test rig study

### 9.20

#### S10-Mazzola
L. Mazzola, S. Alfì, S. Bruni
Bogie design optimization to minimize wheel wear

#### S01-Kato
T. Kato, A. Sugito, T. 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

### 9.40

#### 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

### 10.00

#### S10-Zakharev
Computer-aided simulation of the influence of track and vehicle parameters on the wheel/rail interaction characteristics

#### S01-Kato
T. Kato, A. Sugito, T. Nakayama
Investigation of influence factors on spalling property in railway wheel steel

#### S08-Stock
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### 11.00

#### S10-Mazzola
L. Mazzola, S. Alfì, S. Bruni
Bogie design optimization to minimize wheel wear

#### S10-Manashkin
A. Manashkin, S. V. Myamlin, A.N. Pshinko, V.I. Prikhotok
Simulation of wheelset movement in car dynamics problems

#### S01-Jaywal
J. Jaiwal, D. Wilcox
An objective measurement of the microstructural damage resulting from rail wheel contact

### 11.30

#### S03-Matsuda
H. Matsuda, Y. Saitoh, 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. Tortensson, R. Stock, M. Ekh
Prediction of wear and plastic flow in rails - test rig results, model calibration and numerical prediction

### 11.50

#### 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. Myamlin, A.N. Pshinko, V.I. Prikhotoko
Simulation of wheelset movement in car dynamics problems

#### S01-Kuboyashi
J. Kuboyashi
An innovative wheel-rail contact model for multibody applications

#### S11-Matsuda
H. Matsuda, Y. Saitoh, Y. Kanematsu, K. Iwafuchi
Effect of grease lubrication on wear and rolling contact fatigue on high rail in gentle curves

#### S09-Magheri
S. Magheri, M. Malvezzi, E. Meli, A. Rindi
Influence of partial slip and direction of traction on contact stress and plastic fatigue in wheel-rail contact

### 12.10

#### S03-Matsuda
H. Matsuda, Y. Saitoh, Y. Kanematsu, K. Iwafuchi
Effect of grease lubrication on wear and rolling contact fatigue of high rail

#### S09-Magheri
S. Magheri, M. Malvezzi, E. Meli, A. Rindi
An innovative wheel-rail contact model for multibody applications

#### S09-Falomi
S. Falomi, M. Malvezzi, E. Meli, M. Rinchi
Multibody algorithms for the detection of wheel-rail contact points

#### S09-Mandal1
N.K. Mandal, M. Dhonaker, P. Boyd
Elasto-plastic stress analysis of an IRJ with a loading below shakedown limit / Shakedown stress analysis of an IRJ

#### S09-Mandal2
N.K. Mandal, M. Dhonaker, P. Boyd
Elasto-plastic stress analysis of an IRJ with a loading below shakedown limit / Shakedown stress analysis of an IRJ
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<td>Track and network design and monitoring</td>
<td>Rail corrugation and vehicle / track dynamics</td>
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<td>S. Bruni, R. Corradi, L. Mazzola</td>
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<td>Enhanced methods for the assessment of rolling noise and rail vibrations</td>
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<td>Fracture mechanics assessment of crack propagation behaviour in railway axles</td>
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<td>Influence of type of grinding stones on efficiency of rail grinding</td>
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<td>An experimental numerical combined approach to forecast groundborne vibrations and noise due to trains in underground lines</td>
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